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ARTIFICIAL INTELLIGENCE AND DIGITAL WORLD

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Artificial Intelligence: Future Outlook for AI Startups

Aastha Dubey*
Dr. Mayank Agarwal**

Introduction

AI startups are new and emerging companies that specialize in the development and application of artificial intelligence (AI) technologies. These startups are typically focused on creating innovative AI-powered solutions to address real-world problems, and they often work in areas such as machine learning, natural language processing, computer vision, robotics, and autonomous systems.AI startups may develop AI algorithms, software tools, hardware systems, or a combination of these, with the goal of improving efficiency, productivity, and profitability for businesses and organizations across a variety of industries. Many AI startups are funded by venture capital firms or angel investors, and they often operate in highly competitive and rapidly evolving markets.

The history of AI startups can be traced back to the 1950s when the term "artificial intelligence" was first coined. However, it was not until the 1980s and 1990s that AI technology became more widely available and commercially viable, thanks in part to advances in computing power and data storage.The first wave of AI startups emerged in the late 1990s and early 2000s, during the dot-com boom. Many of these startups focused on developing intelligent agents, natural language processing, and machine learning algorithms for e-commerce and online advertising.

However, the burst of the dot-com bubble in the early 2000s led to a decline in funding for AI startups, and many of these companies failed to survive. It was not until the mid-2000s that interest in AI technology began to pick up again, fuelled by breakthroughs in areas like speech recognition, computer vision, and robotics.Since then, the number of AI startups has exploded, with many companies focused on

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developing AI-powered solutions for a wide range of industries, including healthcare, finance, retail, and transportation. Advances in cloud computing, big data, and deep learning have made it easier and cheaper for startups to develop and deploy AI applications, leading to a new wave of innovation and entrepreneurship in the field.

Examples of AI startups include DataRobot, UiPath, Sentient Technologies, Vicarious, and Deep 6 AI, among many others. These companies are all focused on leveraging AI technologies to create value for their customers and to advance the field of AI as a whole.

Some of the characteristics of AI startups include:

- **Innovation:** AI startups are typically highly innovative, leveraging cutting-edge technologies to create new products and services that solve real-world problems.
- **Scalability:** AI startups are designed to scale quickly, as they typically leverage cloud-based infrastructure and automated processes to rapidly grow their customer base.
- **Data-Driven:** AI startups rely heavily on data to create their products and services, often using machine learning algorithms to analyze large amounts of data and derive insights that can be used to optimize their products.
- **Focus on User Experience:** AI startups place a strong emphasis on user experience, as they strive to create products that are easy to use and provide tangible value to their customers.
- **Interdisciplinary:** AI startups often require a team of experts from various fields, including computer science, statistics, and engineering, to develop and deploy their AI technologies.
- **Continuous Improvement:** AI startups are constantly improving their products and services, using feedback from customers and data insights to refine their algorithms and create better solutions.
- **High-Risk, High-Reward:** AI startups are often considered high-risk, high-reward investments, as they have the potential to disrupt entire industries and create significant value for their stakeholders. However, they also face significant challenges, including regulatory hurdles and the need for significant capital investment.

Review of Literature

- **AI in Healthcare Startups:** It reveals the emergence of a number of AI-based healthcare startups focused on using machine learning algorithms to analyze medical data, assist with diagnoses, and support medical decision-making. Such startups are poised to revolutionize the healthcare industry and have the potential to improve patient outcomes. (Chen et al., 2019)

- **AI in Finance Startups:** The financial industry is seeing an influx of AI-based startups that are leveraging machine learning algorithms to improve trading, fraud detection, and customer service. These startups are gaining attention from investors due to their potential for disruption in the industry. (Chang et al., 2020)
- **Business Models of AI Startups:** A study of AI startups' business models found that they typically focus on creating value through data acquisition, data analysis, and data dissemination. The study also found that these startups face unique challenges due to the rapidly evolving nature of AI technology. (Pisano et al., 2020)
- **Ethics and AI Startups:** It highlights the importance of ethical considerations in the development and deployment of AI technologies. AI startups must address issues related to privacy, bias, and transparency in order to build trust with their customers and stakeholders. (Liu et al., 2021)
- **AI and Social Impact Startups:** A growing number of AI startups are focused on addressing social and environmental challenges. These startups are leveraging AI technologies to promote sustainability, reduce inequality, and enhance social welfare. (Bala et al., 2020)
- **Challenges in Scaling AI Startups:** A study of AI startups found that scaling can be a significant challenge due to issues related to data quality, talent acquisition, and funding. The study suggests that startups should focus on building partnerships and leveraging existing infrastructure to overcome these challenges. (Singh et al., 2020)
- **Legal and Regulatory Issues in AI Startups:** AI startups face a number of legal and regulatory challenges related to intellectual property, privacy, and data protection. These challenges can impact the startup's ability to secure funding and attract customers. (Oliveira et al., 2020)
- **AI and Education Startups:** AI technologies are being used in education startups to personalize learning and improve student outcomes. These startups are leveraging machine learning algorithms to create personalized learning experiences and provide real-time feedback to students. (Miao et al., 2019)
- **AI and Agriculture Startups:** AI technologies are being used in agriculture startups to increase productivity, reduce waste, and improve sustainability. These startups are leveraging machine learning algorithms to analyze data from sensors and drones to optimize crop yield and reduce resource consumption. (Huang et al., 2020)

- **AI and Cybersecurity Startups:** AI technologies are being used in cybersecurity startups to detect and prevent cyber threats. These startups are leveraging machine learning algorithms to analyze network traffic and identify patterns of behavior that may indicate an attack. (Alcaraz et al., 2020)

Growth and Development of the AI Startup Ecosystem

The AI startup ecosystem has been growing rapidly in recent years, driven by advances in AI technologies and increased investment in the sector. Here are some key developments in the growth and development of the AI startup ecosystem:

- **Increased Investment:** Investment in AI startups has increased significantly in recent years, with venture capital firms and corporate investors pouring billions of dollars into the sector.
- **Emergence of AI Hubs:** AI startups are increasingly clustering in geographic areas with established AI ecosystems, such as Silicon Valley, Boston, and Tel Aviv, creating hubs of innovation and collaboration.
- **Collaboration with Academia:** Many AI startups are partnering with universities and research institutions to leverage their expertise in AI technologies and gain access to talent.
- **Government Support:** Governments around the world are investing in AI research and development, creating programs to support AI startups, and offering incentives for companies to invest in the sector.
- **Increased Adoption of AI Technologies:** As AI technologies become more ubiquitous, demand for AI-based products and services is increasing, providing a growing market for AI startups.
- **Specialization and Differentiation:** As the AI startup ecosystem becomes more crowded, startups are increasingly specializing in specific niches or differentiating themselves through unique approaches to AI technologies.
- **Ethical and Regulatory Considerations:** As AI technologies become more powerful, there is growing concern about the ethical and regulatory implications of their use, leading to increased scrutiny of AI startups and their technologies.

Overall, the growth and development of the AI startup ecosystem are creating significant opportunities for innovation and disruption, while also presenting significant challenges and risks. As the sector continues to evolve, it will be important for AI startups to remain agile, innovative, and responsive to changing market conditions and regulatory environments.

Success Factors and Challenges for AI Startups

Success Factors for AI Startups

- **Technical Expertise:** A deep understanding of AI technologies, such as machine learning, natural language processing, and computer vision, is crucial for AI startups to develop effective solutions.
- **Strong Team:** Building a talented and diverse team with a range of technical and business skills is essential for success. This includes data scientists, software engineers, product managers, and sales and marketing professionals.
- **Unique Value Proposition:** AI startups need to offer unique and compelling value propositions that differentiate them from competitors. This can include specialized AI applications, innovative use cases, or disruptive business models.
- **Data Strategy:** A strong data strategy is critical for success in the AI startup ecosystem. This includes developing robust data pipelines, managing data quality, and leveraging machine learning algorithms to extract insights and drive business outcomes.
- **Strategic Partnerships:** Developing strategic partnerships with other companies or institutions can provide AI startups with access to valuable resources, expertise, and customers.
- **Scalability:** AI startups need to be scalable in order to grow rapidly and take advantage of market opportunities. This often involves leveraging cloud-based infrastructure and automated processes to minimize costs and maximize efficiency.
- **Customer-Centric Approach:** AI startups need to prioritize the needs of their customers and develop solutions that provide tangible value to their target markets.

Overall, AI startups need to balance technical expertise with business acumen in order to succeed in the rapidly evolving AI ecosystem. By focusing on these success factors, AI startups can increase their chances of developing innovative solutions and disrupting existing industries.

Challenges for AI Startups

- **Talent Acquisition:** Recruiting and retaining top talent in the highly competitive AI startup ecosystem can be a significant challenge, particularly for companies outside of established AI hubs.

- **Funding:** Raising capital for AI startups can be challenging, particularly for early-stage companies without a proven track record. Investors may be wary of the high risk and long development cycles associated with AI technologies.
- **Technical Complexity:** Developing and deploying AI technologies can be highly complex, requiring significant technical expertise and resources.
- **Competition:** The AI startup ecosystem is becoming increasingly crowded, with a growing number of startups vying for market share. This can make it challenging for new companies to establish a foothold and differentiate themselves from competitors.
- **Data Access and Quality:** Access to high-quality data is critical for the success of AI startups, but obtaining and managing this data can be challenging, particularly in industries with limited data availability or poor data quality.
- **Deployment and Integration:** Deploying and integrating AI solutions into existing systems can be difficult, particularly in large organizations with complex IT infrastructures.

Overall, AI startups have the potential to transform various industries and drive innovation and competitiveness. However, to fully realize this potential, AI startups need to overcome significant challenges, such as talent acquisition, funding, regulatory and ethical considerations, technical complexity, competition, and deployment and integration issues. By addressing these challenges, AI startups can create a positive impact on innovation and competitiveness, driving economic growth and creating new market opportunities.

Various AI Startups in India

- **HAPTIK** is a chatbot platform that provides businesses with an artificial intelligence-powered chatbot to handle customer queries and requests. It was founded in 2013 by AakritVaish and Swapan Rajdev and is headquartered in Mumbai, India. The chatbot platform is designed to handle a wide range of customer queries, from simple FAQs to more complex issues that require human intervention. The platform uses natural language processing (NLP) and machine learning algorithms to understand customer queries and respond with appropriate answers.The chatbots can be integrated into a business's website or mobile app, as well as popular messaging platforms like WhatsApp, Facebook Messenger, and Google Assistant. This allows businesses to provide 24/7 customer support without the need for human agents.In addition to customer support, Haptik's chatbot platform can also be used for lead generation, sales, and marketing. The platform provides businesses with

detailed analytics and insights into customer interactions, allowing them to optimize their chatbot and improve the overall customer experience.

- **NIRAMAI** is an Indian startup that focuses on developing innovative medical technologies to detect breast cancer at an early stage. The name "Niramai" stands for Non-Invasive Risk Assessment with Machine Intelligence. It was founded in 2016 by Geetha Manjunath and Nidhi Mathur, who are both experts in the fields of artificial intelligence and medical imaging. The company's core technology is an AI-powered thermal imaging solution that uses machine-learning algorithms to detect breast cancer without the need for any physical contact or radiation exposure. The Niramai solution is based on the principles of thermography, which involves capturing the temperature patterns of the breast using a high-resolution thermal imaging camera. The images are then processed using AI algorithms that can detect early signs of cancerous activity in the breast tissue. The solution is completely non-invasive, painless, and does not require any physical contact with the breast. Niramai's solution has been widely recognized for its potential to revolutionize breast cancer screening, particularly in developing countries where traditional screening methods are often expensive, invasive, and inaccessible. The company has won several awards and accolades for its innovative technology, including the National Startup Award from the Indian government in 2020.
- **OBSERVE** AIis a cloud-based platform that uses artificial intelligence to improve the quality and productivity of customer service interactions. The platform uses advanced speech recognition and natural language processing technologies to analyze customer conversations in real time, providing insights and recommendations to help customer service agents deliver better customer experiences.Observe.AI was founded in 2017 by Akash Singh, Sharath Keshava Narayana, and Swapnil Jain. The company is headquartered in San Francisco, California, and has offices in Bangalore, India. The platform can be integrated into a business's existing customer service systems, such as call center software, and can analyze voice conversations, chat transcripts, and email interactions. Observe. AI's AI algorithms can identify keywords and phrases that indicate customer sentiment, identify areas where customer service agents can improve their performance, and provide real-time guidance to agents to help them resolve customer issues more effectively. Observe. AI's platform also provides detailed analytics and insights into customer interactions, allowing businesses to identify trends, patterns, and areas for improvement in their customer service operations. The platform is particularly useful for companies that have high call volumes or complex customer service interactions, as it can help to improve agent efficiency and reduce customer wait times.

- **SIGTUPLE** is an Indian startup that uses artificial intelligence to develop innovative medical diagnostic solutions. The company was founded in 2015 by Rohit Kumar Pandey, Tathagato Rai Dastidar, and Apurv Anand. It's core technology is an AI-powered diagnostic platform that uses machine learning algorithms to analyze medical images and data. The platform is designed to help healthcare professionals diagnose a wide range of medical conditions, from blood disorders to chronic diseases. One of SigTuple's flagship products is Shonit, an AI-powered solution for analyzing blood samples. Shonit uses computer vision and machine learning algorithms to automate the process of analyzing blood samples, reducing the time and cost associated with traditional manual analysis. SigTuple's platform can be integrated into a variety of healthcare settings, including hospitals, diagnostic labs, and primary care clinics. The company's solutions are designed to improve the accuracy and efficiency of medical diagnostics, particularly in developing countries where access to healthcare professionals and medical technology is limited. SigTuple has won several awards and accolades for its innovative technology, including the Innovation of the Year award at the Economic Times Awards for Corporate Excellence in 2019. The company is headquartered in Bengaluru, India, and has offices in Seattle, Washington.
- **ENTROPIK TECH** is an Indian startup that develops emotion recognition technology using artificial intelligence. The company was founded in 2016 by Ranjan Kumar and Bharat Singhvi and is headquartered in Bengaluru, India. Entropik Tech's core technology is an AI-powered platform that analyzes human emotions using various sensors, such as cameras, microphones, and biometric sensors. The platform uses machine learning algorithms to identify facial expressions, tone of voice, and other physiological signals to determine a person's emotional state. Entropik Tech's emotion recognition technology has a wide range of applications, including market research, advertising, and customer experience management. For example, the platform can be used to measure consumer emotional responses to advertisements, products, and services, allowing businesses to optimize their marketing strategies and improve customer engagement. Entropik Tech's technology has also been used in healthcare settings to monitor patients' emotional states and provide early intervention for mental health disorders. The platform has the potential to revolutionize mental healthcare by providing real-time insights into patients' emotional states and improving the accuracy of diagnoses. Entropik Tech has received several awards and recognition for its innovative technology, including the Most Innovative AI Startup award at the Global AI Conclave in 2020. The company is considered a leading player in the emerging field of

emotion recognition technology and is expected to have a significant impact on various industries in the coming years.

- **MAD STREET DEN** is an Indian startup that uses artificial intelligence to develop innovative retail solutions. The company was founded in 2013 by Ashwini Asokan and Anand Chandrasekaran. Mad Street Den's core technology is an AI-powered platform called Vue.ai, which uses computer vision and machine learning algorithms to provide personalized product recommendations and visual search capabilities to customers. The platform can analyze product images, customer behavior, and other data to provide relevant product recommendations and improve the customer experience. Vue.ai's visual search capabilities allow customers to find products they are looking for by using images rather than text-based search queries. This can help to improve the accuracy of product searches and reduce the time customers spend searching for products on e-commerce websites. Mad Street Den's solutions have a wide range of applications in the retail industry, including e-commerce, fashion, and beauty. The company's technology can help retailers to improve customer engagement, increase sales, and reduce customer churn. Mad Street Den has received several awards and recognition for its innovative technology, including the Retail Innovation of the Year award at the Retail Systems Awards in 2019. The company is considered a leading player in the emerging field of AI-powered retail solutions and is expected to have a significant impact on the retail industry in the coming years.
- **Fourth Dimension Solutions** is an Indian company that provides technology-based solutions for various industries, including automotive, aerospace, and defense. The company was founded in 1997 and is headquartered in Hyderabad, India. Fourth Dimension's core technology is its proprietary software platform called "Virtual Test Bed" (VTB), which is used for the simulation and testing of complex engineering systems. VTB is designed to help engineers and designers to simulate and test their products in a virtual environment, reducing the need for physical testing and accelerating the product development process. VTB can simulate various physical phenomena, such as heat transfer, fluid dynamics, and structural analysis, and can be used to test a wide range of products, including vehicles, aircraft, and missiles. The platform can help to reduce the cost and time required for physical testing while improving the accuracy of product testing and design. Fourth Dimension's solutions have a wide range of applications in the automotive and aerospace industries, including vehicle design, aerodynamic optimization, and structural analysis. The company's technology can help to improve the performance, safety, and reliability of complex engineering systems. Fourth Dimension has received several awards and recognition for its innovative

technology, including the Best Product award at the India Electronics Week in 2019. The company is considered a leading player in the field of engineering simulation and is expected to have a significant impact on various industries in the coming years.

- **PLAYMENT** is an Indian startup that provides a platform for image and video annotation services. The company was founded in 2015 by Siddharth Mall, Ajinkya Malasane, and Akshay Lal. Playment's core technology is its proprietary image and video annotation platform, which uses a combination of human and machine intelligence to provide high-quality annotation services for various industries, including automotive, retail, and healthcare. The platform can be used to annotate images and videos for object recognition, semantic segmentation, and other computer vision applications. Playment's platform is powered by a large network of crowd-workers who are trained to annotate images and videos with high accuracy and speed. The platform uses machine learning algorithms to ensure the quality and consistency of annotations, while also providing real-time feedback to crowd-workers to improve their performance. Playment's solutions have a wide range of applications in various industries, including self-driving cars, e-commerce, and medical imaging. The company's technology can help to improve the accuracy and efficiency of image and video analysis, while also reducing the cost and time required for manual annotation. Playment has received several awards and recognition for its innovative technology, including the Best Artificial Intelligence Startup award at the Amazon AI Conclave in 2017. The company is considered a leading player in the field of image and video annotation and is expected to have a significant impact on various industries in the coming years.
- **ACTIVE** Alis an Indian fintech startup that uses artificial intelligence to provide conversational banking services. The company was founded in 2016 by Ravi Shankar and Parikshit Paspulati and is headquartered in Singapore, with offices in India, the United States, and the United Kingdom. Active.Ai's core technology is its AI-powered chatbot platform, which provides natural language processing capabilities for financial institutions, enabling them to interact with their customers through messaging channels. The platform can help banks and financial institutions to provide personalized banking services, including account balance inquiries, money transfers, and investment advice. Active.Ai's chatbot platform uses machine learning algorithms to understand customer intent and provide relevant responses in real-time. The platform can also be integrated with existing banking systems to provide a seamless customer experience. Active.Ai's solutions have a wide range of applications in the financial industry, including retail banking, insurance, and wealth management.

The company's technology can help to improve customer engagement, reduce operational costs, and increase revenue for financial institutions. Active.Ai has received several awards and recognition for its innovative technology, including the Best Innovation in Banking award at the Asian Banker Awards in 2019. The company is considered a leading player in the field of conversational banking and is expected to have a significant impact on the financial industry in the coming years.

- **MYELIN Foundry** is an Indian deep tech startup that specializes in artificial intelligence-driven video technology solutions. The company was founded in 2019 by Gopichand Katragadda, Aditi Olemann, and Ganesh Suryanarayanan. Myelin Foundry's core technology is its AI-powered video analytics platform, which uses machine learning algorithms to analyze video data and provide insights for various industries, including media and entertainment, sports, and surveillance. The platform can help to identify and classify objects in video footage, detect anomalies and patterns, and automate video editing tasks. Myelin Foundry's video analytics platform uses deep learning algorithms to analyze video data in real time and provide accurate and reliable insights. The platform can be integrated with existing video systems to provide a seamless experience for customers. Myelin Foundry's solutions have a wide range of applications in various industries, including sports analytics, video content creation, and surveillance. The company's technology can help to improve the accuracy and efficiency of video analysis, while also reducing the cost and time required for manual analysis. Myelin Foundry has received several awards and recognition for its innovative technology, including the Most Innovative AI Startup award at the Amazon AI Conclave in 2019. The company is considered a leading player in the field of video analytics and is expected to have a significant impact on various industries in the coming years.
- **AVAAMO** is an AI-powered conversational platform for enterprises, founded in 2014 by Ram Menon and Sriram Chakravarthy. The company is based in Los Altos, California, and has offices in India and the Netherlands. Avaamo's core technology is its conversational AI platform, which provides natural language processing capabilities to businesses, enabling them to interact with their customers through messaging channels. The platform can help businesses to provide personalized services, such as customer support, sales, and marketing, through conversational interfaces. Avaamo's conversational AI platform uses machine learning algorithms to understand customer intent and provide relevant responses in real time. The platform can also be integrated with existing business systems to provide a seamless experience for customers. Avaamo's solutions have a wide range of applications in various industries, including healthcare, financial services, and retail. The company's

technology can help to improve customer engagement, reduce operational costs, and increase revenue for businesses. Avaamo has received several awards and recognition for its innovative technology, including the Innovation Award for Cognitive Computing from Frost & Sullivan in 2018. The company is considered a leading player in the field of conversational AI for enterprises and is expected to have a significant impact on the business landscape in the coming years.

- **Qure.AIis** an AI-based healthcare startup founded in 2016 by Prashant Warier and Pooja Rao. The company is headquartered in New York City with offices in India and the United Kingdom. QURE.AI's core technology is its AI-powered diagnostic platform, which uses machine learning algorithms to analyze medical images and provide insights for radiologists and healthcare providers. The platform can help to identify abnormalities and anomalies in medical images, such as X-rays and CT scans, and provide automated diagnosis and recommendations for treatment. The diagnostic platform uses deep learning algorithms to analyze medical images in real-time and provide accurate and reliable insights. The platform can also be integrated with existing healthcare systems to provide a seamless experience for healthcare providers. QURE.AI's solutions have a wide range of applications in various medical fields, including radiology, cardiology, and neurology. The company's technology can help to improve the accuracy and efficiency of medical diagnosis, while also reducing the cost and time required for manual analysis.QURE.AI has received several awards and recognition for its innovative technology, including the Best Application of AI in Healthcare award at the Global Annual Achievement Awards for Artificial Intelligence in 2019. The company is considered a leading player in the field of AI-based healthcare and is expected to have a significant impact on the healthcare industry in the coming years.
- **WYSA** (short for "World Youth Summit Award") is an AI-powered mental health chatbot and platform that was launched in 2018 by Jo Aggarwal and Ramakant Vempati. The company is based in India and serves customers globally. WYSA's core technology is its AI-powered chatbot, which uses natural language processing and machine learning algorithms to provide personalized mental health support to users. The chatbot is designed to mimic human conversation and uses evidence-based techniques from cognitive-behavioral therapy (CBT) and mindfulness-based stress reduction (MBSR) to help users manage their mental health. WYSA's chatbot can help users manage a wide range of mental health conditions, including stress, anxiety, depression, and insomnia. The platform also provides additional mental health resources, such as guided meditation and breathing exercises. WYSA's

chatbot is available through a mobile app, which has been downloaded over a million times globally. The company also provides its platform to businesses and organizations to support employees' mental health and well-being. WYSA has received several awards and recognition for its innovative technology, including the Health & Well-being category at the Google Play Awards in 2019. The company is considered a leading player in the field of AI-powered mental health support and is expected to have a significant impact on the mental health industry in the coming years.

- **INTELLO LABS** is an AI-powered agri-tech startup founded in 2016 by Milan Sharma, Nishant Mishra, and Devendra Chandani. The company is headquartered in Gurgaon, India and has offices in several other cities in India, as well as in the United States and Singapore. Intello Labs' core technology is its AI-powered image analysis platform, which uses computer vision and deep learning algorithms to analyze images of crops and provide insights for farmers and agribusinesses. The platform can help farmers to identify and diagnose crop diseases, assess crop quality, and predict yield. Intello Labs' image analysis platform is designed to work with a wide range of crops, including fruits, vegetables, and grains. The platform can also be integrated with existing farm management systems to provide a seamless experience for farmers and agribusinesses. Intello Labs' solutions have a wide range of applications in the agriculture industry, including crop monitoring, disease detection, and yield prediction. The company's technology can help farmers to improve crop productivity, reduce waste, and increase revenue. Intello Labs has received several awards and recognition for its innovative technology, including the Best Agri-Tech Startup award at the NASSCOM Emerge 50 Awards in 2019. The company is considered a leading player in the field of AI-powered agriculture and is expected to have a significant impact on the agriculture industry in the coming years.
- **CROPIN** is an AI-powered agri-tech startup founded in 2010 by Krishna Kumar and Kunal Prasad. The company is headquartered in Bengaluru, India and has offices in several other cities in India, as well as in Amsterdam, Nairobi, and Cairo. CropIn's core technology is its AI-powered farm management platform, which uses machine learning algorithms to provide real-time insights for farmers and agribusinesses. The platform can help farmers to monitor crop health, predict yield, and optimize inputs, such as water and fertilizer. CropIn's farm management platform is designed to work with a wide range of crops, including fruits, vegetables, and grains. The platform can also be integrated with existing farm management systems to provide a seamless experience for farmers and agribusinesses. CropIn's solutions have a wide range of applications in the agriculture industry, including crop monitoring, yield

prediction, and supply chain management. The company's technology can help farmers to improve crop productivity, reduce waste, and increase revenue. CropIn has received several awards and recognition for its innovative technology, including the Best Agri-Tech Startup award at the NASSCOM Emerge 50 Awards in 2014. The company is considered a leading player in the field of AI-powered agriculture and is expected to have a significant impact on the agriculture industry in the coming years.

Various AI Startups in Different Fields					
Healthcare	**Finance**	**Transportation**	**Retail**	**Manufacturing**	**Education**
Babylon Health	ZestFinance	Waymo	Syte	Cognitivescale	Carnegie Learning
PathAI	Feedzai	Nauto	ViSenze	Sight Machine	Coursera
Viz.ai	Ayasdi	Embark Trucks	Optoro	Sisense	Knewton
K Health	DataRobot	Argo AI	Dynamic Yield	Vicarious	Duolingo
Paige.AI	Kensho Technologies	Aurora	Celect	DataRobot	Gradescope

Strategies for the Success of AI Startups

- **Focus on A Specific Problem or Industry:** AI technology has the potential to transform many industries, but it can be challenging to develop a broad-based AI platform. Successful AI startups often focus on solving a specific problem or meeting a specific need within a particular industry.
- **Build a Strong Team:** AI startups require a diverse range of skills, including expertise in machine learning, data science, software engineering, and business development. Building a strong team with complementary skills and a shared vision is critical to success.
- **Leverage Open-Source Tools and Platforms:** There are many open-source AI tools and platforms available, which can help startups save time and resources. By leveraging existing frameworks and libraries, startups can focus on developing unique features and capabilities that set them apart.
- **Gather and Analyze Data:** AI technology relies on data to learn and improve over time. Successful startups focus on gathering and analyzing high-quality data to train their models, and they continuously refine their algorithms to improve accuracy and performance.
- **Foster a Culture of Innovation:** Innovation is critical in the fast-paced world of AI startups. Successful startups foster a culture of innovation, where employees are encouraged to experiment, take risks, and learn from failures.
- **Collaborate with Industry Partners:** AI startups often partner with established companies in their target industries to develop and test their solutions. These partnerships can provide access to valuable data, resources, and expertise, as well as potential customers and investors.

- **Stay Up-to-Date on the Latest Research and Trends:** AI technology is constantly evolving, and startups must stay up-to-date on the latest research and trends. Successful startups invest in ongoing training and education for their teams, attend conferences and meetups, and stay engaged with the broader AI community.

Future Outlook for Indian AI Startups

The future of Indian AI startups is very promising. India has a large pool of talented engineers, data scientists, and entrepreneurs who are eager to develop and deploy AI-powered solutions that can help businesses operate more efficiently, enhance customer experience, and gain insights from data. Here are a few factors that are likely to shape the future of Indian AI startups:

- **Growing Demand for Ai-Powered Solutions:** As businesses in India increasingly look to leverage AI technology, there will be a growing demand for AI-powered solutions across many industries.
- **Government Support:** The Indian government has launched several initiatives to support the development of AI startups, including the National AI Mission, which aims to create a thriving AI ecosystem in the country.
- **Increased Access to Capital:** As the Indian startup ecosystem continues to mature, there will be increased access to capital for AI startups, both from domestic and international investors.
- **Emergence of Specialized AI Startups:** As AI technology becomes more complex, there will be an emergence of specialized AI startups that focus on specific industries or use cases, such as healthcare, finance, or agriculture.
- **Focus on Ethical AI:** There is an increased focus on ethical AI practices and compliance with regulations in India, which will be a key consideration for startups looking to develop and deploy AI-powered solutions.

Overall, the future of Indian AI startups is very bright. With a growing demand for AI-powered solutions, government support, increased access to capital, and a focus on ethical AI practices, Indian AI startups are well-positioned to play a crucial role in the development and development of AI technology across many industries.

Conclusion

AI startups are at the forefront of the rapidly evolving field of artificial intelligence, and they have the potential to transform many industries and create significant value for businesses and consumers alike. The success of AI startups depends on many factors, including a focus on solving specific problems, building strong teams, leveraging open-source tools and platforms, gathering and analyzing data, fostering a culture of innovation, and collaborating with industry partners. The future for AI startups is very promising, with increased adoption of AI technology, a

focus on explainability and transparency, collaboration with established companies, advancements in AI hardware, and an increased focus on ethics and regulation. As AI technology continues to evolve, AI startups will play a crucial role in developing and deploying AI-powered solutions that can help businesses operate more efficiently, make better decisions, and create new opportunities for growth and innovation.AI startups are playing a critical role in the development and deployment of AI-powered solutions across many industries. These startups are driving innovation and creating new opportunities for businesses to improve their operations, enhance customer experience, and gain insights from data. The success of AI startups depends on a range of factors, including a focus on solving specific problems, building strong teams, leveraging open-source tools and platforms, gathering and analyzing data, fostering a culture of innovation, and collaborating with industry partners.

Looking to the future, the outlook for AI startups is very promising, with increased adoption of AI technology, a focus on explainability and transparency, collaboration with established companies, advancements in AI hardware, and increased focus on ethics and regulation. As AI technology continues to evolve, AI startups will continue to play a vital role in shaping the future of business and society.

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Artificial Intelligence and Digital World

Ankit Chourasiya*
Dr. Rupali Saini**

Introduction

Artificial intelligence is the wisdom and engineering of intelligent machines and computer programs. It is a rapidly changing subject that includes a wide range of technologies such as machine literacy, computer vision, natural language processing, and robotics.

Artificial intelligence(AI) has surfaced as a crucial motorist of the digital metamorphosis of the world. With its capability to pretend mortal- suchlike intelligence and decision-making capabilities, AI has the implicit to revise the way we live, work and interact with the digital world. AI has been applied to colourful disciplines, including finance, healthcare, transportation, education, and entertainment. In the digital world, AI is transubstantiating the way we interact with information, products, and services. This paper will give an overview of the history, current state, and unborn prospects of AI in the digital world, as well as its operations, benefits, and implicit pitfalls.

Artificial Intelligence is a broad field that encompasses machine literacy, deep literacy, natural language processing, computer vision, robotics, and other affiliated technologies. It involves the development of intelligent algorithms and systems that can learn from data, make opinions, and perform tasks without mortal intervention. The main factors of AI are data, algorithms, and calculating power. The vacuity of large quantities of data and the added computing power of computers have accelerated the development of AI.

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History of Artificial Intelligence

The conception of artificial intelligence has been around for centuries, but the ultramodern period of AI began in the 1950s with the development of the first electronic computersJohn McCarthy coined the phrase "artificial intelligence" in 1956 when he arranged the Dartmouth Conference, when the first AI software was exhibited. Since also, There have been numerous periods of AI research, including the rule-based expert system phase, the connectionist neural network phase, and the present machine literacy and deep literacy phase.

Artificial Intelligence(AI) is a field that has been around for over 60 times, and its development can be traced back to the early days of computer wisdom. In this essay, we will explore the history of AI, from its commencement to the present day.

The idea of intelligent machines can be traced back to the ancient Greeks, who imagined creating a mechanical bias that could perform simple tasks. Yet, it wasn't until the twentieth century that the area of artificial intelligence began to take shape.In the 1940s, the first electronic computers were being developed, and scientists began to explore the idea of using machines to perform complex computations. One of the first settlers in the field was British mathematician Alan Turing, who proposed the idea of a" universal machine" that could pretend any algorithmic calculation.

In the 1950s, a group of experimenters led by John McCarthy, Marvin Minsky, and Claude Shannon chased the term" Artificial Intelligence" and began to explore the idea of creating machines that could suppose and learn like humans. They believed that by programming machines with rules and algorithms, they could produce machines that could reason, learn, and make opinions.

The 1960s and 1970s saw significant progress in the field of AI, with experimenters developing new algorithms and programming languages to enable machines to perform more complex tasks. One of the most significant improvements was the development of expert systems, which were programs designed to mimic the decision-making processes of mortal experts in a particular field.

In the 1980s, AI exploration endured a reversal, with numerous experts expressing disappointment that the technology hadn't progressed as snappily as they had hopedYet, the area advanced, with researchers creating new methods comparable to machine literacy, which allowed robots to learn from data without being explicitly taught.

The 1990s and 2000s saw significant progress in AI, with experimenters developing new ways similar as deep literacy, which enabled machines to learn from vast quantities of data and make further accurate prognostications. AI also began to be applied to a wide range of operations, including image recognition, natural language processing, and independent vehicles. moment, AI is a fleetly growing field,

with new improvements and operations being developed all the time. It's being applied to a wide range of diligence, including healthcare, finance, and transportation, and is anticipated to have a significant impact on frugality and society in the coming times. The history of AI is a story of remarkable progress, from the early days of simple computations to the complex algorithms and machine literacy ways of the present day. While there have been lapses and bummers along the way, the field has continued to evolve and develop, and the eventuality of AI to transfigure the world is lesser than ever ahead.

Review of Literature

(Bui & Nguyen, 2022) 'Artificial intelligence (AI) is a relatively new disruptive technology that has the potential to primarily effect assiduity and society. Cognitive methods that mimic mortal obtains and allow have resulted in sophisticated logical models that assist firms in in-furrowing deals and perfecting client involvement, functional effectiveness, and service quality by creating fresh applicable data from being data. These decision-making models are built on descriptive, predictive, and traditional analytics.'

(D'Almeida et al., 2022) 'In a trend known as assiduity4.0, the use of digital and artificial intelligence technology has extended and reshaped business models and the creation of opportunities for the development of value in numerous associations. Smart surveillance systems, real-time monitoring, and intelligent clothing are examples of new digital transformation technologies. The current study aimed to deconstruct articles connected to the operation of AI methods in oil painting wells that were published in the twentieth century, in colourful vehicles, and pierced through the exploration.'

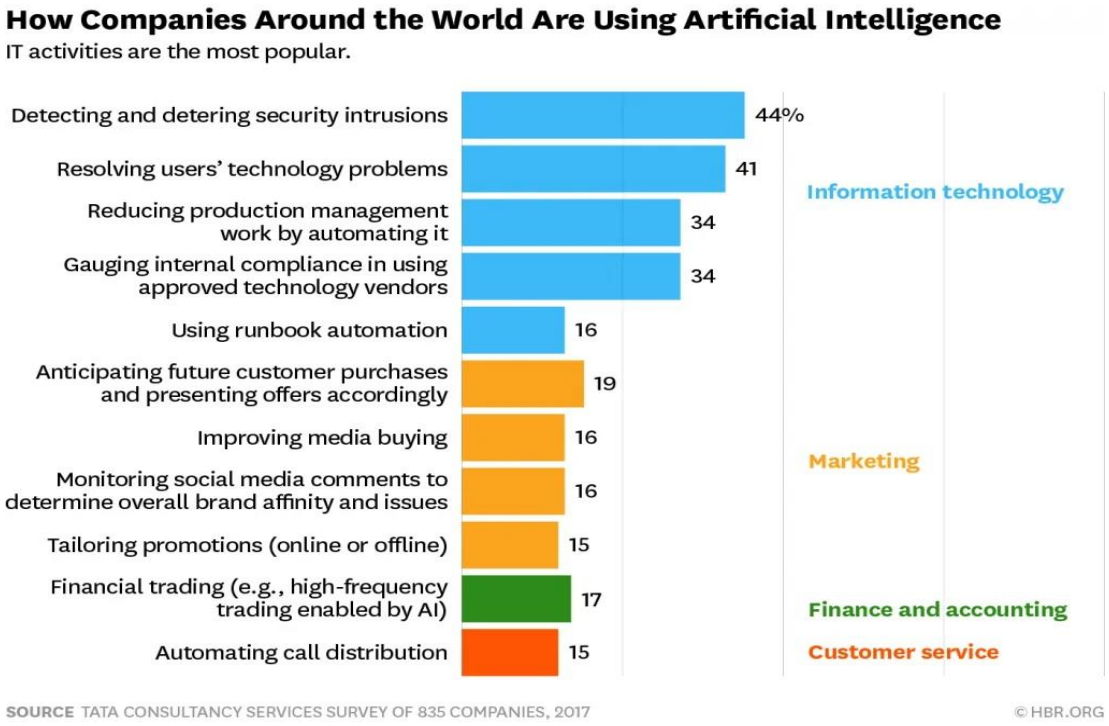
(Murgai, 2018) 'Artificial intelligence (AI) is rapidly becoming more prevalent in today's digital world, and the marketing and advertising industries are no exception. Artificial intelligence is gradually transforming diligence. Artificial intelligence activities range from finding trends in data to reduce request problems, improving customer assistance with virtual specific sidekicks, and even analysing millions of documents throughout a company's systems to uncover compliance violations. Nonetheless, it is only recently that businesses have been able to predict and fantasise about the possibilities that Artificial Intelligence and robots will bring to the corporate world's future. Artificial intelligence makes use of tone-learning systems by utilising methods such as data mining, pattern recognition, and natural language processing. Hence, in terms of critical commercial benefits over human intelligence, Artificial Intelligence is essentially scalable, delivering tremendous cost reductions. Instead, the depth and rule-based systems of Artificial Intelligence assist businesses to reduce their criminal activity. Its longevity, along with constant developments and the capacity to validate procedures, turns into fulfilling commercial opportunities..'

Artificial Intelligence's Present State

The extensive use of machine learning and deep learning algorithms characterises the present level of AI. These algorithms are used to process large amounts of data and extract patterns and insights that can be used to make predictions, automate tasks, and improve decision-making. The availability of cloud computing services and big data platforms has made it easier for organizations to leverage AI technologies. AI is being applied to various domains, including healthcare, finance, transportation, and education.

Applications of Artificial Intelligence in the Digital World

AI has a wide range of applications in the digital world. One of the most common applications of AI is in search engines, which use machine learning algorithms to provide personalized search results. AI is also used in recommendation systems that suggest products or services based on user preferences. It is used in chatbots, which can interact with users in a natural language format, and virtual assistants like Siri and Alexa. AI is also used in fraud detection, credit scoring, and risk management. Chatbots, which can interact with users in a natural language format. AI is also used in search engines, image recognition, speech recognition, and natural language processing. It is used in recommendation systems that suggest products or services based on user preferences. AI is also used in fraud detection, credit scoring, and risk management.



https://hbr.org/2017/04/how-companies-are-already-using-ai

The term "digital transformation" refers to a collection of procedures, strategies, and technologies used by contemporary organisations to optimise their operational operations, such as offering differentiated service, enhancing performance, and expanding their reach power, with workers and customers as the major emphasis.

So far, digital transformation is more than just a new department within a firm; it is a paradigm shift in the role of technology in the workplace. As a result, it is now known as the Fourth Industrial Revolution.

In quite a while, digital transformation has matured into a movement that attracts firms interested in using technology to examine processes, innovate, and increase competitiveness. Technology, in the context of transformation, is a collection of tools that must support the company's business plan rather than a goal in and of itself.

With the capacity to link several systems and automate numerous daily activities, digital transformation advanced further when Artificial Intelligence (A.I.) and Machine Learning (ML) became part of many businesses' business strategy.

These technologies are crucial in digital transformation because they allow your company to make greater use of the data it generates in a number of ways, resulting in faster and more efficient operations and, as a consequence, increased output. It is critical to make sense of the previous two years' worth of data, which represents 90% of all data produced in history. "Data is the new oil," as the saying goes.

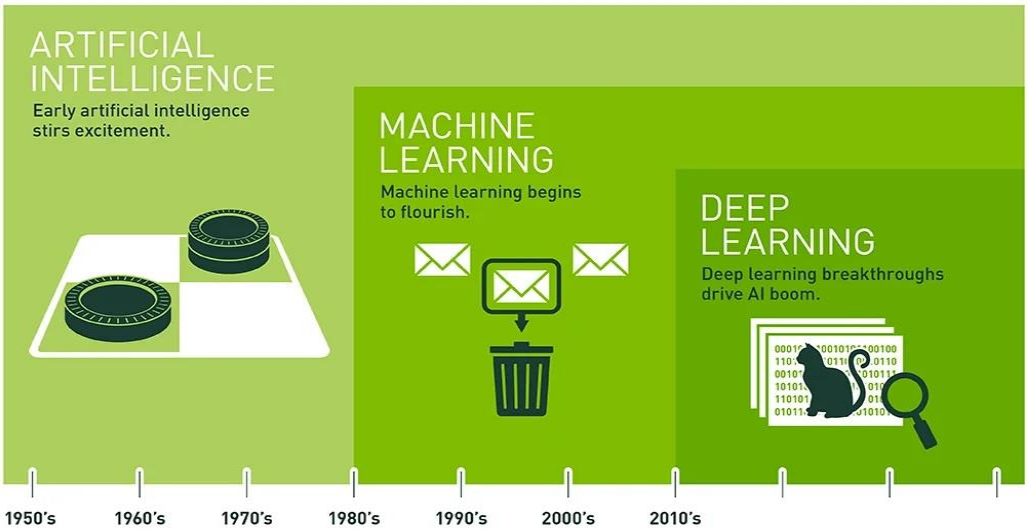
Machine Learning and A.I. enable us to use all of this data to propel the firm forward, either by enhancing current goods and services or by exploring new inventive methods. The most significant consequence, without a question, is the learning that robots provided to humans, a far better understanding of the situation in which we find ourselves.

Artificial Intelligence (A.I.) and Machine Learning (ML) are two of the most potent digital transformation protagonists, laying the groundwork for today's most efficient digital solutions. Furthermore, they are facilitators of increasingly creative and effective solutions, which have a direct impact on market growth and competitiveness, as well as customer experience and expectations.

Benefits of Artificial Intelligence in the Digital World

The benefits of AI in the digital world are numerous. AI can automate repetitive tasks, increase efficiency, and reduce costs. It can improve customer experiences by providing personalized recommendations and enhancing the quality of interactions. AI can assist organisations in making better decisions by delivering data-driven insights and forecasts. It can also improve the accuracy of data analysis and reduce the risk of errors.AI makes operations more effective and seamless, while also giving managers

important information to help them make educated decisions. As a consequence, companies might reconsider how they integrate information, evaluate data, and use the insights gained.



Source:https://www.digite.com/blog/digital-transformation-and-artificial-intelligence/ https://www.digite.com/wp-content/uploads/2018/09/Deep_Learning_ Icons_R5_PNG.jpg1_.png

Once the AI solution is deployed in the operations, it begins processing data and analysing trends to determine the best course of action, which appears as suggestions. As more data is fed into AI, it gets more accurate. After months of data analysis, the AI can make accurate predictions.

AI may assist membership organisations in better understanding their clients and tailoring their membership marketing campaigns accordingly. It uses CRM data to segment members based on demographics and shared interests.

Ethical and Social Implications of AI in the Digital World

Artificial Intelligence(AI) is fleetly advancing, and it has the implicit to transfigure numerous aspects of our lives, including the digital world. AI has been used in colourful operations, including virtual sidekicks, recommendation machines, cybersecurity, and finance. While AI has the implicit to revise the digital world, it also raises significant ethical and social enterprises.

One of the most burning enterprises is the impact of AI on employment. As machines come decreasingly able of performing tasks that were preliminarily the exclusive sphere of humans, there's a threat that numerous jobs will come spare. The

World Economic Forum estimates that by 2025, over five million jobs will be lost to robotization in 15 leading husbandry. The loss of jobs could affect significant profitable and social consequences, including increased inequality and social uneasiness.

Policymakers will need to consider how to address this challenge and insure that workers aren't left before in the digital revolution. One implicit result is to invest in education and training programs that prepare workers for jobs in digital frugality. Governments could also consider enforcing programs similar to job guarantees, introductory income, or shorter workweeks to alleviate the impact of job losses.

Another source of concern is the possibility of AI immortalising and hence complicating impulses and inequities. AI systems are only as good as the data on which they are taught, and there's a threat that prejudiced data could affect in prejudiced issues. For illustration, an AI-powered hiring system could unintentionally distinguish against certain groups if it's trained on prejudiced data. Moreover, facial recognition systems have been designed to be less accurate for those with darker skin tones, which may have an impact on discrimination concerns. Policymakers will need to insure that AI is developed and stationed in a way that promotes fairness and equivalency. This will bear careful attention to the data used to train AI systems and the algorithms used to make opinions. Policymakers should also consider enforcing regulations that bear translucency in AI decision- timber and accreditation that AI systems are checked for bias.

There's also a threat that AI could be used to prosecute vicious conditioning, similar as cyber-attacks and intimation juggernauts. As AI becomes more sophisticated, it could be used to make generally gratifying false news and deep fake videos, which might be used to control public opinion. Policymakers will need to develop strategies to address these pitfalls and insure that AI is used for salutary purposes.

One eventuality result is to promote the development of AI systems that are designed with security and sequestration in mind. Policymakers could also consider enforcing regulations that bear companies to expose the use of AI in their products and services and insure that druggies have control over their data.

AI has the implicit to transfigure the digital world, but it also raises significant ethical and social enterprises. Policymakers will need to consider these enterprises and develop strategies to alleviate the pitfalls associated with AI. By promoting responsible development and deployment of AI, policymakers can insure that this technology benefits society as a whole.

Potential Risks of Artificial Intelligence in the Digital World

Despite the benefits of AI, there are also implicit pitfalls associated with its use in the digital world. One of the biggest pitfalls is the implicit loss of jobs due to robotization. AI can also lead to bias and demarcation if it isn't designed and enforced

meetly. It can also pose pitfalls to sequestration and security if it isn't secured duly. The use of AI in decision- timber can also lead to ethical enterprises if the opinions made by AI aren't transparent or fair.

Artificial Intelligence(AI) has the implicit to revise the digital world, but it also poses significant pitfalls. As AI becomes more sophisticated, it could have unintended consequences that could pose pitfalls to individualities and society as a whole. In this essay, we will explore some of the implicit pitfalls of AI in the digital world.

One of the most significant pitfalls of AI is the eventuality for independent munitions systems. As AI becomes more advanced, there's a threat that it could be used to produce munitions that can operate singly, without mortal intervention. Autonomous munitions systems could pose significant pitfalls to civilians, as they could be programmed to make opinions that could affect in detriment or death.

Another implicit threat of AI is the loss of sequestration. AI systems can be used to collect and dissect vast quantities of data, including particular data similar as biometric data, position data, and online exertion. This data could be used to produce largely targeted and substantiated marketing juggernauts, but it could also be used for further unrighteous purposes, similar as identity theft or stalking.

In addition to sequestration enterprises, there's also a threat that AI could be used to immortalize and complicate being impulses and inequalities. AI systems are only as unprejudiced as the data they're trained on, and there's a threat that prejudiced data could affect in prejudiced issues. For illustration, an AI- powered hiring system could unintentionally distinguish against certain groups if it's trained on prejudiced data. Also Facial recognition systems have been programmed to be less accurate for persons with darker skin tones, which may have an impact on discrimination. Another implicit threat of AI is the eventuality for job loss. As machines come decreasingly able of performing tasks that were preliminarily the exclusive sphere of humans, there's a threat that numerous jobs will come spare. The loss of jobs could affect in significant profitable and social consequences, including increased inequality and social uneasiness.

Similarly, AI may represent a threat to cybersecurity.AI systems could be used to develop more sophisticated and targeted attacks, which could be more delicate to descry and defend against. As AI systems come more sophisticated, they could also be used to develop further effective phishing attacks or to produce satisfying fake news and deep fake vids, which could be used to manipulate public opinion.

While AI has the potential to revolutionise the digital world, it also has substantial drawbacks. Policymakers and inventors will need to consider these pitfalls and develop strategies to alleviate them. By promoting responsible development and deployment of AI, policymakers can insure that this technology benefits society as a whole, rather than posing pitfalls to individualities and communities.

Conclusion

Artificial Intelligence has the potential to transform the digital world and create new opportunities for businesses and individuals. However, it is important to understand the potential risks and challenges associated with its use. Appropriate regulation and ethical considerations should be taken into account when implementing AI in the digital world to ensure that it is used for the benefit of society as a whole.AI is here to stay and is driving an industrial revolution to increase the competitiveness and efficiency of businesses. AI has already become a crucial component in driving long-term growth and giving businesses a competitive advantage. The challenge for all of us is to manage the necessary adjustments in organisational structure, management culture, and skill development investment so that the workforce is capable of adjusting to this global trend that we are already experiencing in our professional and personal lives.

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The Impact of the Metaverse on Business: Examining the Potential Applications of the Metaverse for Businesses

Dr. Mayank Agarwal*
Aastha Dubey**

Introduction

Metaverse refers to a hypothetical future iteration of the internet, which would be a shared, persistent, and immersive virtual space where people can interact with each other and digital objects to simulate a physical world. In the metaverse, users would be represented by digital avatars and would be able to explore, socialize, work, and play in virtual environments that are seamlessly connected to each other. It would offer new ways of experiencing and interacting with digital content, as well as opportunities for commerce, education, and entertainment. Currently, there are a few different definitions and visions of what the metaverse could look like, and it is still an emerging concept that is being developed by technology companies, game developers, and other stakeholders. However, recent advancements in technology, such as virtual and augmented reality, blockchain, and cloud computing, have made the development of the metaverse more feasible. The metaverse would offer a new paradigm for online communication, with users able to interact in a more natural, immersive way than is currently possible through traditional means of text-based messaging, video calls, or social media platforms. One of the potential benefits of the metaverse is that it could provide a more accessible and inclusive platform for people to connect and collaborate, regardless of geographic or physical limitations. For example, people with disabilities or mobility issues could participate in activities and experiences that would otherwise be difficult or impossible in the physical world. While the concept of the metaverse is still in its early stages, it has already attracted significant investment and attention from technology giants like Facebook, which has

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recently rebranded as Meta to signal its focus on building the metaverse. However, there are also concerns about the implications of a fully-realized metaverse, such as privacy and security issues, potential addiction, and the impact on physical interactions and relationships. In addition to the potential benefits and concerns, there are also some technical challenges that need to be addressed for the metaverse to become a reality.

History of Metaverse

The idea of the metaverse has been around for several decades and has its roots in science fiction. The concept was first introduced in Neal Stephenson's 1992 novel Snow Crash, which described a virtual world where people could interact with each other through avatars in a three-dimensional environment. In the years that followed, other authors and thinkers explored the concept of the metaverse, including William Gibson's cyberpunk novel Neuromancer and the virtual reality pioneer Jaron Lanier, who coined the term "virtual reality" in the 1980s.

The first examples of virtual worlds that resembled the metaverse began to emerge in the 1990s, with platforms like Second Life and Active Worlds allowing users to create avatars and interact with each other in virtual environments. However, these early platforms were limited in terms of graphics, interaction, and scalability. The advent of new technologies like virtual and augmented reality, blockchain, and cloud computing in the 2010s has led to renewed interest in the metaverse concept. In recent years, major tech companies like Facebook (now Meta), Microsoft, and Epic Games have announced plans to develop their own versions of the metaverse, which they see as the next major evolution of the internet. As the concept of the metaverse continues to evolve, it remains to be seen how it will be shaped by technological, economic, and social factors, and what implications it will have for the way we live, work, and interact with each other in the digital world.

Examples of Businesses that are using Metaverse

Currently, the use of the metaverse is still in its early stages, and not many businesses globally or in India are actively using the technology. However, here are some examples of global and Indian businesses that have started exploring the potential of the metaverse:

Global Businesses

- **Adidas:** The sportswear giant has created a virtual world in the metaverse called "Futurespace," which is a digital hub for the company's employees and partners.
- **Nike:** Nike has also launched a virtual world in the metaverse, called "Nike's Game Growers," which is designed to provide coaching and mentoring to young women in sports.

- **Gucci:** The luxury fashion brand has created a virtual store in the metaverse, which allows customers to browse and purchase virtual versions of its products.

Indian Businesses

- **Zomato:** The food delivery platform has announced plans to enter the metaverse space, with a focus on creating virtual dining experiences.
- **Tata Group:** As mentioned earlier, the Tata Group has partnered with a blockchain-based gaming platform called Splinterlands to create a virtual world that showcases the company's various businesses and brands. The virtual world is designed to provide a new way for customers to engage with Tata Group's brands and services.
- **Flipkart:** The e-commerce giant has launched a virtual store in the metaverse, which allows customers to browse and purchase virtual versions of its products. The virtual store is part of Flipkart's larger strategy to expand its reach and engage with customers in new and innovative ways.
- **Nazara Technologies:** The Indian gaming company Nazara Technologies has recently announced plans to enter the metaverse space, with a focus on creating immersive gaming experiences. The company sees the metaverse as a key growth area for the gaming industry, particularly in India where there is a large and growing market for gaming.

These are just a few examples of global and Indian businesses that are exploring the potential of the metaverse. As the technology continues to evolve and mature, we are likely to see more and more businesses across the world and in India leveraging the metaverse to drive growth and innovation.

Review of Literature

"The Metaverse: A Roadmap for Business and Society" by Matthew Ball (2021) This paper provides an overview of the metaverse and its potential impact on business and society. The author examines how the metaverse could be used for a variety of purposes, including advertising, gaming, and social networking. The paper also explores some of the potential challenges and risks associated with the metaverse.

"The Metaverse as a New Business Model" by Richard Florida (2021) In this paper, Florida examines the metaverse as a new business model, with the potential to disrupt traditional business models. He argues that the metaverse offers businesses the opportunity to create new products and services that are more immersive and interactive than those in the physical world.

- **"The Metaverse:** An Introduction to the Future of Business" by Tim Sweeney (2021) Sweeney explores the metaverse as a potential future for business,

with a focus on how it could change the way we work, learn, and play. He argues that the metaverse has the potential to create new opportunities for businesses and individuals, as well as providing a platform for social and economic development.

"Exploring the Business Potential of the Metaverse" by Jeremy Bailenson (2021) This paper examines the potential business applications of the metaverse, including virtual meetings, training, and education. Bailenson also discusses some of the ethical and social implications of the metaverse, such as privacy concerns and the potential for addiction.

"The Metaverse and Its Impact on Marketing" by Cathy Hackl (2021) Hackl explores the potential impact of the metaverse on marketing, including how it could be used for brand experiences, product demos, and customer engagement. She also discusses some of the challenges and opportunities associated with marketing in the metaverse, such as the need for new metrics and the potential for greater personalization.

"The Business of the Metaverse: Opportunities and Challenges" by Lorraine Bardeen (2021) Bardeen examines the business opportunities and challenges associated with the metaverse, including the need for new business models and revenue streams. She also discusses some of the potential benefits of the metaverse, such as increased collaboration and innovation.

- **"The Metaverse:** A New Frontier for E-commerce" by Elizabeth Segran (2021) Segran explores the potential for the metaverse to disrupt the e-commerce industry, with the potential to create new shopping experiences that are more immersive and personalized. She also discusses some of the challenges and opportunities associated with e-commerce in the metaverse, such as the need for new payment and logistics systems.

"The Future of Work in the Metaverse" by Alexia Cambon (2021) Cambon examines the potential impact of the metaverse on the future of work, including how it could change the way we collaborate and communicate. She also discusses some of the potential challenges associated with working in the metaverse, such as the need for new skills and the potential for social isolation.

- **"The Metaverse and Intellectual Property:** Challenges and Opportunities" by Mark Lemley (2021) Lemley explores the potential intellectual property challenges and opportunities associated with the metaverse, including copyright, trademark, and patent law. He argues that the metaverse presents unique challenges for IP law, but also offers new opportunities for innovation and creativity.
- **"The Metaverse:** Opportunities and Risks for Small Businesses" by Rohit Bhargava (2021) In this paper, Bhargava examines the potential opportunities

and risks associated with the metaverse for small businesses. He argues that the metaverse offers small businesses the opportunity to reach new audiences and experiment with new business models, but also presents challenges such as the need for new skills and resources.

- **"The Metaverse and Financial Services:** Opportunities and Challenges" by Alex Tapscott (2021) Tapscott explores the potential impact of the metaverse on financial services, including how it could change the way we interact with money and financial institutions. He also discusses some of the potential challenges associated with financial services in the metaverse, such as security and regulatory concerns.
- **"The Metaverse and Healthcare:** Opportunities and Challenges" by John Mattison (2021) Mattison examines the potential impact of the metaverse on healthcare, including how it could be used for remote consultations, training, and research. He also discusses some of the potential challenges associated with healthcare in the metaverse, such as privacy concerns and the need for new regulatory frameworks.
- **"The Metaverse and Education:** Opportunities and Challenges" by Jeremy Bailenson (2021) Bailenson explores the potential impact of the metaverse on education, including how it could be used for virtual classrooms, simulations, and experiential learning. He also discusses some of the potential challenges associated with education in the metaverse, such as the need for new pedagogical approaches and the potential for inequality.
- **"The Metaverse and Sustainability:** Opportunities and Challenges" by Mark Wilson (2021) Wilson examines the potential impact of the metaverse on sustainability, including how it could be used for virtual meetings, events, and experiences that reduce carbon emissions. He also discusses some of the potential challenges associated with sustainability in the metaverse, such as the need for new standards and metrics.

Importance of Metaverse

The metaverse refers to a virtual world where people can interact with each other and digital objects in a three-dimensional space. Its importance lies in the potential for it to become the next major technological shift, with implications across a wide range of industries and aspects of daily life. Some of the key reasons why the metaverse is important include:

- **New Forms of Social Interaction:** The metaverse has the potential to create entirely new forms of social interaction and connection, allowing people to interact with each other in immersive and interactive ways that were previously impossible.

- **New Business Opportunities:** The metaverse could create new business opportunities across a wide range of industries, from gaming and entertainment to education, healthcare, and real estate.
- **Enhanced Collaboration:** The metaverse could enable new forms of collaboration and teamwork, allowing people to work together on complex projects and tasks in virtual spaces.
- **Improved Accessibility:** The metaverse could provide new opportunities for people with disabilities or mobility limitations to participate in social and economic activities.
- **New Forms of Creativity and Expression:** The metaverse could provide new opportunities for creative expression and artistic exploration, allowing people to create and share new forms of digital art and experiences.
- **New Revenue Streams:** The metaverse offers new opportunities for businesses to generate revenue through virtual transactions, such as virtual goods and services, advertising, and sponsorship deals.
- **Enhanced Customer Engagement:** The metaverse offers a new channel for businesses to engage with customers in immersive and interactive ways, potentially increasing customer loyalty and brand awareness.
- **Improved Data Collection and Analysis:** The metaverse provides businesses with new ways to collect and analyze data on customer behavior and preferences, which can inform product development, marketing strategies, and other business decisions.
- **Cost Savings:** The metaverse can potentially reduce business costs by enabling virtual collaboration and remote work, eliminating the need for physical offices and travel.
- **Brand Differentiation:** Early adopters of the metaverse can differentiate themselves from competitors and establish themselves as leaders in their respective industries.
- **Expansion into New Markets:** The metaverse has the potential to enable businesses to expand into new markets and reach new audiences in ways that were previously impossible. For example, a business could use the metaverse to market products to a global audience without the need for physical distribution.
- **Enhanced Product Development:** The metaverse can offer new opportunities for product development by enabling businesses to create virtual prototypes and test them in a virtual environment before producing physical products.

- **New Business Models:** The metaverse can enable new business models that were previously impossible, such as virtual real estate development, virtual events, and immersive experiences.
- **Improved Customer Service:** The metaverse can provide new opportunities for businesses to offer customer service in immersive and interactive ways, potentially improving customer satisfaction and loyalty.
- **Future-Proofing:** By embracing the metaverse, businesses can future-proof themselves against technological disruption and position themselves for long-term growth and success.

Overall, the metaverse has the potential to offer significant benefits to businesses across a wide range of industries, from retail and entertainment to healthcare and education. As such, it is worth considering how businesses can leverage the metaverse to stay ahead of the curve and drive growth in the coming years.

Current Applications of Metaverse in Business

- **Virtual Events:** One of the most obvious applications of the metaverse for businesses is in the realm of virtual events. Companies can use virtual spaces to host product launches, trade shows, and other events that would typically require a physical presence.
- **Retail:** Retailers are also exploring the use of the metaverse to create virtual storefronts where customers can browse and purchase products in a more immersive environment. This could also include the use of virtual assistants to help customers find what they are looking for.
- **Real Estate:** Real estate companies are using the metaverse to create virtual tours of properties, allowing potential buyers to explore homes and apartments without leaving their own homes.
- **Gaming:** Gaming is one of the most popular applications of the metaverse, and businesses are exploring ways to use games and virtual worlds to engage with customers and build brand awareness.
- **Education and Training:** The metaverse is also being used for education and training purposes, with virtual classrooms and training programs being developed to teach employees new skills.
- **Social Media:** Social media platforms are also exploring the use of the metaverse, with virtual environments being created to facilitate online communities and social interactions.
- **Virtual Workspaces:** With the rise of remote work, businesses are looking for new ways to create collaborative work environments. The metaverse offers an opportunity to create virtual workspaces where employees can collaborate on projects and communicate with each other in real time.

- **Advertising and Marketing:** Businesses can use the metaverse to create immersive advertising experiences, where customers can interact with products and brands in a more engaging way. This could include virtual product demonstrations, interactive advertising campaigns, and more.
- **Healthcare:** The metaverse has potential applications in healthcare, allowing doctors and healthcare professionals to communicate with patients in a virtual environment. This could include virtual consultations, telemedicine, and more.
- **Travel and Tourism:** The metaverse could also be used to create virtual tourism experiences, allowing travellers to explore destinations from the comfort of their own homes. This could include virtual tours of landmarks, museums, and other tourist attractions.
- **Sports and Entertainment:** Sports teams and entertainment companies are exploring the use of the metaverse to create immersive fan experiences. This could include virtual sports events, concerts, and other live performances.
- **Finance:** The metaverse could also have applications in finance, allowing users to interact with financial services in a more immersive way. This could include virtual banking, investment simulations, and more.
- **Virtual Reality Training:** The metaverse can be used to create virtual training programs that simulate real-life scenarios, allowing employees to learn new skills in a safe and controlled environment. This could include training for high-risk jobs such as firefighting, military training, and medical training.
- **Virtual Product Design and Development:** The metaverse can be used to create virtual prototypes of products, allowing businesses to test and refine their designs before creating physical products. This can help to reduce costs and speed up the product development process.
- **Virtual Conferencing:** The metaverse can be used to create virtual conference rooms and facilitate virtual meetings, allowing businesses to connect with employees and clients from around the world in a more immersive and engaging way.
- **Supply Chain Management:** The metaverse can be used to create virtual supply chain networks, allowing businesses to track and manage their inventory and logistics in real time.
- **Human Resources:** The metaverse can be used to create virtual job interviews, allowing businesses to conduct interviews with candidates from anywhere in the world. This can help to reduce costs and increase the efficiency of the hiring process.

- **Art and Creative Industries:** The metaverse can be used to showcase and sell art and creative works in a more immersive way. This could include virtual galleries, exhibitions, and performances.

Overall, the metaverse offers a wide range of opportunities for businesses to innovate and create new experiences for customers and employees alike. As technology continues to evolve, we can expect to see even more creative applications of the metaverse in various industries.

What will be the Impact of Metaverse on Businesses

The impact of the metaverse on businesses is expected to be significant, with many potential applications and benefits. Here are some of the ways that the metaverse could impact businesses:

- **Increased Efficiency:** The metaverse could enable businesses to operate more efficiently by providing a new way for teams to collaborate and work together remotely. This could reduce the need for physical office space and travel, saving time and money.
- **New Revenue Streams:** The metaverse could provide businesses with new revenue streams through virtual commerce, such as selling virtual goods and services or charging for access to virtual events.
- **Enhanced Customer Engagement:** The metaverse could enable businesses to engage with customers in new and immersive ways, providing a more engaging and interactive experience.
- **Improved Customer Service:** The metaverse could provide businesses with new ways to provide customer service, such as through virtual assistants and chatbots.
- **Access to New Markets:** The metaverse could provide businesses with access to new markets, such as virtual markets for niche products or services.
- **Enhanced Branding and Marketing:** The metaverse could provide businesses with new ways to promote their brand and products, such as through virtual events and immersive experiences.
- **New Business Models:** The metaverse could enable businesses to develop new business models that take advantage of the unique capabilities of virtual environments.
- **New Opportunities for E-Commerce:** The metaverse could provide Indian businesses with new opportunities to sell virtual goods and services, which could be particularly relevant for the country's growing e-commerce sector.
- **Improved Collaboration and Communication:** The metaverse could enable Indian businesses to collaborate more effectively with remote teams and partners, which could be particularly beneficial for companies with a distributed workforce.

- **Increased Access to Global Markets:** The metaverse could provide Indian businesses with a new way to reach global markets, particularly for businesses that operate in niche or specialized markets.
- **Enhanced Customer Engagement:** The metaverse could provide Indian businesses with new ways to engage with customers, particularly through immersive and interactive experiences.
- **New Business Models:** The metaverse could enable Indian businesses to develop new business models that take advantage of the unique capabilities of virtual environments.
- **Improved Education and Training:** The metaverse could provide Indian businesses with new opportunities for education and training, particularly for industries that require specialized skills and knowledge.

Overall, the impact of the metaverse on Indian businesses is likely to be significant, particularly as the country continues to develop its digital infrastructure and capabilities. However, the specific impact will depend on the industry and the specific strategies that businesses adopt to take advantage of the metaverse.

Contribution of the Metaverse to the Field of Business

The metaverse has the potential to make significant contributions to the field of business. Here are some ways in which the metaverse could benefit businesses:

- **Innovation:** The metaverse provides a new canvas for businesses to innovate and experiment with new products, services, and experiences. By creating virtual environments that go beyond what is possible in the physical world, businesses can develop new ideas and approaches that can drive growth and differentiation.
- **Engagement:** The metaverse provides a highly engaging and interactive environment that can help businesses to build stronger connections with their customers and employees. By creating immersive experiences that capture attention and stimulate the senses, businesses can create more meaningful and memorable interactions that drive loyalty and advocacy.
- **Collaboration:** The metaverse provides a platform for businesses to collaborate and work together in new ways. By bringing together people from different parts of the world and different industries, businesses can foster innovation and creativity that can lead to new ideas, products, and services.
- **Global Reach:** The metaverse allows businesses to reach customers and employees from all over the world, regardless of their physical location. This can help businesses to expand their markets and tap into new sources of revenue.

- **Cost Savings:** The metaverse can help businesses to reduce costs associated with physical locations, travel, and other expenses. By conducting virtual events, meetings, and training programs, businesses can save money and increase efficiency.
- **Data and Analytics:** The metaverse provides a wealth of data and analytics that can help businesses to better understand their customers and employees. By analyzing user behavior and preferences, businesses can develop more targeted and effective marketing campaigns, improve product design and development, and optimize their operations.
- **Branding and Marketing:** The metaverse can provide a unique and creative platform for businesses to promote their brand and products. Through virtual events, experiences, and sponsorships, businesses can connect with consumers in new and exciting ways, and create more memorable and impactful branding and marketing campaigns.
- **Customer Service:** The metaverse can provide a new channel for businesses to deliver customer service and support. By creating virtual help desks, chatbots, and other interactive tools, businesses can improve the customer experience and resolve issues more efficiently.
- **Employee Training and Development:** The metaverse can provide a powerful platform for businesses to train and develop their employees. Through virtual simulations, role-playing exercises, and other immersive experiences, businesses can provide employees with hands-on training that prepares them for real-world challenges.
- **Social Responsibility:** The metaverse can provide a platform for businesses to demonstrate their commitment to social responsibility and sustainability. By creating virtual environments that promote environmentalism, diversity, and social justice, businesses can align their brand with important social causes and build a more loyal and engaged customer base.
- **New Business Models:** The metaverse can enable new business models that are not possible in the physical world. For example, businesses can create virtual marketplaces where users can buy and sell virtual goods and services, or monetize their virtual environments through advertising, sponsorships, or subscriptions.
- **New Revenue Streams:** The metaverse can provide new revenue streams for businesses through the sale of virtual goods, digital assets, and other forms of virtual currency. By tapping into the growing market for virtual goods and services, businesses can diversify their revenue streams and create new opportunities for growth.

Overall, the metaverse has the potential to transform the field of business in many ways, providing new opportunities for innovation, growth, and differentiation. As businesses continue to explore the possibilities of the metaverse, we can expect to see even more ways in which it can contribute to their success.

Limitations of Metaverse for Indian Businesses

While the metaverse holds significant potential for Indian businesses, there are also some limitations and challenges that businesses will need to navigate. Here are some key limitations of the metaverse for Indian businesses:

- **Limited Access to Technology:** A significant challenge for many Indian businesses will be limited access to technology infrastructure, particularly high-speed internet connectivity and advanced hardware. This could limit the ability of businesses to create and deliver high-quality virtual experiences.
- **High Costs:** The development of virtual experiences for the metaverse can be expensive, particularly for small and medium-sized businesses. This could limit the ability of these businesses to invest in the metaverse and create compelling virtual experiences.
- **Regulatory Framework:** The development of an appropriate regulatory framework for the metaverse in India could be a challenge, particularly around issues related to data privacy, security, and intellectual property rights. This could create uncertainty and make it difficult for businesses to navigate the legal and regulatory landscape.
- **User Adoption:** While there is significant potential for the metaverse in India, user adoption may take time to develop. This could be due to factors such as limited access to technology, cultural differences, and concerns around data privacy and security.
- **Cultural Factors:** The metaverse may not be a good fit for all Indian businesses, particularly those that operate in industries where face-to-face interaction is valued, such as hospitality and healthcare. These businesses may struggle to create compelling virtual experiences that match the in-person experience.
- **Skill Gap:** The development of virtual experiences for the metaverse requires a range of technical and creative skills, such as 3D modeling, game design, and user experience design. Indian businesses may struggle to find individuals with these skills, particularly in smaller cities and towns.
- **Digital Divide:** While the Indian government is taking steps to bridge the digital divide, there is still a significant gap in access to technology between urban and rural areas. This could limit the ability of rural businesses to leverage the metaverse and create compelling virtual experiences.

- **Competition:** As the metaverse gains in popularity, there is likely to be increased competition among businesses to create compelling virtual experiences. This could make it difficult for smaller businesses to stand out and compete with larger, more established players.
- **Infrastructure Challenges:** India's infrastructure challenges, such as power cuts and inadequate transportation systems, could also impact the success of the metaverse. These challenges could impact the ability of businesses to create and deliver high-quality virtual experiences.
- **Cybersecurity Risks:** The metaverse is likely to be a target for cyber-attacks and other security threats. Indian businesses will need to invest in robust cybersecurity measures to protect themselves and their customers.
- **Infrastructure and Technology:** The development of metaverse technology requires advanced infrastructure and technology, which may not be readily available in all parts of India. This could limit the potential for businesses in certain regions to establish a presence in the metaverse.
- **Limited Access to Capital:** Many Indian businesses may not have the resources to invest in the development of a metaverse presence. This could limit the ability of these businesses to compete with larger, more established brands that have the resources to invest in metaverse technology.
- **Security Concerns:** The metaverse raises important security concerns, particularly around the use of personal data. Businesses in India must ensure they have appropriate safeguards in place to protect customer data and comply with applicable regulations.
- **Digital Divide:** The adoption of metaverse technology may be limited by the digital divide, particularly in rural and low-income areas. This could limit the potential customer base for businesses in these areas, particularly those targeting customers in rural or low-income areas.
- **Skills Gap:** The development of metaverse technology requires specialized skills and expertise that may not be readily available in India. This could limit the ability of businesses in India to develop and implement metaverse strategies.

Future of Metaverse in India

The metaverse has the potential to significantly impact a wide range of industries in India and transform the way businesses engage with customers, employees, and partners. Here are some potential future scenarios for the metaverse in India:

- **Increased Adoption of Virtual Reality:** As the metaverse continues to evolve, we can expect to see increased adoption of virtual reality technology in India, particularly in industries such as gaming, entertainment, and education.
- **Emergence of New Business Models:** The metaverse is likely to give rise to new business models that leverage virtual worlds, social media, and gaming to create immersive and engaging experiences for customers. This could include virtual marketplaces, virtual events, and virtual product launches.
- **Enhanced Customer Engagement:** The metaverse could provide a new way for businesses in India to engage with customers and build brand awareness, particularly through immersive and interactive experiences. This could include virtual showrooms, virtual events, and social media platforms.
- **Transformation of Work:** The metaverse could transform the way businesses in India work, with virtual workspaces and virtual collaboration tools becoming increasingly important. This could enable more remote and flexible work arrangements, and create new opportunities for collaboration and innovation.
- **Virtual Retail:** The metaverse has the potential to revolutionize the way consumers shop and engage with brands. Indian businesses could create immersive virtual shopping experiences that allow customers to browse and purchase products in a virtual environment.
- **Education and Training:** The metaverse could be used to provide virtual education and training experiences, particularly in areas where physical classrooms are not possible. This could be particularly impactful for students in rural areas or those with limited access to educational resources.
- **Entertainment:** The metaverse has the potential to transform the entertainment industry in India. Businesses could create immersive virtual experiences for music concerts, sports events, and other forms of entertainment.
- **Real Estate:** The metaverse could also have a significant impact on the real estate industry in India. Businesses could create virtual tours of properties, allowing potential buyers and renters to view properties from anywhere in the world.
- **Healthcare:** The metaverse could be used to provide virtual healthcare experiences, such as telemedicine consultations and virtual physical therapy sessions. This could be particularly impactful in rural areas where access to healthcare is limited.
- **Advertising and Marketing:** The metaverse could be used to create engaging virtual advertising and marketing experiences, such as branded virtual events and immersive product demonstrations.

- **Gaming and Esports:** India has a thriving gaming and esports industry, and the metaverse could offer new opportunities for businesses in this space. Virtual gaming experiences and esports tournaments could be created within the metaverse, offering new revenue streams for gaming and esports businesses.
- **Tourism:** The metaverse could also be used to create virtual tourism experiences, allowing visitors to explore Indian landmarks and cultural sites in a virtual environment. This could be particularly impactful for international visitors who may not be able to travel to India in person.
- **Social Networking:** The metaverse could be used to create new social networking experiences, allowing individuals and businesses to connect and interact in a virtual environment. This could be particularly impactful for individuals and businesses in remote areas who may not have access to traditional social networking platforms.
- **Collaboration and Communication:** The metaverse could offer new opportunities for remote collaboration and communication among businesses in India. Virtual meeting spaces and immersive communication tools could be created within the metaverse, enabling businesses to collaborate and communicate in new and innovative ways.

Overall, the future of the metaverse in India and for Indian businesses is exciting and full of potential. As the technology and infrastructure continue to develop, we can expect to see new and innovative applications of the metaverse emerge, offering new opportunities for businesses to connect with customers and drive growth.

Recommendations for Businesses Looking to Leverage the Metaverse

If you are a business looking to leverage the metaverse, here are some recommendations:

- **Understand the Technology:** The first step is to understand the technology behind the metaverse and how it works. This will require some research and exploration to gain a basic understanding of virtual reality, augmented reality, blockchain, and other technologies that make up the metaverse.
- **Define Your Goals:** Next, it is important to define your goals for leveraging the metaverse. Are you looking to improve customer engagement, reduce costs, or drive innovation? By defining your goals, you can develop a clear strategy for leveraging the metaverse that aligns with your business objectives.
- **Start Small:** The metaverse is still in its early stages, so it is important to start small and experiment with different approaches. Rather than trying to create a fully immersive virtual environment from scratch, consider starting with a simple augmented reality app or a virtual event to test the waters.

- **Focus on User Experience:** The success of any metaverse project will depend on the user experience. To create a compelling and engaging experience, it is important to focus on the needs and preferences of your users. This may require user testing, user research, and other methods to gather feedback and insights.
- **Collaborate:** The metaverse is a collaborative environment, so it is important to collaborate with other businesses, developers, and experts to leverage their skills and expertise. Look for opportunities to join virtual communities, attend virtual events, and connect with other businesses and developers who are exploring the metaverse.
- **Be Innovative:** The metaverse is a new and innovative environment, so it is important to be creative and explore new ideas and approaches. Don't be afraid to experiment with new technologies, new business models, and new ways of engaging with customers and employees.
- **Stay Up-to-Date:** Finally, it is important to stay up-to-date with the latest developments in the metaverse. This will require ongoing research, exploration, and education to keep up with the latest trends, technologies, and best practices.
- **Develop A Metaverse Strategy:** A well-defined strategy is critical for leveraging the metaverse. It should include goals, target audience, budget, timeline, and the technologies and platforms to be used. A well-planned strategy will ensure that your metaverse efforts align with your business goals and maximize ROI.
- **Prioritize Security and Privacy:** The metaverse presents new security and privacy challenges, and it is essential to prioritize these concerns to protect your users and your business. Ensure that your metaverse experiences are secure, data is protected, and users' privacy is respected.
- **Cultivate a Community:** The metaverse is all about community, and businesses can leverage this by cultivating a community around their brand. Create a branded virtual space, encourage user-generated content, and host events to engage and grow your community.
- **Embrace Diversity and Inclusion:** The metaverse provides a unique opportunity to create more inclusive and diverse environments. By embracing diversity and inclusion in your metaverse experiences, you can build a more engaged and loyal user base.
- **Measure and Optimize:** Measuring the success of your metaverse efforts is crucial to optimizing your strategy and maximizing ROI. Track key metrics

such as user engagement, user retention, and conversion rates, and use this data to refine and optimize your metaverse experiences.

- **Build for Interoperability:** The metaverse is a network of interconnected virtual worlds, and it is important to build for interoperability. This means designing experiences that can work across different platforms and technologies, and making it easy for users to move seamlessly between virtual worlds.
- **Experiment with New Revenue Models:** The metaverse offers new revenue models beyond traditional product sales. Consider experimenting with models such as subscription services, virtual goods sales, and advertising in your metaverse experiences.

By following these recommendations, businesses can leverage the metaverse to create new and innovative experiences that engage users, build brand loyalty, and drive growth. The key is to approach the metaverse with an open mind, a spirit of experimentation, and a commitment to delivering value to your users.

Conclusion

The metaverse represents an exciting new frontier for businesses to explore. It offers a wide range of opportunities to engage with customers, improve efficiencies, and drive growth in entirely new ways. However, it also presents some significant challenges and requires businesses to approach it with a strategic and creative mindset.

Looking to the future, the metaverse is likely to become an increasingly important part of the digital landscape. As virtual and augmented reality technologies continue to improve, and blockchain technology enables new forms of decentralized governance and ownership, the metaverse will become more immersive, more engaging, and more widely adopted.

In the years ahead, we can expect to see businesses continue to experiment with new metaverse experiences, platforms, and technologies. From virtual events and product demonstrations to immersive retail experiences and virtual real estate, the possibilities are virtually limitless. As the metaverse continues to evolve, it will offer new and exciting ways for businesses to connect with customers, innovate, and grow.

Overall, the metaverse represents a unique and exciting opportunity for businesses to embrace the future of digital technology and deliver value to their customers and stakeholders. By staying up-to-date with the latest developments, taking a strategic and innovative approach, and prioritizing user experience and privacy, businesses can leverage the metaverse to unlock new opportunities and achieve greater success in the digital age.

In conclusion, the metaverse represents a unique and exciting opportunity for businesses to embrace the future of digital technology and drive growth and innovation in entirely new ways. As the metaverse evolves, businesses will need to stay up-to-date with the latest developments, take a strategic and innovative approach, and prioritize user experience and privacy. By doing so, they can unlock new opportunities, build stronger connections with their customers, and drive success in the digital age.

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Role of Artificial Intelligence in Healthcare Sector

Dr. P.Vakula Kumari*

Introduction

A key component of digital businesses, information and communication technology (ICT) can improve operational effectiveness and competitive advantage (Aabo, G., 2016). Advanced digital technology and devices are widely used for innovation and value generation across industries in the Fourth Industrial Revolution (4IR) age of today (Lee & Lim, 2018). There is no exception in the healthcare sector. Hospitals and other healthcare facilities are actively implementing digital technologies including artificial intelligence (AI), machine learning, smart sensors and robots, big data analytics, and the Internet of Things (IoT) to increase operational efficiency and care quality across the globe (Lee, D.,2019). According to research by Hewlett-Packard Enterprise subsidiary more than 60% of hospitals around the world have integrated IoT into their infrastructure(Aruba, 2019).

Hospitals & Healthcare Service Providers Hospitals are the most important segment of healthcare service division, also most commonly known as healthcare service providers. They provide treatments for diseases, and medical diagnostic to the patients. These includes various types like general hospitals, specialized hospitals, surgical hospitals, super specialty healthcare centers, multi-specialty hospitals and houses several departments like inpatient department, specialized medical department, consulting department, operation theatre, dispensary, pharmacy, paramedical, nursing, radiology and diagnostic departments, rehabilitation centers, outpatient department, managerial or hospital administrative department, human resources, house-keeping department, facilities and operations department, waste management, maintenance department, information technology department and others.

Businesses need shorter waiting times in the digital age since the market environment may change more quickly than in earlier decades. This perspective has

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led to the adoption of new technology by a number of enterprises (Akhtar, et.al.,2019) in order to achieve high performance and a competitive advantage. Artificial Intelligence (AI) has played a key role in these developments (Balog,2020) and has captured the interest of both academics and business leaders. The ability of a machine to learn from experience, adapt to new inputs, and carry out human-like activities is referred to as artificial intelligence (AI) (Duan, Y.; Edwards, J.S., & Dwivedi, Y.K., 2019).

Healthcare using Artificial Intelligence: A Global Perspective

The hallmark of doing business across national borders is globalisation, which gives healthcare organisations the chance to share resources, technologies, infrastructure, and skilled human resources in order to compete with one another for excellence and to provide the best care to patients and the wider healthcare community. The healthcare sector is made more vibrant by artificial intelligence thanks to international competitors and globally accessible technologies. The emergence of organisations like PAHO (Pan American Health Organizations), Care International, the Center for Disease Control and the WHO Prevention Centre, as well as the International Red Cross Committee, has united most of the world's nations around the goal of developing their economies, healthcare systems, and human capital. Healthcare organisations with a global perspective must efficiently create services and they need to amass a lot of experience across several functional areas in order to achieve core competency and maintain their firm in the cutthroat international healthcare industry. So, this is where the worldwide importance of AI enablement techniques in healthcare is found. However, given the fierce competition that exists globally for such talents and the fact that they are needed in a variety of positions and must take responsibility for the technological advancements and innovations that are reshaping the world of medicine, healthcare organisations today face significant difficulties in attracting and keeping skilled healthcare practitioners and health-tech professionals. In order to develop and supply sustainable healthcare solutions and thereby have an impact on society, the global healthcare business must focus on innovation methods and manage their workforce effectively.

According to the CIO's research on enabling a better, more intelligent, and more effective healthcare ecosystem, Dell technology aid hospitals and clinics by using artificial intelligence to gain insights from data (Debra Slapak and Curtis Breville, 2020) In a time of crisis, managing artificial intelligence-based solutions is even more important. Because of their skill and talent capacity in assisting the tech professionals to develop artificial intelligence solutions that leads to achieve sustainable competitive advantage, healthcare professionals are regarded as the key assets of healthcare organisations. The report also notes that advances in life science with the support of digital transformation across the industries are encountered with various potential benefits in transforming the current global economy.

Healthcare using Artificial Intelligence: An Indian Perspective

The ideas of liberalisation, privatisation, and globalisation made it possible for entrepreneurs and private healthcare organisations in the country to conduct international commerce. As a result, Indian healthcare organisations had to contend with intense international rivalry, and maintaining their viability in this global market was a difficult effort for them. Numerous foreign healthcare organisations began arriving in India to conduct business either on their own or in partnership with Indian healthcare service providers after the announcement of new economic reform in 1991. Since that time, a significant amount of innovation and technological adaptation in the healthcare organisations has occurred quickly (National Health Portal, 2019). Given this situation, Indian healthcare organisations had to improve in a number of areas, including medical infrastructure, the prevalence of lifestyle diseases, which is on the rise, health penetration, technological advancements, the cost of healthcare, and the effective management of the healthcare workforce, among others.

The Indian healthcare industry is increasingly using artificial intelligence, machine learning, and deep learning techniques for a variety of tasks, including identifying the rise in non-communicable diseases, managing disease outbreaks during pandemics, and managing healthcare institutions and professionals. Numerous applications show that deep learning algorithms have improved clinicians' and healthcare practitioners' understanding of disease detection, analysis of vitality syndromes in patients, disease prediction, and visualisation of procedures. Artificial intelligence systems also help practitioners see procedures better in high-resolution 3D images and plan surgical precision for specific illnesses (The Week Report, 2020).

The National Digital Health Mission (NDHM) and the National Digital Health Blueprint (NDHB), both of which were created by the National Health Authority, are examples of government initiatives that support digital health. They also serve to establish the goals for the future Indian healthcare system. The use of digital technology like artificial intelligence by healthcare institutions to think outside the box and provide services to the general public. Other government-sponsored health-tech programmes include the national telemedicine network, integrated diseases surveillance programme, electronic vaccine intelligence network, e-hospital, national health portal, e-shushrut, electronic vaccine intelligence network, and other health missions that support and promote innovation in the Indian healthcare ecosystem and public health policies that enable the development of real-time technology-enabled solutions for solving complex problems (National Health Portal, 2017).

Benefits of Artificial Intelligence in Healthcare

- Successful artificial intelligence-enabled solutions integrated into healthcare operations help to promote preventative medicine and identify genetic anomalies that are critical in nature where healthcare organisations find ways

to that ensure current and backup incumbents based on the trained data sets thus, enabling healthcare organisations in creating better clinical decisions and providing insights on treatment in a more effortless manner

- A successful artificial intelligence system integration enables the development of a better healthcare ecosystem with a clear channel and process for identifying the various patient data sets and a system that automates tasks in service delivery at a faster rate and at a lower cost, resulting in increased revenue and returns for the organisation and having an impact on overall organisational performance. A minimal solution with strong and long-lasting potentials is reviewed and managed by many healthcare organisations. This solution must be incorporated to the greater portion of functional activities. The provision of pre-treatment linked services, such as pre-authorization of health insurance, 25 prevention of remissions, payment of bills, and maintenance of patients' medical histories and data, is not explicitly segmented out for this group by healthcare service providers.
- A successful artificial intelligence enablement process enhances patient care by gathering patient insights through predictive analysis, assists in analysing potential health issues and risks, lessens the workload of healthcare professionals, enhances the quality management system, healthcare information management system, and promotes routine maintenance of infrastructure and equipment. In order to prevent disruptions in the performance of the business, many healthcare organisations have elaborate succession plans for a number of roles in the healthcare operations.
- Successful artificial intelligence enablement has flourished to simulate the idea of a decentralisation in the workplace, improving service levels, healthcare professionals' proficiency and skills, their ability to capture a large market, and their ability to achieve sustainable competitive advantage. Healthcare firms are able to outperform the competitors at many tasks thanks to these advantages. Individual motivation, communication and coordination, organisational culture, and training and educational activities on artificial intelligence-enabled solutions are regularly used in the workplace and are shown to be beneficial for completing tasks more quickly. The involvement of the healthcare personnel in decision-making processes gives them a sense of fulfilment when contributing to innovations, which in turn strengthens their managerial skills and develops their leadership style.

Major challenges of Artificial Intelligence in Healthcare

While the rapid advancement of AI and related technologies and the investments made in them hold enormous potential for health services in terms of reducing resource and administrative problems, there is a lot of hyperbole, and

prudence is required. There are several AI applications that have not yet reached their full maturity. In addition to the numerous technical shortcomings of existing AI technologies (Teddy, M.,2018) when compared to human vision, language processing, and context-specific reasoning, there are other noteworthy difficulties in implementing AI in healthcare delivery. The medico-legal context(Marcus, P.,1981) in which AI applications will be used comes first. Lines of responsibility are not always apparent even under the current medical regulations when medical errors occur, and it is even less clear where those obligations should lie when AI 'bots' increasingly support or even offer healthcare services on their own (Kingston, J., 2016). There has to be more definition and clarification regarding how accountability for system use, system use, and user is determined. In this sector, regulatory and legal authorities must work closely with a variety of health services partners, including doctors and software developers.

Making sure that people can comprehend how AI makes clinical judgements and maintain critical awareness is another issue. Certain parts of decision making may be opaque due to the intricacy of deep learning and other advanced algorithms; this is known as the "black box" problem (Amito et.al, 2013) Clinicians need to rigorously supervise the creation of AI services, scrutinise the data used to train the algorithms, and hold a sizable amount of control over their application. The workforce at health services may also be reluctant to adopt AI programmes, even when they are occasionally accurate and occasionally built on a solid understanding of patient care and service delivery. As challenges in implementing electronic health records arise, change management strategies that encourage participation from all stakeholders must be adopted. Finally, access to context-specific patient data is essential for developing and enhancing an AI program's accuracy.

Conclusion

It is quite expected that AI will be utilised extensively in the delivery of healthcare, and there is enormous potential for cost savings as well as service quality improvement due to the rapid advancements in AI research and the resources being supplied by governments and business. The manner and rate of this development, however, are still up for debate. Prior to implementation, it is important to ensure that engineering practise and evidence standards are of the highest calibre and to address "soft" concerns like fair and open access to data, medico-legal obligations in decision-making, and equitable benefit sharing. Government investments in the creation and application of AI in healthcare must be tempered with caution and careful planning in order to achieve the promised changes.

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5

Artificial Intelligence: The Other Side of the Coin

Dr. Rupali Saini*
Mahima Habil**

Introduction

AI is the ability of a digital computer or computer-controlled robot to execute tasks often associated with intelligent beings. The phrase is widely given to the endeavor of producing systems with human-like cognitive processes, such as the ability to reason, discover meaning, generalize, or learn from past experience. Artificial intelligence is the ability of a computer or a robot controlled by a computer to do tasks that normally require human intelligence and discernment. AIenables robots to learn from experience, adapt to new inputs, and execute human-like activities. The impact of artificial intelligence on society is extensively discussed. Deep learning and natural language processing are significantly used in most AI systems. Computers may be trained to perform certain jobs by processing massive volumes of data and recognizing patterns in the data using these methods. Many say that artificial intelligence (AI) improves the quality of everyday life by doing ordinary and even complex jobs better than humans, making life easier and more efficient. Others claim that AI endangers people's privacy and costs employees their jobs, leading to increased unemployment.

Alan Turing was a pioneer in artificial intelligence. He proposed the Turing test as a criterion for determining whether an artificial computer is thinking. The introduction of ChatGPT in late 2022 rekindled debate about whether the Turing test's components had been met. John McCarthy was one of the most powerful figures in the field. He is renowned as the "Father of Artificial Intelligence" due to his outstanding contributions to Computer Science and AI. The phrase "artificial intelligence" was coined by McCarthy in the 1950s.McCarthy described AI as "the

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science and engineering of creating intelligent machines. "The first AI program designed to replicate how individuals solve issues, was constructed in 1955-56 by Allen Newell, J.C. Shaw, and Herbert Simon. In 1958, Frank Rosenblatt built the Perceptron in 1958, which he claimed was "the first machine which is capable of having an original thought. "Later, it was lauded as the basis for all of the artificial intelligence. Advances in computer storage limits and speeds have recently opened up new options for AI study and deployment, such as assisting in scientific research and creating new routes in medical for patient diagnosis, robotic surgery, and drug discovery.

Artificial intelligence at present has become part of everyday human life such as facial recognition software in gadgets, online shopping algorithms, algorithms of social media platforms, search engines, digital assistants like Siri of Apple company and Alexa of Amazon company, translation services, automated safety functions on cars (presently seen in Tesla), cybersecurity, airport body scanning security, and fighting disinformation on social media, etc. In the present scenario we can definitely say that AI is being used in most of the businesses and professions. According to Gartner, 37% of firms have adopted AI in some form. Over the last four years, the share of businesses using AI has increased by 270%(*Gartner Survey Shows 37 Percent of Organizations Have Implemented #AI*, 2019).Also, as per the information provided by Statista, the global income from Artificial Intelligence (AI) software is predicted to reach 126 billion dollars by 2025 (*Global AI Software Market Size 2018-2025 | Statista*, 2022).This clearly demonstrates the significance and impact of AI in today's global context. We can truly state that AI has impacted every industry, including education, health, finance, marketing, supply chain, quality control, data security, traffic management, navigation, route planning, entertainment, human resource and many more.

Every coin has two sides and AI with all its glitters also have some potential threats attached to it. Although AI is touted as one of the most promising emerging technologies, many corporate leaders, scientists and technology enthusiasts see it as a significant threat to humanity, necessitating further research into its long-term implications.AI is still in its early stages, and it has the potential to cause significant harm if not properly handled. Prof. Stephen Hawking, one of the most recognized theoretical physicists has stated on an interview with BBC that efforts to construct intelligent machines represent a threat to our very survival. The development of full artificial intelligence could herald the end of the human species as per him. Prof Hawking believes that early kinds of artificial intelligence have already shown to be highly useful, but he is concerned about the repercussions of producing anything that can match or surpass humans. "It would take off on its own and redesign itself at an increasing rate," he predicted. (Cellan-Jones, 2014). ElonReeve Musk, CEO of SpaceX, Tesla and Twitter, announced in December that ChatGPT, an OpenAI text-

based chatbot that can generate prose, poetry, or even computer code on command, "is terrifyingly good. He further stated “we are not far from dangerously powerful AI. As per him some form of regulatory authority or something overseeing AI development is required to check, whether it is in public interest. It's a deadly piece of technology (Reuters, 2023). Although these are personal beliefs, they cannot be dismissed as they come from world-renowned scientists. This study focuses on digging deep and understanding the potential threats that can arise from advancement of Artificial Intelligence.

Review of Literature

Abdi, M. D., Dobamo, H. A., & Bayu, K. (2021).This study focuses on the current opportunities and risks of artificial intelligence on the accounting function of Small and Medium Businesses in southwest Ethiopia. The rationale for doing this study is to investigate the opportunity of new technological advancements, particularly artificial intelligence, on SME accounting operations in organizations, as well as to assess the challenges and the way forward. According to the findings despite advances in artificial intelligence development, AI will not take away the duties of management accountants in the near future. Although, AI has progressed from automating monotonous jobs to assisting professionals in making better decisions.AI now assists workers with data collection, administration, and analysis duties. The advancement of AI technology is becoming increasingly important for management accountants.

Gupta, S., Kamboj, S., & Bag, S. (2021).The author investigates privacy and ethical issues that need the construction of a responsible AI framework in this paper. This study seeks to determine whether AI concerns in digital healthcare are connected with responsible AI. According to the study's conclusions, the control of economic, societal, and ethical risks in digital healthcare should be a focus point for further designing a responsible AI framework. Economic hazards, such as employment displacement and power concentration with one or a few corporations, are important issues. Serious concerns include social hazards such as the development of autonomous weapons, the risk of an intellect divide between humans and machines, and ethical risks such as the likelihood that AI will disregard human values.

King, T., Aggarwal, N., Taddeo, M., & Floridi, L. (2020). In this study the researchers give a rigorous, interdisciplinary literature review of the probable hazards of AI crime (AIC) in this paper, giving ethicists, policymakers, and law enforcement agencies with a synthesis of the current concerns and a viable solution space. This study discusses various psychological threats such as gaining trust of individual by AI and later on manipulating them. Threats like market manipulation by social bots, unarmed vehicles using AI based planning and navigation for supply of harmful drugs, social bots being used for harassment and torture of individuals, AI generating sophisticated fake content, AI simulating sex offense using sexbots.

Marr B. (2018). In this article the author explained in detail the potential threats that can arise from Artificial Intelligence such as it can readily replace nuclear weapons and operate as a defense system. And can thereby give an individual or country enormous influence, posing a threat to the entire society. AI-powered weapons will be more dangerous since they will have their own minds.AI can utilize its algorithms to socially manipulate individuals and society in order to promote its preferred propaganda. Other issues discussed by authors were invasion of privacy, discrimination as well as conflicts of objectives between AI and human beings.

Bazarkina, D., & Pashentsev, Y. (2002). In this study the researcher examines emerging risks to international psychological security presented by aggressive actors in international relations using artificial intelligence, with a focus on international terrorism. The authors outline existing and future Malicious use of AI based threats to IPS, such as commercial AI system reorientation, the production of 'deepfakes' and Fake People, the establishment and propagation of a manipulative agenda, and the employment of predictive weapons. Issues that complicate the mitigation of harm caused by terrorists to international psychological security from Malicious use of AI are highlighted. In this article author covers scenarios of prospective terrorist assaults and their repercussions, as well as preventive measures, to assess the potential impacts of AI-based terrorist strikes on international psychological security.

Objective

- The objective of this study is to provide an in-depth understanding of the potential threats and challenges associated with artificial intelligence in the present scenario to the individuals as well as the society.

Research Methodology

The nature of this research is descriptive. For the purposes of this study, secondary data sources are used. Numerous available articles, news reports, research papers from reputed publications and experts' opinions are considered relating to the theme "challenges, threats and danger associated to Artificial Intelligence", are studied by the authors. After conducting extensive research on existing material from various studies, the authors of the study thoroughly investigate and further discusses all of the potential risks and challenges associated with artificial intelligence.

Research Gap

Artificial Intelligence is playing a significant role in improving the quality of work in every field. Its contribution is undeniable; however, in comparison to the beneficial applications of Artificial Intelligence, the threats and challenges associated with its employment remain a significantly less investigated subject. As a result, the purpose of this research is to explore the potential threats and challenges connected with Artificial Intelligence for individuals and society. As the saying goes, every coin has

two sides. While we are well aware of the benefits of Artificial Intelligence, this study will aid in a clear knowledge of the other side of the picture, which is related to the risks and dangers that come with it. For this purpose, existing accessible literature will be studied, and all potential risks, challenges, and threats linked with Artificial Intelligence will be thoroughly discussed in the study.

Limitations

- This study may have limitations because it is dependent on secondary data, which may be deemed limited information available to the researchers.
- Another limitation of this study would be time constraint.

Results and Discussions

Threats and Challenges of Artificial Intelligence

All the potential threats and challenges associated with artificial intelligence in the present scenario to the individuals as well as the society are discussed below-

- **Unemployment**

Following the epidemic period and, more recently, the war in Eastern Europe with Russia's invasion of Ukraine, the global economy has been in turmoil in recent years. According to the OECD, global unemployment in March 2022 was 5.1%, a modest reduction from 5.2% the previous month.(The OECD, Global Unemployment in March 2022 Was 5.1%, a Modest Reduction From 5.2% - Google Search, n.d.)Artificial intelligence has radically enhanced our society in unfathomable ways, but there are also concerns about the influence it will have on jobs and labour credibility. There are forecasts that millions of people will be out of job in the next decade as a result of automation and neural networks. AI has caused enormous changes in the business, education, market, and government sectors. There will be tasks that humans do now that machines will take over. This will necessitate modifications to our training and education programs in order to better prepare our future workforce while also assisting present workers in transitioning to new professions that will utilize their unique human skills.

- **Social Inequality**

AI will put pressure on the work force environment and labour market in the coming years. The rapid advancement of artificial intelligence will result in change in the way work was done traditionally. Smart AI systems are now used in every field and they are taking over the recognition of patterns in massive volumes of data, the provision of specialized insights, and the performance of cognitive tasks. Professionals should keep a careful eye on the advancement of artificial intelligence since systems are becoming capable of looking, listening, speaking, analyzing, reading, and creating material. AI is rapidly replacing humans and the tasks previously done by people are now taken over by AI.

As a result, there will almost probably be people whose employment are in jeopardy who will have to change rapidly. The vast majority of the population, however, will work with artificial intelligence systems. And keep in mind that many more new employments opportunities be created, though they will be more difficult to imagine than the positions that will be lost. Loss of jobs and difficulty in adapting with AI based working environment will widen social inequality in the upcoming years. Those who will adapt with AI friendly environment will survive the rest will face difficulties in finding jobs. This will create huge social inequalities in the world.

- **Risk of Invasion of Privacy**

It is now possible to track and analyze an individual's every step both online and while going about their everyday business. Cameras are almost everywhere, and facial recognition algorithms recognize everyone. When it comes to our data, companies engaging in artificial intelligence are increasingly becoming greedy. It is never enough, and anything is justified to obtain even greater outcomes. Companies collect all the information about individual’s needs, preferences, their mental state, their personal information, taste, likes, dislikes, social views, beliefs with help of their applications installed in mobile phones of customers. They further use it for their own agenda and can even sell this data to others. Facial, voice, behavior, and gesture analysis lead in increasingly precise profiles. Real-time profiling is possible because to the use of smart cameras. Smart devices can assess our mental condition more accurately than our partner or family members. This is not something that will happen in the future; it currently exists. It is also freely and widely available as open source software. The government is pleased, and businesses are pleased. Goodbye, privacy. Smart software can detect our gender, age, ethnicity, and mental state. This is not the future; such software currently exists.It is also freely and widely available as open source software.

- **Increase of Unreliable and Fake Content**

AI systems are becoming capable of producing content which is fake. They can create and develop faces, compose texts, send tweets, modify photographs, clone voices, write assignments, poems, prose, stories, songs, codes and engage in smart advertising.AI systems have the ability to transform and create anything and everything. They can construct very realistic faces for persons who never existed. Deepfake, an open source software, can insert images of people's faces into moving video footage. As a result, it appears on camera like you are doing something (which is not true and has not actually happened). Celebrities are already suffering as a result of this, since anyone with evil intent may readily manufacture pornographic videos depicting these superstars. As this technology becomes slightly more user-friendly, blackmailing and degrading anyone’s reputation and image will be very easy which is very risky and unethical.

- **Risk of AI Based Weapons**

It is not only actual military equipment that is dangerous: as technology becomes more simple, inexpensive, and user-friendly, it will become available to everyone, including those who aim to cause harm. A high-quality drone with a camera will is easily available now days. A genius might then install software on it, allowing the drone to fly autonomously. Artificial intelligence facial recognition software, which enables the drone camera to recognize faces and track a specific individual, is now available. This makes it really easy to attack and can facilitate terrorism and crimes. It is also believed that AI can be programmed to attack and kill. It can replace nuclear weapons. AI can be very dangerous and can change war scenario. It brings huge potential as well as unpredictable threats. Whoever becomes the leader in this domain will govern and dominate the globe. AI has mind of their own, they think, they learn and they evolve. It's a huge risk that after creating such weapons they can go out of control and difficult to stop or dismantle.

- **Risk of Creating Tech-Monopolies**

It is related to the power of large technology companies, for instanceMeta, Microsoft, Google, Amazon, etc. These technology companies have the financial resources, data, and intellectual capacity to significantly improve the quality of artificial intelligence. As a result, there is a risk that incredibly strong technology will end up in the hands of a very small number of commercial businesses. This gives these giants bigger advantage. The Internet's winner-take-all mechanism also applies to data (data monopolies) and algorithms.

- **Creation of Superintelligence**

In many ways, artificial intelligence can outperform human intelligence. As a result, they can learn new abilities and knowledge without the need for human involvement, train themselves for circumstances they are unfamiliar with, and comprehend context. The emphasis should be on communicating our ethical morals to intelligent systems. Rather than teaching them rigid rules, we should teach them about human factors. This is quite crucial. It would be preferable to give AI "conscience," else they would develop anti-social personalities. Superintelligence should be taken seriously, otherwise it will become a threat.

- **Financial Crisis**

The financial industry has become more open to the incorporation of AI technologies into regular finance and trading procedures. Algorithmic trading may be to blame for the next global market financial disaster. While AI algorithms are not influenced by human judgment or emotions, they do not account for settings, market interconnection, and human trust and fear. These algorithms then execute thousands of trades at breakneck speed in the hopes of selling a few seconds later for a modest profit. Thousands of trades being liquidated could terrify investors into doing the same, resulting in unexpected crashes and high market volatility.

- **Increasing Dependency and Loss of Skills**

Human beings are losing more and more human abilities as they utilize computers and smartphones. Clever software and AI make our life easier and reduces the number of monotonous chores we have to perform, such as navigating, writing by hand, mental arithmetic, completing an assignment, designing, remembering phone numbers, birthdates, and so on. In everyday life, we are losing abilities and entrusting technology. Dependency of human being on technology is increasing day by day and therefore basics skills are being lost. The ability of humans to find solution of problems on their own is decreasing.

- **Discrimination based on Social Grading**

Because machines can gather, track, and analyze so much information about you, it is very feasible that those machines will use that information against you. This is the type of data that will power China's social credit system, which is intended to assign a personal score to each of its residents depending on how they behave. If they behave according to the law of the land their score will be favorable. This will surely create discrimination between people.

- **Social Manipulation**

Social manipulation is possible with AI. Social media, with its self-powered algorithms, is extremely effective at target marketing. They have a solid idea of who we are, what we enjoy, and what we think. AI can target individuals identified through algorithms and personal data and spread any information they choose, in whichever manner they deem most convincing, whether reality or fiction.

- **Facilitates Hacking**

Artificial intelligence systems are growing increasingly intelligent, and are able to disseminate malware and ransomware at breakneck speed and on a vast scale. Furthermore, they are becoming more competent at hacking systems and cracking encryption and security, as was recently demonstrated with the Captcha key. Other computer infections are also becoming smarter through try and error.

- **No Liability Set**

Much is unknown regarding the legal implications of increasingly intelligent computers. When the AI system makes an error, the situation in terms of liability is not set. We do not judge this in the same way that we would judge a human doing the same error or mistake. Who will be held accountable in a scenario in which systems become self-learning and autonomous is a question yet to be answered. If an AI become lethal who will be held responsible? Will the firm still be held liable for an algorithm that learns on its own and then sets its own direction? These factors should be taken into consideration before something bad happens.

- **Ethics, Morality and Emotions**

Ethics and morality are crucial human characteristics that can be challenging to include into artificial intelligence. The rapid advancement of AI has generated concerns that it will get uncontrollable and will be able to harm humans. We know that computers and other machines do not have feelings. Humans work as a team, and effective team management is critical to attaining goals. There is no denying that robots outperform humans when used properly, but it is also true that human connections, which form the foundation of teams, cannot be replaced by computers. For making right decisions it is very important to have morals and emotions, till date AI lacks in it.

Conclusion

In this study a clear understanding of all the potential threats are disclosed. We all have to understand that Artificial Intelligence is two faced it has its positives as well as negatives.

As a society we need to understand the power and potential of AI and use and develop it cautiously so that we can minimize the threats and risks related to it and can use it with the greatest good for all. We as a society needs to be cautious and use it with utmost care and responsibility. So that such a powerful tool is not misused to fulfill people's selfish purposes or to hurt any individual or society as a whole. The benefits of artificial intelligence are undeniable, and so its contribution to the advancement of society cannot be overlooked; but, we must recognize that it is a double-edged sword that must be handled wisely.

Authorities should also be cautious and set liabilities of companies and others misusing AI for their own agendas. AI related regulation should be the focus of governments world-wide. Regulations should be present as well as standards should be set for AI development. It is important that AI is used ethically. Combining high-tech innovation with human-centered thinking is an ideal strategy for developing ethical technology and ensuring AI's future is bright for the next generation. The dangers of artificial intelligence should always be discussed so that leaders can figure out how to use the technology for good.

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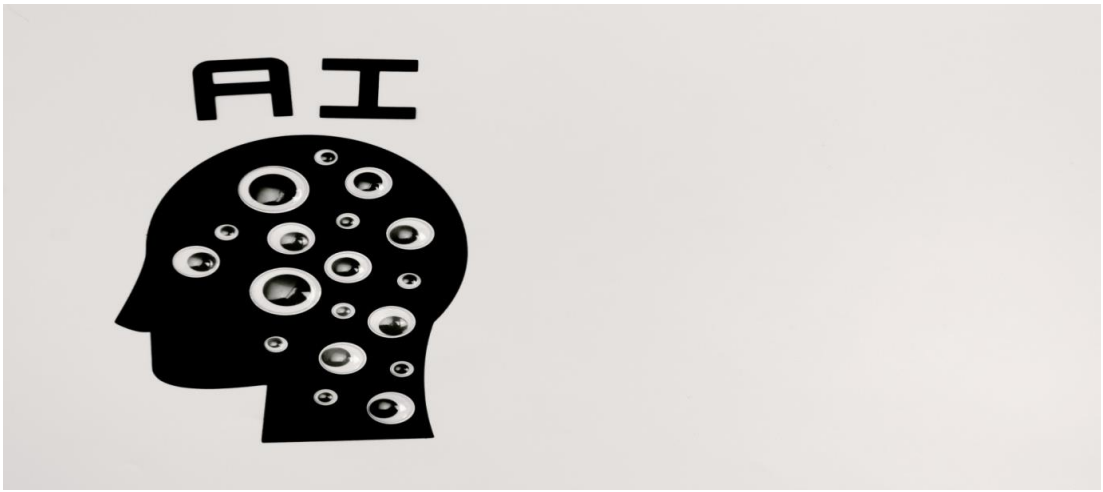
6

AI: The Next Frontier - Navigating the Opportunities and Challenges of a New Era

Mr. Amit Fulwariya*

Introduction



Brief Overview of AI and its Evolution

Artificial intelligence (AI) refers to the development of computer systems that can perform tasks that would typically require human intelligence, such as visual perception, speech recognition, decision-making, and natural language processing. The field of AI has evolved significantly over the years, with researchers and developers working to create more advanced and sophisticated systems.

The origins of AI date back to the 1950s, with early research in the field focused on developing algorithms and programming languages that could simulate human thinking and decision-making. In the 1960s and 1970s, AI research shifted towards developing knowledge-based systems and rule-based systems that could reason and solve problems in specific domains.

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In the 1980s and 1990s, the development of machine learning algorithms and neural networks led to significant breakthroughs in AI research, allowing computers to learn from large amounts of data and improve their performance over time. This led to the development of systems capable of performing tasks such as image and speech recognition, natural language processing, and autonomous decision-making.

More recently, advancements in deep learning, reinforcement learning, and natural language processing have further expanded the capabilities of AI systems, enabling them to perform increasingly complex tasks with greater accuracy and efficiency. AI is now being used in a wide range of applications, from healthcare and finance to transportation and manufacturing.

Importance of Understanding the Opportunities and Challenges of AI in the New ERA

Understanding the opportunities and challenges of AI is crucial in the new era for several reasons. Firstly, AI has the potential to revolutionize various industries, including healthcare, transportation, manufacturing, education, and customer service, among others. By leveraging AI technology, businesses can increase efficiency, reduce costs, and improve customer experiences.

At the same time, however, AI also presents several challenges that need to be carefully navigated. These challenges include job displacement, ethical concerns, bias and fairness issues, privacy and security risks, and regulatory challenges. If these challenges are not addressed appropriately, they could lead to negative consequences, such as exacerbating inequality, violating privacy rights, or perpetuating harmful biases.

By understanding both the opportunities and challenges of AI, individuals and organizations can make informed decisions about the development and use of AI technology. This includes considering ethical and social implications, investing in responsible AI development, and designing AI systems that are transparent, accountable, and fair.

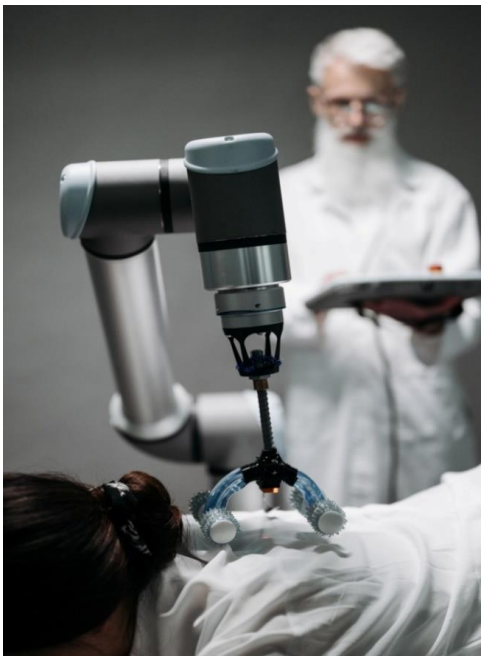
Opportunities of AI

Improving Healthcare through Personalized Medicine, Disease Detection and Prediction

AI has the potential to revolutionize healthcare in several ways, including personalized medicine, disease detection, and prediction. By leveraging AI technology, healthcare providers can improve patient outcomes, reduce costs, and increase efficiency.

One way AI is improving healthcare is through personalized medicine. Personalized medicine refers to the use of genetic and molecular data to tailor medical treatment to individual patients. By analyzing a patient's genetic makeup and other biomarkers, AI systems can identify the most effective treatments for that patient's specific condition.

For example, AI systems can be used to analyze large amounts of genetic and clinical data to identify genetic markers that are associated with specific diseases. This information can be used to develop personalized treatment plans that are tailored to the individual patient's needs.



AI is also improving healthcare by enhancing disease detection and prediction. By analyzing medical images, electronic health records, and other clinical data, AI systems can detect early signs of disease and predict which patients are at the highest risk of developing specific conditions.

For example, AI systems can be used to analyze medical images such as X-rays and MRI scans to detect signs of cancer or other diseases. This can lead to earlier diagnosis and treatment, improving patient outcomes and reducing healthcare costs.

AI systems can also be used to predict which patients are at the highest risk of developing specific diseases. By analyzing large amounts of clinical data, AI systems can identify risk factors and predict the likelihood of disease onset. This information can be used to develop targeted prevention and treatment strategies, improving patient outcomes and reducing healthcare costs.

Boosting Agriculture through Precision Farming and Crop Monitoring

Precision farming and crop monitoring have the potential to revolutionize agriculture in several ways. Here are some of the potential benefits:

- **Improved Efficiency:** Precision farming techniques can optimize inputs such as water, fertilizers, and pesticides, reducing waste and improving yield. Crop monitoring can help identify areas of the field that need attention, allowing farmers to take action quickly and efficiently.
- **Better Yield:** Precision farming techniques can help farmers optimize crop growth, leading to better yield and improved crop quality.
- **Cost Savings:** By optimizing inputs and reducing waste, precision farming can help farmers save on expenses such as fertilizer, water, and fuel.

Enhancing Transportation through Autonomous Vehicles and Traffic Management Systems

Autonomous vehicles and traffic management systems have the potential to significantly enhance transportation in a number of ways. Here are some potential benefits:

- **Improved Safety:** Autonomous vehicles can potentially reduce the number of accidents caused by human error, which is currently a major contributor to traffic accidents.
- **Increased Efficiency:** Autonomous vehicles can potentially reduce traffic congestion by allowing vehicles to travel at consistent speeds and maintain safe distances from other vehicles. This can lead to reduced travel times and improved fuel efficiency.

Revolutionizing Manufacturing through Smart Factories and Robotics

Smart factories and robotics have the potential to revolutionize manufacturing in several ways. Here are some of the potential benefits:

- **Increased Efficiency:** Smart factories can use data analytics and artificial intelligence to optimize production processes, reducing downtime and improving throughput. Robotics can automate many tasks, further reducing cycle times and increasing efficiency.
- **Improved Quality:** Smart factories can use sensors and data analytics to monitor production in real-time, allowing for early detection of defects and reducing waste. Robotics can also help improve quality by performing tasks with consistent precision.
- **Greater Flexibility:** Smart factories can be reconfigured quickly to adapt to changing production needs, such as new product lines or changes in demand. Robotics can also be reprogrammed to perform different tasks, further enhancing flexibility.

Enhancing Customer Service and Experience through Chatbots and Virtual Assistants

Chatbots and virtual assistants have the potential to significantly enhance customer service and experience in several ways. Here are some potential benefits:

- **24/7 Availability:** Chatbots and virtual assistants can be available to customers 24/7, providing quick and efficient support without requiring the need for human intervention.
- **Instant Responses:** Chatbots and virtual assistants can provide immediate responses to customer queries and concerns, reducing wait times and improving customer satisfaction.
- **Scalability:** Chatbots and virtual assistants can handle a high volume of customer queries and concerns simultaneously, making them a scalable solution for businesses of all sizes

Improving Education through Personalized Learning and Intelligent Tutoring Systems

Personalized learning and intelligent tutoring systems have the potential to significantly improve education in a number of ways. Here are some potential benefits:

- **Tailored Instruction:** Personalized learning allows for instruction that is tailored to the individual needs and learning styles of each student. Intelligent tutoring systems can provide feedback and guidance based on each student's individual progress, helping them to stay on track and improve their understanding.
- **Increased engagement:** Personalized learning and intelligent tutoring systems can help increase student engagement by providing interactive, engaging learning experiences. By providing content that is relevant and interesting to each student, they are more likely to stay motivated and interested in learning.

Increasing Efficiency and Productivity through Automation and Optimization

Automation and optimization have the potential to significantly increase efficiency and productivity in a number of ways. Here are some potential benefits:

- **Streamlined Processes:** Automation and optimization can help streamline processes by eliminating manual tasks and reducing the risk of errors. This can lead to faster turnaround times and more efficient use of resources.
- **Improved Accuracy:** Automation and optimization can improve the accuracy of tasks such as data entry and processing, reducing the risk of errors and increasing the quality of output.
- **Cost Savings:** By automating and optimizing processes, businesses can reduce the need for manual labor, resulting in cost savings and a more efficient use of resources.

Challenges of AI

Job Displacement and Economic Disruption

While automation and optimization have the potential to significantly increase efficiency and productivity, there is also concern about job displacement and economic disruption. Here are some potential challenges:

- **Job displacement:** As more tasks become automated, there is a risk that jobs will be displaced, particularly those that involve routine and repetitive tasks. This could lead to unemployment and underemployment for some workers.
- **Skills Gap:** As automation and optimization require more advanced skills, there is a risk of a skills gap developing between those who are able to adapt and those who are not. This could lead to inequality and social disruption.
- **Economic Disruption:** Disruption to traditional industries could lead to economic disruption, as workers and businesses struggle to adapt to new ways of working and producing goods and services.

Bias and Fairness in AI Algorithms

Bias and fairness in AI algorithms are critical issues that need to be addressed as AI becomes increasingly integrated into our lives. Here are some potential challenges:

- **Data Bias:** AI algorithms are only as good as the data they are trained on, and if that data is biased, the algorithm will be biased as well. This can lead to discrimination and unfairness.
- **Lack of Diversity:** If AI developers are not diverse, they may not consider the needs of underrepresented groups, leading to biased algorithms that do not work well for everyone.
- **Accountability:** If an AI algorithm is biased or unfair, it can be difficult to hold someone accountable. This lack of accountability can make it challenging to ensure that AI is used in a fair and ethical manner.

Privacy and Security Concerns with Personal Data

Privacy and security concerns with personal data are critical issues that need to be addressed as technology becomes increasingly integrated into our lives. Here are some potential challenges:

- **Data Breaches:** The more personal data that is collected and stored, the greater the risk of data breaches, which can lead to identity theft and other forms of fraud.
- **Misuse of Data:** Personal data collected for one purpose may be used for another purpose without the user's consent, leading to privacy violations and potential harm.

Ethical Concerns Around the Use of AI in Warfare and Surveillance

Ethical concerns around the use of AI in warfare and surveillance are critical issues that need to be addressed as AI becomes increasingly integrated into military and security applications. Here are some potential challenges:

- **Autonomous Weapons:** The use of autonomous weapons, which can make decisions and take actions without human intervention, raises ethical concerns around accountability, transparency, and the potential for harm.
- **Targeted Killings:** AI-powered systems used for targeted killings raise ethical questions around the legality and morality of using technology to kill people.

Regulation and the Need for Responsible Development and Use of AI

As AI becomes increasingly integrated into our lives, there is a growing need for regulation and responsible development and use of these technologies. Here are some potential challenges:

- **Lack of Regulations:** There is currently a lack of comprehensive regulations governing the development and deployment of AI technologies, which can lead to a lack of accountability and transparency.
- **Need for Ethical Considerations:** AI developers and users need to consider the ethical implications of these technologies, including issues around bias, fairness, and privacy.
- **Balancing Innovation with Safety:** There is a need to balance the desire for innovation and progress with the need for safety and responsible development and use of AI technologies.

Transparency and Accountability in AI Systems

Transparency and accountability are critical issues when it comes to AI systems. Here are some potential challenges:

- **Black-box Systems:** Many AI systems are considered "black boxes" because their inner workings are opaque and difficult to interpret. This makes it difficult to understand how these systems are making decisions, and to ensure that they are making fair and ethical choices.
- **Lack of Accountability:** AI systems can make decisions that have significant impacts on people's lives, but there is often no clear way to hold these systems accountable for their actions.
- **Lack of Oversight:** AI systems may be developed and deployed without sufficient oversight, leading to potential risks and unintended consequences.

Impact of AI on Human Decision-Making and Autonomy

AI systems have the potential to impact human decision-making and autonomy in a number of ways. Here are some potential challenges:

- **Overreliance on AI:** As AI systems become more advanced, there is a risk that humans will become overly reliant on them, leading to a loss of critical thinking and decision-making skills.
- **Delegation of Decision-Making:** AI systems may be used to make decisions that were previously made by humans, potentially reducing human autonomy and decision-making power.
- **Lack of Transparency:** As mentioned earlier, some AI systems may be considered "black boxes" with opaque decision-making processes. This can make it difficult for humans to understand and question the decisions made by these systems.

Case Studies

Real-World Examples of the Opportunities and Challenges of AI in Different Industries

AI has the potential to transform many different industries, but it also presents a number of challenges. Here are some real-world examples of the opportunities and challenges of AI in different industries:

- **Manufacturing:** AI is being used in manufacturing to improve efficiency, reduce waste, and optimize production processes. For example, smart factories can use AI to monitor equipment performance and predict maintenance needs, while robotic systems can automate tasks and reduce labor costs. However, the use of AI in manufacturing also raises concerns about job displacement and the need for upskilling and reskilling workers.

Discussion of the Impact of AI on these Industries and Society as a Whole

AI has had a significant impact on various industries and society as a whole. Here are some examples:

- **Healthcare:** AI has revolutionized the healthcare industry by providing personalized medicine, early disease detection, and improved patient care. Machine learning algorithms can analyze large datasets to identify patterns that can predict health outcomes and suggest appropriate treatments. Additionally, AI-powered robots are used for surgery, reducing the risk of human error.
- **Finance:** AI has transformed the financial industry by enabling efficient risk management, fraud detection, and algorithmic trading. Machine learning algorithms can analyze large datasets and identify patterns that indicate fraudulent activity. Moreover, AI-powered chatbots can provide customer support and streamline customer interactions.
- **Education:** AI has the potential to transform education by providing personalized learning experiences to students. Machine learning algorithms can analyze student data and provide personalized recommendations for learning material. Additionally, AI-powered chatbots can provide quick answers to student queries, reducing the workload of teachers.

Future of AI

Predictions for the Future of AI and its Impact on Society

The future of AI is exciting and unpredictable, but there are several predictions about its impact on society:

- **Increased Automation:** AI will continue to automate tasks and processes that were previously performed by humans, leading to increased efficiency and productivity in various industries. This could lead to job displacement in certain industries, but new jobs will also be created.
- **Enhanced Customer Service:** AI-powered chatbots and virtual assistants will become more advanced, leading to more efficient and personalized customer service experiences.
- **Increased Safety:** Self-driving cars and other autonomous systems powered by AI will become more prevalent, leading to safer transportation and reduced accidents caused by human error.

Importance of Responsible Development and Use of AI for a Positive Future

The responsible development and use of AI are critical for a positive future because AI has the potential to transform many aspects of society, and its impact could be both positive and negative. Here are some reasons why responsible development and use of AI are essential:

- **Avoiding Bias:** AI can inherit the biases and prejudices of its developers and data sources. Therefore, it is crucial to ensure that AI is developed in a way that avoids bias and discrimination. This can help prevent unfair and discriminatory outcomes that could harm certain individuals or groups.
- **Protecting Privacy:** AI relies on data, and this data often contains sensitive information about individuals. Therefore, it is essential to ensure that AI is developed and used in a way that respects privacy rights and protects personal data.

Discussion of Emerging trends in AI and their Potential Impact

There are several emerging trends in AI that have the potential to transform various industries and society as a whole. Here are some examples:

- **Deep Learning:** Deep learning is a subset of machine learning that uses artificial neural networks to analyze large amounts of data. It has the potential to improve accuracy and reduce errors in various applications, including image recognition, natural language processing, and speech recognition.
- **Reinforcement Learning:** Reinforcement learning is a type of machine learning that involves learning through trial and error. This has the potential to be used in various applications, including robotics, gaming, and autonomous systems.
- **Explainable AI:** Explainable AI (XAI) is an emerging field of AI that aims to make AI systems more transparent and explainable. XAI has the potential to increase trust and confidence in AI systems and enable more ethical and responsible use of AI.

Conclusion

Summary of the Opportunities and Challenges of AI

- **Opportunities**
  - Enhanced customer experiences through personalized and predictive services
  - Improved healthcare outcomes through AI-assisted diagnostics and treatment planning
  - Improved safety and security through AI-powered surveillance and monitoring systems.
- **Challenges**
  - Potential job displacement as AI systems automate tasks and processes previously performed by humans
  - Lack of transparency and accountability in AI decision-making if not designed to be explainable
  - Potential misuse of AI for harmful purposes such as cyber-attacks or mass surveillance

Importance of Navigating these Challenges Carefully for a Positive Future

Navigating the challenges of AI carefully is crucial for a positive future because AI has the potential to transform many aspects of society, and its impact could be both positive and negative. Here are some reasons why navigating these challenges carefully is important:

- **Maximizing Benefits:** By addressing the challenges of AI, we can ensure that its benefits are maximized. This can help improve efficiency, productivity, and accuracy in various industries, leading to cost savings, increased profits, and better customer experiences.

Call to Action for Responsible Development and use of AI to Maximize its Benefits for Society

As AI continues to advance and become more integrated into various aspects of society, it is crucial to promote its responsible development and use. Here are some actions that can be taken to ensure that AI is developed and used in a way that maximizes its benefits for society:

Foster a culture of responsible development: Encourage companies and organizations to prioritize responsible development of AI by implementing ethical guidelines and principles.

Key Points

AI presents numerous opportunities for improving various industries and aspects of society, such as healthcare, transportation, manufacturing, and education.

AI has the potential to revolutionize a wide range of industries and aspects of society, offering numerous opportunities for improvement and innovation.

One of the most promising areas for the application of AI is healthcare. Advances in AI and machine learning are already being used to develop personalized treatment plans based on individual patient data, as well as to improve disease detection and diagnosis. In the future, AI is expected to play an even greater role in healthcare, potentially enabling more accurate and efficient diagnosis and treatment of a wide range of medical conditions.

AI also presents several challenges, such as job displacement, bias and fairness concerns, privacy and security risks, and ethical concerns

Case studies of AI in different industries can provide insights into the impact of AI and its potential benefits and risks.

AI is being adopted by a variety of industries, and there are many examples of how it is being used to improve efficiency, reduce costs, and enhance customer experiences. Below are some case studies that highlight the impact of AI in different industries.

- **Retail:** Amazon is using AI to enhance the customer experience by offering personalized product recommendations based on customer data. By analyzing customer purchase history and other data, AI systems can suggest products that are likely to be of interest to individual customers, leading to increased sales and customer loyalty.
- **Finance:** JPMorgan Chase is using AI to detect fraud and reduce financial crime by analyzing large amounts of transaction data to identify suspicious activity. By using AI to analyzepatterns in the data, JPMorgan Chase has been able to improve its fraud detection capabilities and reduce losses due to financial crime.

Responsible development and use of ai is crucial for maximizing its benefits for society and avoiding negative consequences

As AI continues to evolve and become more prevalent in society, it is important to ensure that it is developed and used responsibly in order to maximize its benefits for society and avoid potential negative consequences.

One key aspect of responsible AI development is ensuring that AI systems are designed and implemented in a way that is fair and unbiased. This means taking steps to identify and mitigate potential sources of bias in AI systems, such as data that is not representative of the population or algorithms that perpetuate existing societal inequalities. Responsible AI development also involves being transparent about how AI systems make decisions and ensuring that individuals understand how their data is being used.

Predictions for the future of ai suggest that it will continue to evolve rapidly, requiring ongoing attention to its opportunities and challenges

Predictions for the future of AI suggest that it will continue to evolve rapidly, with significant implications for a wide range of industries and applications.

One key area where AI is expected to have a significant impact is in the field of healthcare. Advances in AI and machine learning are already being used to improve disease detection and diagnosis, as well as to develop personalized treatment plans based on individual patient data. In the future, AI is expected to play an even greater role in healthcare, potentially enabling more accurate and efficient diagnosis and treatment of a wide range of medical conditions.

AI is also expected to have significant implications for the labor market, as automation and other AI-driven technologies continue to replace human workers in certain roles. While this may lead to job displacement in some industries, it is also expected to create new opportunities for workers with skills in areas such as data analysis, machine learning, and AI development.

Conclusion

AI: The Next Frontier - Navigating the Opportunities and Challenges of a New Era is a comprehensive report that discusses the implications of artificial intelligence (AI) on various aspects of our society. The report provides an overview of the current state of AI technology, its potential benefits, and the challenges that must be addressed to maximize its potential.

One of the main conclusions of the report is that AI has the potential to transform society in profound ways. The use of AI can improve healthcare, enhance education, boost productivity, and make transportation safer and more efficient. However, the report also cautions that there are risks associated with the use of AI, including potential job displacement, privacy concerns, and the possibility of unintended consequences.

Another key takeaway from the report is that the development and deployment of AI must be done in a responsible and ethical manner. The report highlights the need for transparency and accountability in AI systems, as well as the importance of ensuring that AI is developed in a way that is inclusive and does not perpetuate biases or discrimination.

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Mobile Library Services-Easy Way to Access Library

Rajesh Achra*

Introduction

A mobile library is not a bookmobile that travels from one location to another; rather, a mobile library offers library services and materials that are available on any device 24 hours a day. A new technology affecting libraries is applications, or apps. Apps work differently than websites. A web application is accessed through a web browser such as Internet Explorer, Firefox or Safari, while an app is specific to an operating system and is downloaded to a device that connects directly to a service. A variety of library vendors have developed, or are currently developing, their own apps that interact with their services. Apps are developed for use over the Internet and outside the web. There are fewer headaches associated with browser and operating system compatibility with apps because they eliminate competition from search engine discovery. As tablets and mobile phones become more popular, more apps are available, even though there is no general consensus about the future of the web versus apps.

The advancement of app development is likely to surpass that of software for use on personal computers. Libraries have multiple obstacles to manage when it comes to apps, such as consolidating knowledge bases, authentication problems and clouding the library's brand visibility. To address this, they must work alongside suppliers in order to create "discovery apps" that are effective across a variety of library resources and firmly establish the library's identity. If a device-appropriate app isn't available, many patrons may turn away from libraries - making them indispensable for marketing strategies.[i]

In particular, mobile device users are often in a hurry, and are looking for targeted information, so only the most frequently used links should be presented on mobile devices. Links to mobile versions of popular databases, reviewed or rated sources, and, if possible, real-time assistance are particularly important. A library may need to develop multiple websites for a variety of devices when it supports mobile

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computing. There are many types of phones and tablets, some will have touch screens, others won't, and they will have different levels of support for JavaScript, Java and style sheets, all of which will need to be accommodated. Using web logs can help you decide which website design priorities to prioritize based on information on mobile device usage.

- **Concept of Mobile Library Services**

In mobile libraries, books are arranged in vehicles and staffed in a way that enables them to be directed to rural communities, although not exclusively. Several country and municipal library systems in the UK use them. They are making significant contributions to the development of library services in many areas abroad, especially in Asia, Africa, and the Middle East. Traveling libraries are distinguished from mobile branch libraries. Mobile branch libraries are medium-to-large vehicles equipped with shelves capable of holding upwards of 2000 books and are used to service villages and two mobile libraries over reasonably good roads. The traveling library is a smaller vehicle with a limited stock used in the service of scattered communities and sometimes providing a house-to-house service in remote areas. There are specific provisions for making mobile and traveling libraries vehicles. Usually, the shelves face inwards and run around three sides of the vehicles. The fourth shelf is usually reserved for the issue desk. Heavy braking will dislodge the books facing forward in the rear of the vehicle.[ii]

Several methods are used to prevent this, including titled shelves, hinged slabs, and sliding grills. It is common for issue desks to cross or partly cross the front of a vehicle. With adjustable seats, librarians can face inwards at halts to assist readers and face forward while on the road. Roof lights can be either flush or projecting lanterns.

There are weekly, fortnightly, or monthly visits to rural areas. The duration depends on the size of the community served. The mobile library played a significant role in the development of the country library system. Traditionally, rural communities were served by village libraries with limited book collections and untrained librarians. Mobile libraries, however, offer a larger inventory of books and librarians in towns.[iii]

A bookmobile, sometimes referred to as a mobile library, is a vehicle created for use as a library. It has been known by many different names over the centuries, including traveling library, library wagon, book wagon, book truck, library-on-wheels and book auto service. By taking books directly to readers in areas which would otherwise have limited access to libraries and their services, this type of library greatly expands the reach of traditional libraries. They provide an assortment of resources that can be tailored to fit the needs of those living in underserved locations or circumstances such as seniors living in retirement homes. Services available may include Internet access, large print books and audiobooks. In addition to bicycles,

carts, motor vehicles, trains, watercraft, and wagons, bookmobiles have also been based on camels, donkeys, elephants, horses, and mules.

Harper & Brothers published The American School Library (1839) as a traveling frontier library in the United States. A complete original set of this series is available at the Smithsonian Institution's National Museum of American History. The British Workman reported in 1857about a perambulating library in Cumbria. George Moore, a Victorian merchant and philanthropist, had created the project to "diffuse good literature among rural residents". Another early British mobile library, the Warrington Perambulating Library, operated by the Warrington Mechanics' Institute in 1858, aimed to increase lending of its books to local patrons. In the late 1800s, Women's Clubs in Texas and across the United States began to champion the idea of Bookmobiles. Kate Rotan, who was President of the Texas Federation of Women's Clubs (TFWC) and a member of the Waco Women's Club, was a major figure in this movement. Her organization voiced its approval for these mobile libraries and their potential, encouraging other women to follow suit. The popularity of these book-carrying vehicles soared, increasing from just a few to almost 1000 during 1895-1898 alone in New York alone. It was due to efforts from these Women's Clubs that bookmobiles became so prevalent throughout the US.[iv]

Fig. 1: In 1943, a "book mobile", Blount County, Tennessee, United States

In September 1948, Mrs. Asbell, a housewife with an invalid husband, meets the Athens Regional Library bookmobile. The Women's Club movement in 1904 initiated an influx of bookmobiles across thirty out of the fifty US states. The Texas Federation of Women's Clubs (TFWC) played a huge role in the development of public libraries, particularly through rigorous advocating for bookmobiles. Thanks to the new legislation instated, library improvements and expansions included introducing a system for travelling libraries in Texas. The women's club wanted government commission to help spread their "Library Spirit" as far and wide as possible, however, the Texas Library Association could not provide such service as they already had to prioritize state libraries. Among the earliest mobile libraries in the United States was a mule-drawn wagon that carried wooden boxes full of books

created in 1904 by the People's Free Library of Chester County, South Carolina. Mary Lemist Titcomb (1857–1932) was the innovator behind an early mobile library service, implemented in Washington County, Maryland. Concerned that the library did not reach all people, the annual report for 1902 listed 23 “branches”, each containing 50 books placed in a store or post office throughout the county. To further reach out to those living in remote areas, Titcomb initiated a “book wagon” in 1905 to bring library services right to their doorsteps. In 1920, Sarah Byrd Askew, a pioneering librarian in New Jersey, used her specially equipped Model T to deliver library books to rural areas in New Jersey with the advent of motorized transportation. The automobile remained rare, however, and the Hennepin County Public Library in Minneapolis began operating horse-drawn book wagons in 1922.As a result of the Great Depression in the United States, the Pack Horse Library Project brought books and similar supplies on foot and on hoof to remote coves and mountains in Kentucky and nearby Appalachia from 1935 to 1943 to people who could not visit libraries independently. To distribute the materials, these "packhorse librarians" sometimes relied on a centralized contact.[v]

- **Mobile Library India**

On October 21, 1931, a bullock cart laden with books stopped in Melavasal, a village near Mannargudi. This unique sight sparked the curiosity of the local people - it was indeed the first mobile library to be seen in India! Rao Bahadur S.V. Kanagasabai Pillai, a Mannargudi-based engineer, had conceptualised this innovative solution for disseminating knowledge and books amongst readers who couldn't make it to a conventional one. S.R. Ranganathan, the father of Indian Library Science, was on hand to inaugurate this pioneering effort that day. Now, ninety years later, Culture and Tourism Minister Prahlad Singh Patel has taken steps to ensure easier access to books by flagging off another mobile library service - this one targeting readers in slums, resettlement colonies and rural areas in Delhi specifically.[vi]

With the growth of electronic media and scientific/ technological advances, a continual flow of literature has flooded the market-journals, magazines, book reports, etc. This knowledge has become accessible and democratized in the era of the information explosion. Public libraries have greatly emphasized the utilitarian aspects of books and reading materials, but this knowledge is not limited to them. Dr. S. R. Ranganathan was the driving force behind India's library movement - he established five laws that triggered a major shift in library advancement across the country. The mobile library initiative proved to be an important tool in promoting knowledge and literacy among those who don't have access to traditional libraries. Residents in rural areas, where libraries aren't present, can now enjoy reading materials with the help of these mobile facilities. Delhi Public Library is at the forefront of this endeavour in Delhi. However, financial constraints continue to prevent service expansions at Delhi Public Library. There are 67 mobile service units in the library to serve 7,403

members. As of 31 March 1992, the Extension Department supervising the Mobile Library Service had 145,957 books. Currently, there are six mobile libraries: five for general library services and one for the visually handicapped.[vii]

In Delhi, the service for the visually handicapped serves 16 institutions for the blind and each van can hold 3,000 - 4,000 books. Members can choose their books. Through 1991-1992, the braille mobile van circulated 22,834 books, serving 539 members. The Mobile Library Service is a cost-effective way to reach out to patrons living in remote areas within the Delhi metropolitan area in order to provide library services. The "GharGhar Dastak GharGharPustak" Scheme of the Delhi Public Library (DPL) saw the launch of five-bus mobile library service, under the CSR (corporate social responsibility) assistance from the Airports Authority of India (AAI). While motivating young students to cultivate reading habits during the launch, Patel emphasized that there can be no complete mental growth without books. The minister also called for DPL to constitute a unique collection of books on eminent personalities which can be accessed through the mobile library buses.

Conclusion

A mobile library increases a library's reach and visibility by extending it to a larger area. Fixed libraries are commonly accessible by a significant percentage of the users in that area. Mobile libraries are an excellent addition to libraries and libraries' services. If feasible, it should be implemented. Globally, libraries are striving to activate non-users and extend their "reach" so that library resources can be accessible to all. This has given rise to innovations like bookmobiles and mobile libraries, helping to increase the visibility and accessibility of stationary branches. In most cases, this is enough to cater for a considerable percentage of users in a given area.

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AI in India: Current State and Future Potential of Adoption in Different Sectors of the Economy

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Introduction

Artificial intelligence (AI) is rapidly transforming economies and societies around the world, and India is no exception. As a leading player in the global technology industry and home to a large and dynamic population, India has both the resources and the potential to become a major hub for AI innovation and deployment. Indeed, in recent years, there has been a surge of interest and investment in AI technologies across a range of sectors, from healthcare and education to finance and agriculture. However, despite these promising developments, the adoption of AI in India is still in its early stages, and significant challenges and barriers remain to be overcome. This paper seeks to provide a comprehensive overview of the current state and future potential of AI adoption in different sectors of the Indian economy, with a focus on the benefits, challenges, and opportunities presented by this rapidly evolving field. Through a review of existing literature, analysis of recent trends and developments, and consideration of policy and regulatory issues, this paper aims to shed light on the key factors driving or hindering AI adoption in India, as well as the potential impact of AI on economic growth, social welfare, and human well-being. By doing so, this paper seeks to contribute to a deeper understanding of the role of AI in India's development trajectory and to inform ongoing debates about the future of this exciting and rapidly evolving field.

The paper could provide an overview of the current use of AI in different sectors of the Indian economy, such as healthcare, agriculture, education, finance, and manufacturing. This could include examples of specific AI applications, such as

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chatbots for customer service or predictive analytics for crop management. The paper could explore the potential benefits of AI adoption in India, such as increased productivity, improved quality of services, enhanced decision-making, and better outcomes for citizens. It could also discuss the potential for AI to help address some of India's pressing social and economic challenges, such as healthcare access, education quality, and agricultural productivity. The paper could discuss the challenges and barriers to AI adoption in India, such as lack of awareness and education, limited access to data, regulatory hurdles, and ethical concerns. It could also examine the specific challenges faced by different sectors and stakeholders, such as healthcare providers or small-scale farmers.

The paper could analyze the current policy and regulatory landscape surrounding AI in India, such as the National AI Strategy, the draft AI Ethics Code, and initiatives aimed at promoting AI research and development. It could also discuss the role of government, industry, and civil society in shaping the future of AI in India.The paper could offer some reflections on the future of AI in India, including potential areas for further research and innovation, and the possible impact of AI on India's economy, society, and culture. It could also consider the potential risks and challenges associated with AI, and the need for a balanced and responsible approach to its adoption.

Literature Review

The literature on AI adoption in India is still relatively limited, but a number of studies have begun to shed light on the current state and future potential of this field. In a recent report, the National Institution for Transforming India (NITI Aayog) identified several key sectors where AI could have a transformative impact, including healthcare, agriculture, education, and infrastructure. The report highlighted the potential for AI to improve access, quality, and efficiency of services in these sectors, as well as to drive innovation and create new opportunities for economic growth.

Other studies have focused on specific applications of AI in India. For example, a study by the Indian Council of Medical Research (ICMR) explored the use of AI in healthcare, including applications such as image recognition, natural language processing, and predictive analytics. The study highlighted the potential for AI to improve diagnostic accuracy, reduce errors, and enhance patient outcomes, but also noted the need for robust data governance and ethical frameworks.

In the agricultural sector, a study by the Indian Council of Agricultural Research (ICAR) examined the use of AI for crop management, precision farming, and weather forecasting. The study found that AI could help address some of the major challenges facing Indian agriculture, such as water scarcity, soil degradation, and climate change, but noted the need for improved data collection and sharing, as well as better access to AI technologies for small-scale farmers.

Other studies have explored the challenges and barriers to AI adoption in India. For example, a study by the Centre for Internet and Society (CIS) highlighted the lack of awareness and education about AI among policymakers, industry, and the general public, as well as the need for clear regulatory frameworks and ethical guidelines. Another study by the Indian School of Business (ISB) examined the potential impact of AI on employment in India, and found that while AI could create new job opportunities, it could also lead to significant disruptions and displacement in certain sectors.

Overall, the literature on AI in India highlights both the potential and the challenges of this rapidly evolving field. While there are many exciting applications of AI in different sectors of the Indian economy, there are also significant gaps in data, infrastructure, and governance that need to be addressed. As India seeks to harness the power of AI for its development goals, it will need to adopt a multidisciplinary and collaborative approach that balances innovation with responsibility and accountability.

Theories of AI (Artificial Intelligence)

- **Technological Determinism:** This theory posits that technology drives societal change and that the introduction of new technologies, such as AI, can have significant impacts on the way people live, work, and interact with each other. This theory could be used to analyze the potential impact of AI on different sectors of the Indian economy and its broader implications for society.
- **Innovation Theory:** This theory suggests that innovation is a key driver of economic growth and development. AI is seen as a transformative technology that has the potential to drive innovation and create new opportunities for economic growth in India. This theory could be used to examine the potential for AI to drive innovation and economic development in different sectors of the Indian economy.
- **Actor-network Theory:** This theory emphasizes the importance of understanding the relationships and interactions between different actors, both human and non-human, in shaping the adoption and use of new technologies. This theory could be used to analyze the various factors involved in AI development and deployment in India, including government, industry, academia, and civil society, and how they interact with each other to shape the adoption and use of AI.
- **Ethical Theory:** As AI raises significant ethical concerns, various ethical theories, such as utilitarianism, deontology, and virtue ethics, could be used to analyze the ethical implications of AI in India. This could include examining the potential impact of AI on privacy, security, bias, and job displacement, as well as exploring the ethical responsibilities of various factors involved in AI development and deployment.

Objectives

- To examine the current state of AI adoption in different sectors of the Indian economy, including healthcare, agriculture, education, and infrastructure.
- To explore the potential for AI to improve access, quality, and efficiency of services in these sectors, as well as to drive innovation and create new opportunities for economic growth.
- To identify the key challenges and barriers to AI adoption in India, including data governance, infrastructure, awareness, education, and regulatory frameworks.

Research Gap

Limited research on the ethical and social implications and addressing social and environmental challenges of AI in India: While there is growing interest in the economic potential of AI in India, there is relatively limited research on the ethical and social implications of AI, such as issues of bias, privacy, security, and transparency. This research gap presents an opportunity to investigate the ethical and social dimensions of AI in India and to develop guidelines and frameworks for responsible and accountable AI development and deployment.

Lack of empirical evidence on the impact of AI on employment and labor markets in India: There is a growing concern about the potential displacement of jobs by AI and automation, but there is limited empirical evidence on the actual impact of AI on employment and labor markets in India. This research gap presents an opportunity to conduct empirical studies on the impact of AI on different sectors of the Indian economy and to develop policies and strategies to mitigate the negative effects of AI on employment.

Overview of AI Adoption in India

An overview of AI adoption in different sectors of the Indian economy can provide valuable insights into the current state and future potential of AI in India. Here is a brief overview of AI adoption in some key sectors:

- **Healthcare:** AI has the potential to transform healthcare delivery in India, where there is a shortage of healthcare providers and resources. AI-powered solutions can help improve diagnostic accuracy, personalize treatment plans, and enhance patient engagement. For example, AI-based solutions are being used in India to screen and diagnose diseases such as tuberculosis and diabetic retinopathy, and to develop precision medicine for cancer patients.
- **Agriculture:** Agriculture is a major sector of the Indian economy, employing more than half of the population. AI can help improve crop yield, reduce wastage, and enhance the efficiency of the agricultural supply chain. For

example, AI-powered solutions can help farmers predict weather patterns, detect pest infestations, and optimize irrigation.

- **Education:** AI has the potential to enhance the quality and accessibility of education in India, where there is a shortage of qualified teachers and resources. AI-powered solutions can help personalize learning, assess student performance, and provide feedback. For example, AI-based solutions are being used in India to develop adaptive learning platforms, virtual assistants, and intelligent tutoring systems.
- **Infrastructure:** AI can help improve the efficiency and sustainability of India's infrastructure, which is under strain due to rapid urbanization and population growth. AI-powered solutions can help optimize energy consumption, reduce traffic congestion, and enhance public safety. For example, AI-based solutions are being used in India to develop smart cities, intelligent transportation systems, and disaster management systems.

Key Initiative and Policies to Promote AI in India

India has made significant strides in promoting AI research, development, and adoption in recent years, and has launched several key initiatives and policies to support this emerging field. Here are some of the key initiatives and policies promoting AI in India:

- **National AI Strategy:** In 2018, the Indian government released its National AI Strategy, which aims to position India as a global leader in AI research and application. The strategy includes a five-year roadmap for AI development, with a focus on developing AI technologies for social and economic development, enhancing AI research and innovation capabilities, and promoting ethical and inclusive AI development.
- **AI for All Initiative:** In 2018, the Indian government launched the AI for All Initiative, which aims to democratize AI and make it accessible to all citizens. The initiative includes a series of programs to promote AI education, awareness, and capacity-building among different stakeholders, including students, startups, and government agencies.
- **National Programme on AI:** In 2020, the Indian government launched the National Programme on AI, which aims to accelerate AI research and development in the country. The programme includes several initiatives, such as the creation of AI research centers of excellence, the development of AI talent pool, and the promotion of AI-based startups.
- **AI Startup Challenge:** In 2021, the Indian government launched the AI Startup Challenge, which aims to identify and promote innovative AI startups in

the country. The challenge provides funding, mentorship, and other support to selected startups, and aims to create a thriving AI startup ecosystem in India.

- **Digital India:** The Digital India program, launched in 2015, aims to transform India into a digitally empowered society and knowledge economy. The program includes several initiatives to promote digital literacy, connectivity, and innovation, and has helped create an enabling environment for AI adoption in the country.

Analysis of Challenges and Barriers for AI Adoption in India

While India has made significant progress in promoting AI adoption, there are still several challenges and barriers that need to be addressed. Here are some of the key challenges and barriers to AI adoption in India:

- **Data Governance:** One of the main challenges in AI adoption is the lack of data governance frameworks in India. There is a need for standardized data sharing policies and protocols, as well as robust data protection measures to ensure privacy and security.
- **Infrastructure:** The lack of adequate infrastructure, such as high-speed internet and computing power, is a major hindrance to AI adoption in India. This limits the ability of organizations to process and analyze large amounts of data, which is a key requirement for AI development.
- **Awareness and Education:** There is still a lack of awareness and understanding of AI among the general public and policymakers in India. This can limit the adoption of AI, as it can be seen as a threat to jobs and privacy. There is a need for more education and awareness programs to help people understand the benefits and risks of AI.
- **Regulatory Frameworks:** There is a need for clear regulatory frameworks for AI development and deployment in India. This includes regulations related to data privacy, security, and ethical considerations, as well as regulations related to the use of AI in sensitive sectors such as healthcare and finance.
- **Skilled Talent:** The lack of skilled talent is a major barrier to AI adoption in India. There is a need for more training and education programs to develop a talent pool of AI professionals, including data scientists, machine learning experts, and AI developers.

Potential of AI in India

The potential of AI in India is immense, as it has the potential to drive significant economic growth and social development. Here are some of the key areas where AI has the potential to make a significant impact in India:

- **Healthcare:** AI can help improve healthcare outcomes in India by enabling early disease detection, personalized treatment plans, and efficient healthcare

delivery. AI-powered diagnostic tools can help healthcare professionals make faster and more accurate diagnoses, while AI-powered chatbots and virtual assistants can provide 24/7 access to medical advice and information.

- **Agriculture:** India is an agriculture-based economy, and AI has the potential to revolutionize the agricultural sector by enabling precision farming, crop monitoring, and predictive analytics. AI-powered sensors and drones can provide real-time data on soil moisture levels, weather patterns, and crop health, helping farmers make data-driven decisions.
- **Education:** AI has the potential to transform the education sector in India by providing personalized learning experiences and improving learning outcomes. AI-powered chatbots and virtual tutors can provide students with individualized support and feedback, while AI-powered analytics can help educators identify areas where students need more support.
- **Infrastructure:** AI can play a crucial role in improving infrastructure development and management in India. AI-powered systems can optimize traffic management, reduce energy consumption, and improve public safety by analyzing real-time data and predicting potential issues.
- **Financial Services:** AI has the potential to transform the financial services industry in India by enabling faster and more accurate credit risk assessments, fraud detection, and customer service. AI-powered chatbots and virtual assistants can provide customers with 24/7 support, while AI-powered predictive analytics can help financial institutions make data-driven decisions.

Conclusion

In conclusion, this research paper has explored the current state and future potential of AI adoption in different sectors of the Indian economy. The paper has analyzed key initiatives and policies promoting AI in India, as well as the challenges and barriers to AI adoption, including data governance, infrastructure, awareness, education, and regulatory frameworks.

Despite the challenges, the potential of AI in India is immense, with the potential to drive significant economic growth and social development in areas such as healthcare, agriculture, education, infrastructure, and financial services. However, realizing this potential requires a collaborative effort from government, industry, academia, and civil society to create a supportive ecosystem for AI development and deployment.

Overall, this research paper has highlighted the need for a comprehensive approach to AI adoption in India, one that takes into account the unique challenges and opportunities of the Indian context. By addressing these challenges and

harnessing the potential of AI, India can position itself as a global leader in AI development and deployment, driving growth and development for years to come.

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Digital Exposure of Marginalized Communities in India

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Introduction

Digital exposure is a multifaceted concept encompassing access to digital tools and the ability to use them effectively for various purposes. Digital exposure refers to the level of access and usage of digital technologies and online platforms, as well as the ability to derive benefits from them. This includes access to digital infrastructure (such as internet connectivity), access to digital devices (such as smartphones or computers), and the ability to use digital platforms for education, healthcare, finance, and other services. Digital exposure and digital literacy which is an indispensable part of the 21st century vary across different regions and communities of the world. In general, the socio-economic backward regions and communities experience less digital exposure. (CCDS, 2015, UN, 2021). The present chapter summarises the Indian experience towards digital exposure with a special reference to marginalized communities. The chapter is divided into five sections. After the brief introduction (the present section), it discusses the variation in digital exposure in the world. This section is followed by a discussion on the digital exposure of marginalized communities in India. We have used the 2011 census data and data collected from other socio-economic surveys to portray the digital divide among various social –categories in India. The next section tries to find out the reasons behind the difference in the degree of digitalization and the final section discusses the policy implications and conclusions.

Marginalized communities are groups of people who are systematically excluded and disadvantaged by society due to factors such as their race, ethnicity, religion, gender, socioeconomic status, or geographic location. In India, there is a significant digital divide between marginalized communities and the rest of society.

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According to 2021, Digital Economy and Society Index (DESI) report, India ranks 49th out of 76 countries in terms of digital development. This report highlights that while there has been significant progress in increasing internet penetration in India, the digital divide between urban and rural areas and between different socioeconomic groups remains a significant challenge

Digital Exposure to different Communities: World Experience

During the last few decades' world had taken a giant leap in digital exposure and access still the progress has not taken uniformly. Digitalization has differed in its intensity and inclusiveness across different regions and sections of the world. As reported by FCC (2021), 97% of Americans in urban areas have access to a high-speed, fixed-service network. In rural areas, that number falls to 65%, and on tribal lands to 60%. In total, nearly 30 million Americans cannot fully benefit from the digital age. As per an International Telecommunication Union report, in the developed world the internet penetration rate is 87% but just 47% in developing countries and 19% in the least developed countries. According to a report by Hootsuite and We Are Social, as of 2021, the countries with the highest social media penetration rates are the United Arab Emirates (99%), Taiwan (87%), and South Korea (86%). By contrast, the countries with the lowest social media penetration rates are North Korea (0%), Eritrea (1%), and South Sudan (1%). This variation suggests that exposure to digital media may be higher in some countries than in others. According to a report by Global Web Index, as of 2021, the percentage of internet users who have made an online purchase in the past month varies widely by region. For example, in North America, 73% of internet users reported making an online purchase in the past month, while in Africa, that figure was just 15%. This suggests that digital exposure to e-commerce and online shopping may be higher in some regions than in others. According to a report by Pew Research Centre, as of 2021, younger people are more likely to use mobile phones for a variety of purposes, including accessing social media and video content. For example, 95% of 18-29 year-olds in the United States own a smartphone, compared to just 74% of those aged 50-64. This suggests that there may be generational differences in exposure to digital media. Digital exposure also depends on the level of digital skills individuals possess. According to a report by the World Economic Forum, there is a significant variation in digital skill levels across different regions. For example, as of 2020, only 22% of adults in sub-Saharan Africa had basic digital skills, compared to 80% in Europe.

The report by United Nations, 2021 shows the persistence of the urban-rural gap, in digital exposure: globally, the percentage of households with access to the internet at home in urban areas is 72 percent, which is only 32 percent in rural areas. This is more pronounced in developing countries: in Africa, only 6.3 percent of households in rural areas have access to the internet at home, compared to 28 percent in urban areas. Persons with disabilities face inequalities and additional

barriers in accessing the internet due to constraints in affordability and accessibility. Indigenous peoples also face challenges in digital inclusion, including the lack of digital content in their native languages According to a report by the United Nations Development Programme (UNDP), as of 2020, around 3.7 billion people in the world still lack access to the internet. This lack of access is particularly pronounced in marginalized communities, including low-income communities, rural areas, and indigenous populations. This suggests that digital exposure may be limited in these communities. According to the Pew Research Center report, as of 2021, there are significant differences in digital literacy rates between different demographic groups. For example, individuals with higher levels of education are more likely to be digitally literate, as are those with higher incomes. This suggests that marginalized communities with lower levels of education and income may have lower rates of digital literacy and therefore less exposure to digital media. As per the Centre for Democracy and Technology, as of 2020, marginalized communities in the United States have lower rates of social media use than the general population. For example, only 42% of Black adults and 36% of Hispanic adults in the US report using social media, compared to 69% of white adults. According to a report by the National Digital Inclusion Alliance, as of 2021, there are significant differences in internet access and digital resources available in different communities. For example, low-income households are less likely to have high-speed internet access, and rural areas may have limited access to online resources like healthcare and education. This suggests that marginalized communities may have less exposure to digital media and information.

Chakravorti et al (2020) analyze the current state of digital development by dividing around ninety economies of the world into four zones: stand-out economies (already having high levels of existing digitalization and strong momentum to continue) e.g. Korea, Singapore, Hong Kong, etc.; break out economies (economies with limited existing digital infrastructure, but which are rapidly digitalizing) e.g. India, Indonesia, Vietnam, Bangladesh, etc.; stall out economies (in a matured digital platform but shows less momentum either due to the natural slowing of growth that accompanies maturity or intentional choice for all-inclusive growth) e.g. some countries of EU and watch out economies (characterized by limitations in both existing digital capabilities and momentum for future development) e.g. countries across Africa, Asia, Latin America, and Southern Europe.

Digital Exposure of Marginalised Communities in India

Studies have identified several challenges that marginalized communities face in accessing digital technologies. The data collected by the census 2011 shows that marginalized communities' scheduled castes (SCs) and scheduled tribes (STs) are having less digital exposure compared to the overall population. The following tables summarise the findings:

Table 1: Difference between All Social Groups and SCs in Digital Exposure (in %)

Sr. No	State	Computer / Laptop			Telephone/Mobile Phone		
		With Internet	Without Internet	Total	Landline only	Mobile-only	Both
1	Jammu & Kashmir	1.4	0.8	2.2	0.2	2.4	2.6
2	Himachal Pradesh	1.4	0.8	2.2	1.3	-0.4	5
3	Punjab	3.5	3.2	6.7	1.2	3.3	7.8
4	Chandigarh #	12.7	4.7	17.4	1.4	-5.5	13.3
5	Uttarakhand	2	2.8	4.8	1	8.3	3.7
6	Haryana	3.6	1.8	5.4	0.5	9.5	5.4
7	NCT of Delhi #	13	4.3	17.3	1.6	-6.6	12.2
8	Rajasthan	1.2	1.2	2.4	0.6	2.4	3.4
9	Uttar Pradesh	1.1	0.6	1.7	0.7	9.9	0.9
10	Bihar	0.4	0	0.4	0.5	13.8	0.3
11	Sikkim	0.7	0.6	1.3	0.2	3.2	0.7
12	Arunachal Pradesh	NA	NA	NA	NA	NA	NA
13	Nagaland	NA	NA	NA	NA	NA	NA
14	Manipur	-0.4	-2	-2.4	-2.6	1.5	-0.4
15	Mizoram	-1.7	-1.6	-3.3	-1.2	-2.3	0.9
16	Tripura	0.3	0.3	0.6	0.2	-0.8	1.2
17	Meghalaya	-1.5	-5.1	-6.6	-1.7	-10.6	-4.3
18	Assam	-0.4	-1.4	-1.8	-0.4	0.2	-1
19	West Bengal	1.3	0.9	2.2	0.7	8.1	2.4
20	Jharkhand	0.9	0.7	1.6	0.5	7.1	0.7
21	Odisha	0.7	0.5	1.2	0.3	6.4	1.1
22	Chhattisgarh	0.7	0.7	1.4	0.3	3.7	1
23	Madhya Pradesh	0.8	0.7	1.5	0.5	3.3	1.6
24	Gujarat	1.1	0.9	2	0.2	-1.7	3.4
25	Daman & Diu #	0.1	-2.4	-2.3	0.9	1	-2.2
26	Dadra & Nagar Haveli #	-1.3	-2.4	-3.7	-1.6	-16.5	-0.6
27	Maharashtra	2.8	1.1	3.9	1.3	3.6	4.4
28	Andhra Pradesh	1.5	0.9	2.4	1.3	5.8	2.3
29	Karnataka	3.1	1.4	4.5	2.2	7.1	4.9
30	Goa	-14.7	1	-13.7	0	4.9	-3.1
31	Lakshadweep #	NA	NA	NA	NA	NA	NA
32	Kerala	4.4	3.5	7.9	5.3	-13.1	19.9
33	Tamil Nadu	2.6	1.8	4.4	1.2	6.8	4.1
34	Puducherry #	4	3.7	7.7	1.8	5.8	8.2
35	A & N Islands #	NA	NA	NA	NA	NA	NA
	India	1.8	1.2	3	1	5.6	3.4

Source: Compiled from Census 2011

Table 2: Difference between All Social Groups and STs in Digital Exposure (in %)

Sr. No	State	Computer / Laptop			Telephone/Mobile Phone		
		With Internet	Without Internet	Total	Landline only	Mobile-only	Both
1	Jammu & Kashmir	2.1	1.6	3.7	0.8	25.7	2.9
2	Himachal Pradesh	1	-0.1	0.9	2.7	-1.9	3
3	Punjab	NA	NA	NA	NA	NA	NA
4	Chandigarh #	NA	NA	NA	NA	NA	NA
5	Uttarakhand	1.2	0.2	1.4	-0.4	1.3	2
6	Haryana	NA	NA	NA	NA	NA	NA
7	NCT of Delhi #	NA	NA	NA	NA	NA	NA
8	Rajasthan	1.4	1.6	3	1.4	21.4	4.3
9	Uttar Pradesh	-0.6	-2.7	-3.3	-1.2	7.9	-0.2
10	Bihar	0	-1.3	-1.3	-0.1	10.8	-0.1
11	Sikkim	0.4	0.9	1.3	0.2	3.5	0.5
12	Arunachal Pradesh	0.1	0	0.1	0	3.2	0.2
13	Nagaland	0.1	0.2	0.3	0.1	1.9	0.3
14	Manipur	1	0.8	1.8	1.3	16.4	0.3
15	Mizoram	0.1	0.1	0.2	0.1	0.2	0
16	Tripura	0.5	0.5	1	0.8	14.6	1.6
17	Meghalaya	0.4	0.7	1.1	0.2	2.8	0.8
18	Assam	0.5	0.8	1.3	0	2.7	0.6
19	West Bengal	1.5	0.9	2.4	1.2	19.1	2.7
20	Jharkhand	1.1	1.5	2.6	0.8	20.3	1
21	Odisha	1.1	1.1	2.2	0.9	19.5	1.7
22	Chhattisgarh	1	1.3	2.3	0.7	13	1.3
23	Madhya Pradesh	1.2	1.5	2.7	1.5	22.7	2.3
24	Gujarat	2.5	2.6	5.1	1.7	19.7	5.5
25	Daman & Diu #	1.8	3.5	5.3	0.8	7.1	4.2
26	Dadra & Nagar Haveli #	2.3	2.6	4.9	0.6	23.2	1.9
27	Maharashtra	4.1	2.6	6.7	2.4	20.9	6.1
28	Andhra Pradesh	1.7	0.5	2.2	1.9	14.2	2.7
29	Karnataka	3.2	1.6	4.8	2.2	7.3	4.8
30	Goa	7	2.3	9.3	1.8	-2.2	10.4
31	Lakshadweep #	0.1	0	0.1	-0.4	1.9	-1.3
32	Kerala	4.3	3.8	8.1	6.1	0.5	19.9
33	Tamil Nadu	1	-0.9	0.1	-0.9	9.3	3.1
34	Puducherry #	NA	NA	NA	NA	NA	NA
35	A & N Islands #	2.8	3.4	6.2	0.2	15.6	7.1
	India	2.4	2.2	4.6	2.2	23.5	4.4

Source: Compiled from Census 2011

Table 3: Difference between SCs and STs in Digital Exposure (in %)

Sr. No	State	Computer / Laptop			Telephone / Mobile Phone		
		With Internet	Without Internet	Total	Landline only	Mobile-only	Both
1	Jammu & Kashmir	0.7	0.8	1.5	0.6	23.3	0.3
2	Himachal Pradesh	-0.4	-0.9	-1.3	1.4	-1.5	-2
3	Punjab	NA	NA	NA	NA	NA	NA
4	Chandigarh #	NA	NA	NA	NA	NA	NA
5	Uttarakhand	-0.8	-2.6	-3.4	-1.4	-7	-1.7
6	Haryana	NA	NA	NA	NA	NA	NA
7	NCT of Delhi #	NA	NA	NA	NA	NA	NA
8	Rajasthan	0.2	0.4	0.6	0.8	19	0.9
9	Uttar Pradesh	-1.7	-3.3	-5	-1.9	-2	-1.1
10	Bihar	-0.4	-1.3	-1.7	-0.6	-3	-0.4
11	Sikkim	-0.3	0.3	0	0	0.3	-0.2
12	Arunachal Pradesh	NA	NA	NA	NA	NA	NA
13	Nagaland	NA	NA	NA	NA	NA	NA
14	Manipur	1.4	2.8	4.2	3.9	14.9	0.7
15	Mizoram	1.8	1.7	3.5	1.3	2.5	-0.9
16	Tripura	0.2	0.2	0.4	0.6	15.4	0.4
17	Meghalaya	1.9	5.8	7.7	1.9	13.4	5.1
18	Assam	0.9	2.2	3.1	0.4	2.5	1.6
19	West Bengal	0.2	0	0.2	0.5	11	0.3
20	Jharkhand	0.2	0.8	1	0.3	13.2	0.3
21	Odisha	0.4	0.6	1	0.6	13.1	0.6
22	Chhattisgarh	0.3	0.6	0.9	0.4	9.3	0.3
23	Madhya Pradesh	0.4	0.8	1.2	1	19.4	0.7
24	Gujarat	1.4	1.7	3.1	1.5	21.4	2.1
25	Daman & Diu #	1.7	5.9	7.6	-0.1	6.1	6.4
26	Dadra & Nagar Haveli #	3.6	5	8.6	2.2	39.7	2.5
27	Maharashtra	1.3	1.5	2.8	1.1	17.3	1.7
28	Andhra Pradesh	0.2	-0.4	-0.2	0.6	8.4	0.4
29	Karnataka	0.1	0.2	0.3	0	0.2	-0.1
30	Goa	21.7	1.3	23	1.8	-7.1	13.5
31	Lakshadweep #	NA	NA	NA	NA	NA	NA
32	Kerala	-0.1	0.3	0.2	0.8	13.6	0
33	Tamil Nadu	-1.6	-2.7	-4.3	-2.1	2.5	-1
34	Puducherry #	NA	NA	NA	NA	NA	NA
35	A & N Islands #	NA	NA	NA	NA	NA	NA
	India	0.6	1	1.6	1.2	17.9	1

Source: Compiled from Census 2011

Tables 1 and 2 show for most of the states and UTs the exposure is less for SCs and STs. Table 3 shows the comparison between SCs and STs that again show for most of the states and UTs, STs are far behind towards digital exposure as compared to SCs. As per 2011 census data, internet availability is lower for the

marginalized group in most of the states. However, technology has changed a lot during the last decade and the 3G and 4G revolutions have increased internet penetration dramatically still digital exposure are not available uniformly across all members of society. A study by the Centre for Communication and Development Studies (CCDS) found that caste and gender-based discrimination limit access to digital technologies in rural India. Moreover, the study found that people in rural areas often lack the necessary skills and knowledge to effectively use digital technologies (CCDS, 2015). Similarly, a report by the National Sample Survey Organisation (NSSO) found that only 15% of households in rural India had access to the internet (NSSO, 2019). Covid -19 pandemic outbreak, which had compelled many services to switch over to digital mode, had shown that lack of accessibility had severely affected the marginalized section and widened the gap in the outcome. One of the worst affected sectors is the education sector. A survey-based study by the National Campaign on Dalit Human Rights (NCDHR)'s Dalit Adhikari Andolan across six states of India found that 56% of the surveyed students from marginalized communities were unable to access online classes during the Covid pandemic. Further, 73% of respondents from particularly vulnerable tribal groups were unable to access online classes. There is substantial evidence to suggest that there is a digital exposure gap in marginalized communities in India. According to a report by the Internet and Mobile Association of India (IAMAI), as of 2020, only 50% of India's population has access to the internet. This lack of access is particularly pronounced in marginalized communities, including rural areas and low-income households. As per the report by the Telecom Regulatory Authority of India, as of 2021, only 30% of the population in rural areas of India has access to the internet. This suggests that digital exposure may be limited in these communities. According to a report by the Internet and Mobile Association of India, as of 2020, only 31% of Indians in rural areas had access to a smartphone. This suggests that marginalized communities in India may have limited access to digital media through mobile devices. As per the National Sample Survey Organization, as of 2017-18, only 14% of individuals in India used the internet for education or employment-related purposes. This suggests that marginalized communities in India may have less exposure to digital media and information overall. According to a report by the Centre for the Study of Developing Societies (CSDS), as of 2017, only 24% of Indians use social media, and this usage is concentrated among higher-income groups. The report also found that social media usage is significantly lower in rural areas and among low-income households.

Reasons behind the Digital Divide

The reasons behind the digital divide are both the supply side and the demand side. Low literacy rates, lack of sufficient income levels, remoteness resulting in lack of physical access to technology, lack of motivation, and digital illiteracy contribute to the digital divide. The most prevalent cause of a digital gap is poverty and economic

restrictions that limit resources and create bottlenecks in accessing and using newer technology. High costs of devices and data plans make it difficult for low-income households to afford access to the internet and digital technologies.

To address the issue of the digital divide, the supply side and demand side reasons should be differentiated. While the supply side reasons may include lack of availability, accessibility, and affordability the demand side reasons include lower level of education, digital illiteracy, less motivation, and lack of understanding of the utility of digital exposure.

Way Forward

Several initiatives have been implemented to bridge the digital divide and promote digital inclusion among marginalized communities in India. The government's Digital India campaign aims to provide internet connectivity to rural areas, promote digital literacy, and enable the online delivery of government services. The campaign has several components, including the provision of free Wi-Fi hotspots in rural areas and the promotion of e-governance services. Additionally, several non-profit organizations and social enterprises are working towards providing digital access and training to marginalized communities. For instance, the Digital Empowerment Foundation provides digital access and training to marginalized communities in rural India.

Conclusion

Limited access to digital technologies can have significant consequences for marginalized communities. For example, limited access to online education, training, and job opportunities can negatively affect their socioeconomic mobility. A study by the Internet and Mobile Association of India (IAMAI) and Nielsen found that internet users in India are more likely to be employed, with 48% of internet users reporting being employed compared to 28% of non-users (IAMAI & Nielsen, 2019). Council for Research on International Economic Relations (ICRIER) found that access to mobile phones had a significant impact on the economic well-being of women in rural areas of India. Women who owned mobile phones were able to access information about market prices, and they were more likely to participate in income-generating activities (ICRIER, 2015). Therefore, limited access to information and communication technologies can hinder their participation in governance and public affairs. The focus should be on addressing the supply side and demand side constraints in the way of digitalization. As focused by Digital Evaluation Index, 2017 in marginalized communities, that is: in communities that are structurally and systemically disadvantaged and that experience societal marginalization, trust deficit and skepticism towards digitalization are prevalent. Identification of groups who are left behind from digital inclusion and addressing the issues of each group separately can only pave the way towards the true digital transformation of the country.

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10

Impact of Artificial Intelligence upon different Major Sectors and Human Daily Life: A Literature Review

Dr. Mayank Agarwal*
Shahzad Ali**

Introduction

Artificial Intelligence is a very broad field of study that has connected with many domains not only all the computing disciplines but also mathematics, linguistics, psychology, philosophy, mechanical engineering, statistics, economics, and many others. Artificial intelligence has become an important element of human life and changing this daily life drastically. Artificial Intelligence (AI) is the Science and technology field that is concerned with the theory and practice of developing systems that associate with intelligence in human behavior. Its implication can be seen in education institutes, hospitals, financial institutes, and many other areas of society. The present study reviews the implementation of Artificial Intelligence mentioned in research papers and reports. This study further elaborates on the changes made by Artificial Intelligence in various domains of life and major areas by considering of driving and restraining factor of Artificial Intelligence.

The Objective of the Study

The present study has the following objectives:

- To review some selected research papers in the context of Artificial Intelligence.
- To enquire about the driving and restraining factor in the different major sectors and human daily life through Artificial Intelligence based on some selected research papers and reports.

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Limitations of the Study

The present study has certain limitations:

- It is based on some research papers and reports so the results cannot be generalized.
- It is based on the ‘Meaning of AI’ and 'Impact of AI in the major areas only' there are so many other areas also which should be reviewed.

Impact of AI upon different Major Areas and Human Daily Life

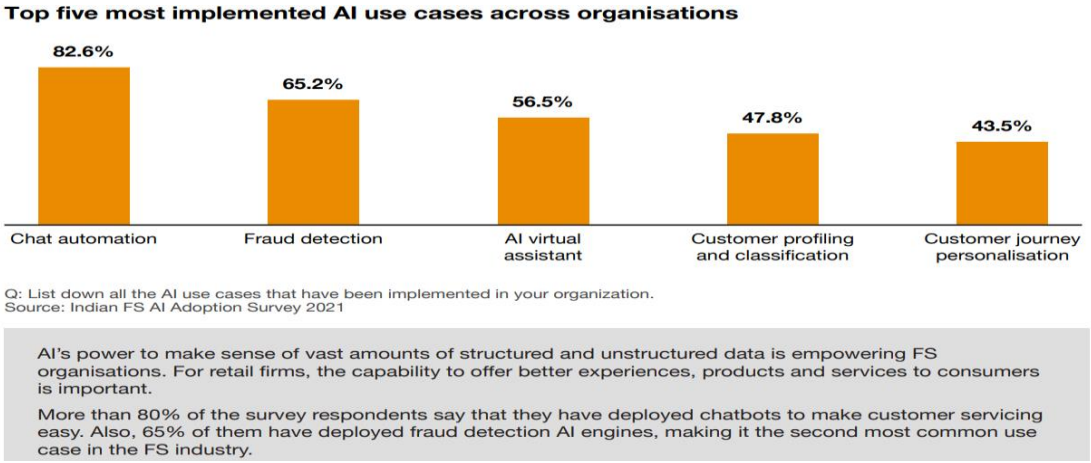
This research paper has focused on the impact of AI on different major sectors including Health, Banking, Manufacturing, Education, and many others area. As per the lots of research conducted on the topic of Artificial intelligence in recent times, It has far clear that the AI has potential to increase productivity and raise the living standards of humans. As per the research conducted upon AI, it has clear that AI has more impact upon some major areas like,

- Banking, financial, and insurance services.
- Health services.
- Manufacturing.
- Education and Teaching.

This research paper discussed these four areas only including the impact on human daily life by the evolution of pros and cons of Artificial Intelligence contained in different research papers and reports.

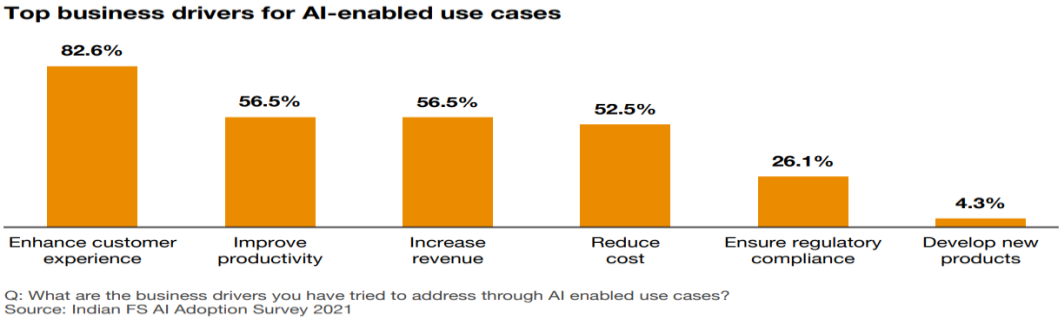
AI in Banking, Financial, and Insurance Services

The Financial Services sector has the Artificial Intelligence (AI) phase, In the modern digitalization era financial institute started their journey with the use of the internet to the advent of Artificial Intelligence by using the latest tools and technology. The emergence of AI is disrupting the system and structure of all financial institutes that provide banking, financial, and insurance services. What are the drivers of AI disruption in the Banking and financial sector:



Driving factors of AI Applications in Banking, Financial, and Insurance Sectors

- **Personalize without Branches:** A major impact on the Banking industry is allowing banks to offer more personalized services and customer interactions.
- **Availability of Infrastructure**: AI has the potential to provide high computational resources and cloud technology as well as infrastructure availability allows for the processing of large data efficiently at lower costs.
- **Regulatory Requirements**: AI-based tools can help banks regarding regulatory requirements by automating data collection processes and improving the speed, quality of decisions, and compliance obligations
- **Competition**: Finacial Institute are competing with their peers, and more recently with FinTechs Institute, to provide the best services to their clients. AI Technology has become a differentiator for each Financial Institute to provide better services in comparison to others. As a result, they are using AI to optimize the current level of service offerings by adding new offerings to the market and providing a more personalized experience for their customers.
- **Chatbots**: AI-powered chatbots incorporated with Natural Language Processing (NLP), that engage and interact with customers any time by conversation. In addition to responding to customers' questions, only it also helps them work through their account details, open new accounts, and handle complaints.
- **Fraud Detection and Prevention:** AI has enabled the identification of fraud and prevention by using previously undetected transactional patterns, data anomalies, and suspicious relationships between individuals and entities. This is a more proactive approach than the traditional reactive approach where AI is used to prevent fraud before it happens.
- **Customer Relationship Management**: It is an important element for banks. Banks are now providing more personalized banking services such as providing facial and voice recognition command features to log in to financial apps. Banks are also leveraging their benefits by using Artificial Intelligence to analyse customer behavioral patterns and perform automatically via selecting customer segmentation which allows for targeted marketing and improved customer interaction and experience.



- **Predictive Analytics:** Machine Learning (ML) and AI have the potential for accurate forecasting and prediction. Data Analytics and AI tools are being applied to revenue forecasting, risk monitoring, stock price predictions, and case management.
- **Credit Risk Management:** AI is used to improve credit approval, risk determination, and portfolio management. It is helps for determine the creditworthiness of facility borrowers and improves the accuracy of credit decisions.
- **Operations** AI can help automate and standardize the process and reduce operating costs. AI can handle lots of routing activities by which employees can focus on high-value activities.

Restraining factors in Banking, Financial, and Insurance Sectors

- Artificial intelligence is high-cost technology to implement, and maintenance of artificial intelligence required huge costs due to having more complex machines, it also implements advanced software programs which require updates with the need requirement of the task. In the case of critical failures, the procedure to reinstate the system and recover lost codes may require enormous time and cost.
- Using AI in BFIS at a large scale may be the cause of huge unemployment, a lot of the tasks currently done by humans can complete by an AI-based automatic machine which results in a decrease in the requirement of humans, because they may be more costly than machines.
- As AI is mostly dependent on data networks, AI systems are prone to security risks. Misuse of valuable data can result in massive losses.
- AI uses data based on past and pre-existing data, they can’t deal with the out of box situations like financial crises situation.

AI in Health Sector

The healthcare sector is the fastest growing sector in our country in recent times, healthcare sector has a growing demand for their services but has the problem of rising costs and workforce. Artificial intelligence (AI) has the potential to transform healthcare services in effectively and efficiently. It can increase productivity and the efficiency of the delivery of services and also allow healthcare systems to provide better care to more people. AI can help improve the working environment of healthcare practitioners, enabling them to spend more time in patient care and improving retention by reducing their stress and raising staff morale. It is also helpful in providing better and fast health service to the patient at a low cost.

Driving factors of AI Applications in the Health Sector

- AI-based technology applications and tools encourage healthier behavior of humans and help in proactively taking health-related issues for a healthy lifestyle.
- AI is already being used to detect and prevent diseases, such as cancer, more accurately and in their early stages. AI is also being applied to diagnose early-stage heart disease,
- It enables doctors and other health practitioners to better monitor and detect potentially life-threatening diseases at earlier more treatable stages.
- It helps to improve and maintain alignment of big health data with appropriate and timely decisions by predictive analytics can support clinical decision-making and actions.
- AI can take a more comprehensive approach to disease management and can coordinate better care plans and help patients to manage and follow their long-term treatment.
- AI can be examining data patterns that can help healthcare organizations to use most of their data, assets, and resources for increasing efficiency and improving the performance of clinical and operational activities and processes.
- AI-based Chatbots also communicate with patients with concerns about their illnesses and symptoms. which can reduce the load on healthcare professionals.
- Virtual health assistants are can manage several things including responding to the queries of patients via calls and emails and can managing the medical information of the patients. It can also handle scheduling appointments with doctors and sending follow-ups.
- Artificial Intelligence technology allows to scan of pre-existing medicines and redesigning them in a way that allows fighting against specific diseases. This makes a cheaper way to develop new drugs.

Restraining factors in Health Care

- Although AI has lots of benefits in the health sector human interaction is still an essential element for taking care of an individual patient.
- AI may be helpful for cost cutting and reducing pressure upon healthcare professionals, but it may also cause some job loss in the health sector. This may result in unmotivated factor for professionals who invested time and money in healthcare education facing challenges.

- AI depends on diagnosis data available from millions of already registered cases. In cases where there are no such data available on particular illnesses then proper diagnosis is entirely not possible.
- As AI is mostly dependent on data networks, AI systems are prone to security risks.

AI in Education and Teaching Sector

AI will transform the education sector as we can see AI provide a better experience by implication of AI applications and tools in the future. AI has the potential to teach children like basic reading writing and logic. AI soon cover a range of education-related activities such as providing online tuition, counseling student, recruiting and maintaining Education staff, assessing the performance appraisal of the student, and maintaining routine activities of the educational institute. AI can provide personalized learning and create customized study materials according to individual preferences and needs. Artificial intelligence can automat administrative activities and reduce the burden and save time doing important task and improve quality education.

Driving factors of AI Applications in the Education and Teaching Sector

- AI is allowing students to use their smart phones and tablets to study in their free time.
- It can be used to understand the student's psychology by reading facial expressions and gestures. This allows students to follow up easily.
- AI can customization the academic curriculum with AI-based tools and techniques. AI tools can enable classrooms for people who are visually or hearing impaired.
- In the traditional education system, the teacher assesses the student's performance which consumes a lot of time, but AI can make a quick assessment by using AI-based tools.
- AI provides several contents in different languages which will be helpful to people who speak different languages or such other difficulties in understanding study content. For example, by using google Translate students can easily read and hear in their national language.
- AI in near future can also be useful for Admissions and enrolment processes which can reduce the burden on education institute staff.
- Artificial Intelligence launched more advanced applications to improve programs related to tutoring and studying. AI can be helpful for adaptive group formation which creates groups of students who are adjustable for a particular task.
- AI provides a reliable and secure solution to ensure the integrity of online test assessments that is reducing the need for physical invigilator and prevent biased evolution.

Restraining factors in the Education and Teaching

Despite the huge factors that AI offers for the improvement of the Education sector there might also be some potential cons with it.

- AI could emerge with new ethical implications and risks with the development of AI applications in higher education like example due to the corona virus pandemic there are many educational institutes cut their budget and they replacing teaching staff with profitable automated AI solutions.
- An increase in AI uses may decrease the chance of interaction between student and teacher and students becoming technology addicted.
- The faculty members, teaching staff, student counselors, and administrative staff might get feared of the AI-based Intelligent Tutor System which can replace them in near future.
- AI system requires a large amount of expenditure for installation, maintenance, and repair which can't be afforded by all education institute, small education institute can not take advantage of competency with their peer institute.
- AI requires large amounts of data that are confidential and it leads to serious privacy issues may happen.

AI in Manufacturing

AI in manufacturing has the potential to transform the manufacturing industry, with potential upsides such as increased productivity with decreased expenses and enhanced product quality. "Companies using AI have seen cost savings and revenue growth, with 16% of those surveyed noticing a 10-19% decrease in costs and 18% seeing a 6-10% increase in overall revenue" as per McKinsey report. Artificial Intelligence-based tools and technologies can process and analyze huge volumes of data from production to spot patterns and predict consumer behavior in real-time in a more efficient and effective manner. AI-powered systems can also adapt and improve continuously by making them essential for manufacturers.

Driving factors of AI Applications in Manufacturing

- Artificial intelligence deals with manufacturing problems in a proactive manner by assisting manufacturers in predicting when the functioning of machine will break so that maintenance and repair of the defective machine may be planned before the breakdown takes place.
- Artificial Intelligence helps make designs by using this technique, manufacturers may produce many types of designs.
- It can predict the requirement of Raw Material price more correctly, and AI-based techniques can anticipate the price of commodities.

- Artificial intelligence can be helpful in Quality Controls of product manufacturing utilizing machine vision technology.
- Artificial Intelligence is helpful in the manufacturing process by improving efficiency and reducing waste which gives cost savings and revenue growth with the use of AI-powered software.
- By using AI-based tools and techniques organizations can sustain production levels by making processes effective and efficient.
- By using Artificial Intelligence producers can test many prototypes of a product before beginning production with the help of AI-based product development tools and techniques. It can also maintain and bug-fixing processes in a simplified manner. Manufacturers may improve and accelerate their innovation and new product development process with AI-based product creation methods which results in new and innovative products that increase competition in the market.

Restraining factors in Manufacturing

- AI-based technology requires plenty of time and resources which leads to huge costs that can't be afforded by all manufacturing. It also needs to update with the latest hardware and software to meet the latest requirements.
- AI is based on pre-existing data and experience techniques that cannot learn to think out of the box and cannot provide products and services with creative approach.
- Using all AI in all fields of production and manufacturing which required repetitive task cause to leads huge unemployment because it can replace human requirements by providing better results than a human being can do in the operation of manufacturing.
- Using AI in manufacturing leads decrease in the creativity of human beings that can innovate new products and services.
- AI is only more efficient in carrying out repeatedly the same task, but if we want any innovation or improvements, we must apply human minds. AI still can't take place of human intelligence in creative and new innovation tasks in manufacturing.

AI in Human Daily Life

Artificial intelligence has a wide range of applications and tools in our daily lives. In recent modern times, we live there is no doubt that artificial intelligence has simplified our lives by solving our daily tasks in a very efficient manner which saves our time, money, and energy. Here are briefly described some important pros of artificial intelligence.

Driving factors of AI Applications in Human Daily Life

- **Social Media:** AI works behind the performance of social media platforms like Facebook, Instagram, Twitter, and others to figure out content related to particular user needs and requirements.
- **Search Engines:** We find pieces of information or solutions to our daily routine problems on the search engine, Without artificial intelligence search engines, can't able to scan the relevant information which we want. Its save our time searching for required information from search engines and it also gives personalized results according to individual wants.
- **Smart Devices:** There are many smart devices available in the market based on Artificial Intelligence that make easier our daily life by learning our habits and automatically reacting according to our individual preferences. It is all possible through Artificial intelligence.
- **Smart Personal Assistants:** By recognizing our voice and speech smart personal assistants like Google Assistant, Amazon Alexa, Siri, etc technology which is based on Artificial Intelligence solve our daily routine problems with smart conversations and help in maintaining our daily routine very easily.
- **Security and Surveillance:** AI provides advanced technology such as object and biometric recognition that can secure more tasks than humans and cameras can do. It provides more security and surveillance with more accuracy and reliability while in near future it may be more advanced technology built on AI-based for more effective performance in regards to Security and surveillance.
- **Smart Tools:** Many tools are developed and many are yet to be developed on AI-Based, like Image editing, text editing, text summarizer, Quick Reply, smart composer, and Grammar Check that make our daily routine tasks better and save our important time to do other important tasks.
- **Navigation and Travel:** In nowadays AI based maps for navigation tools are more convenient and easy to operate to navigate any location where we want to go. It gives not only location access but also suggests the best route to reach our destination.

Restraining factors in Human Daily Life

AI has lots of advantages but it has also disadvantages in human daily life like:

- People may dependent more on technology which decreases human creativity and logic.
- AI is only based on past and pre-existing data that can be biased soon problems and may be not able to solve our newly arrived problems.

- AI needs a lot of time and money which can't be afforded by all human beings which increases inequality among people.
- AI can replace human needs from their work with automation which leads to unemployment problems on a very large scale.
- Using of AI at a large scale can increase privacy, security, and ethical issues in our society.

Conclusion

A lot of new tools and techniques based on AI will be launched soon which change human life drastically and improve working performance efficiently and effectively. It processed and searched information for the individual who will be able to use new technologies to advance their services and it helps an individual to find and access specific information more easily, quickly, and logically. Artificial intelligence can useful tool in many discoveries and advancement of humanity. Artificial intelligence techniques can learn and react like a human being which allows user to improve their performance and reduce errors. The implication of AI besides the technology sector is an early stage or experimental stage but in near future, it implication expand in many sectors like health, education, finance and many others.

Although AI has the potential to enhance and revolutionize human existence, there are still obstacles to overcome, such as winning the public's trust, overcoming fears, and taking responsibility and accountability, it is crucial to compare the benefits and drawbacks of artificial intelligence (AI) and machine learning but the evidence gives enough argument that AI can provide real value to our human lives.

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11

Role of Artificial Intelligence in Mobile App Development: Study of Growth From 2023-28

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Introduction

Artificial Intelligence is an innovative concept which is developed in 1950 by John McCarthy, he was one of the most influential people in the field for his fantastic work in computer science and AI. Thus, he is also known as the Father of Artificial Intelligence. Now, if we discuss about the meaning of Artificial intelligence (AI), then it is a new type of intelligence which is demonstrated by machines, as opposed to intelligence of humans and other animals. For Example there are some tasks in which this is done including: speech recognition, computer vision, translation between (natural) languages, as well as other mappings of inputs.

"Thus, we can say that Artificial Intelligence is just a replacement of Human Intelligence."

In this Paper/Chapter we just discussed about the Role of Artificial Intelligence in Mobile App Development. We also study the growth of AI in Mobile app development in recent years, by analyzing market size of AI in mobile app development.

As, Mobile app development is increasingly growing from retail sector, telecommunications and e-commerce to insurance, healthcare and government, organizations across industries that meet user expectations for real-time Period, more convenient ways to conduct transactions and access information. Today, mobile devices—and the mobile applications are the most popular way for human beings and business houses to connect to the internet. To stay relevant, responsive and

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successful, organizations need to develop the mobile applications that their customers, partners and employee's demand. **Mobile application development** is the process to making some software for smartphones and digital assistants, most commonly for Android and iOS system. This software can be preinstalled on the mobile device, which can be downloaded from a mobile app store or accessed through a mobile web browser. There are some programming and mark up languages used for this kind of software development include Java, Swift, C# and HTML5. Use of AI in Mobile Application development just enhance the user friendly accessing services.

Purpose of Study

The basic purpose of our study only analyzing the role of AI based technology in Mobile app development and also focus on those points which helps in enriching mobile user experiences.

Research Methodology Used

For this research study we just collect the secondary data of growth in market size of AI in Mobile App development.

There are some secondary data which explain about the Artificial Intelligence Market Size in Mobile App Development and those are:

Mobile Artificial Intelligence Market Size

Study Period	**2018 - 2028**
Fastest Growing Market	Asia-Pacific
Largest Market	North America
CAGR	28.65 %

CAGR of India (2022-27). 7.13%

Market Analysis of Mobile Artificial Intelligence

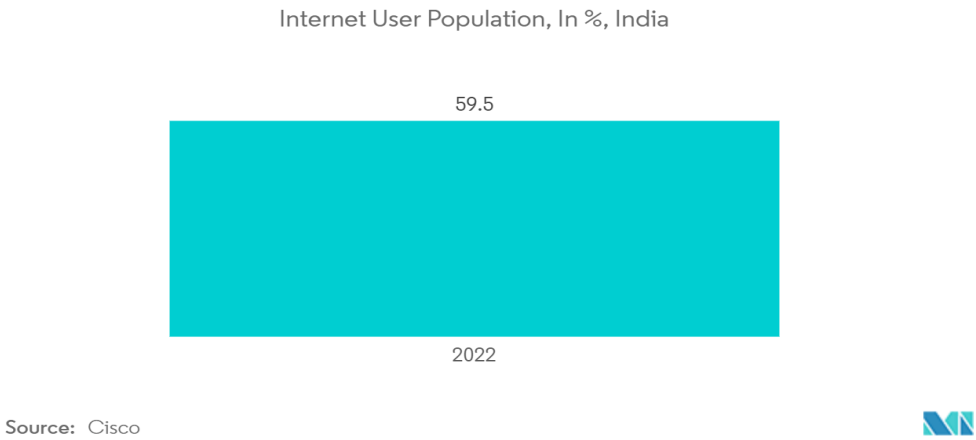
Over the next few years, the mobile artificial intelligence market is expected to register a CAGR of 28.65% (2023-28) in North America, Europe etc. And In India is is about 7.13% in coming next five years from 2022-27. Virtual assistants and chatbots will become more widespread and intelligent in the near future, freeing employees from monotonous tasks like answering simple questions or performing routine tasks. As for the Home assistants, Amazon already introduced Alexa Shopping and more such virtual helpers, each programmed to do a certain range of tasks to make lives of human beings easy. The main things that are making the market growth are the rise of AI based applications in many different end-user industries and the growing demand for cognitive computing and Automation. Also, today more and more people are using mobile devices in their daily lives, such as at work, in school, and for personal use. The increasing use of AI in health care and self-diagnosis systems boosted the market's demand. Thus, More user friendly applications development in Mobile pave the way of growth in the market size of mobile app development. As, per

the report Largest market is “North America" and Fastest growing market is Asia Pacific. A Joint Study Conducted by Microsoft and the Internet and Mobile Association of India (IAMAI) Revealed that India’s artificial intelligence (AI) market is expected to witness a growth rate of 20% over the next five years- will become the second fastest rate globally behind China.

Now, Let’s study how Smartphone Application Drive Growth of The Market

As, the market for smartphone AI processors is growing because today everyone wants real-time voice processing and image recognition. Today, AI is becoming the most important part of smartphones, and it can be used for a lot more than just digital assistants. With Edge-AI technology, many AI functions that used to be done on the back end can now be done on the phone itself. With each update, artificial intelligence (AI) and machine learning (ML) make hardware and software for mobile phones better. The growing penetration of mobile phones worldwide is also helping the market growth. For example, the mobile penetration in North America had 321 million unique mobile subscribers. By 2025, the penetration rate will increase by 2% to 345 million individual mobile subscribers. In India there will be 1 billion smartphone users by 2026 with rural areas driving the sale of internet-enabled phones, a Deloitte study said on Tuesday.

India had 1.2 billion mobile subscribers in 2021, of which about 750 million are smartphone users. It is poised to be the second-largest smartphone manufacturer in the next five years. A growing number of mergers and partnerships between big tech companies also helped the market grow. Apple is the leading buyer of companies in the global artificial intelligence space. For instance, Apple acquired the most AI companies, defeating Accenture, Google, Microsoft, and Facebook. All of the other companies also had an increased number of AI acquisitions.



Resources: Mordor intelligence: MOBILE ARTIFICIAL INTELLIGENCE MARKET - GROWTH, TRENDS, COVID-19 IMPACT, AND FORECASTS (2023 - 2028)

Role of AI in Mobile App Development

Artificial intelligence technology is an innovative mobile application which is based on machine use to offer the best user experience. So, we can explain role of AI in mobile app development with the help of following points:

- **Solve Everyday Problems of Mobile Users:** The main Objective of AI technology is to solve everyday problems of Mobile users and make their life easy & Comfortable.
- **Ability to collect essential data or information from mobile phones:** AI has ability to collect essential data or information from mobile phones like user location, contacts, and daily actions to enhance user engagement on the app and solve complex problems by analyzing user behaviour and interaction with the app.
- **Makes it Possible to Develop AI-powered Mobile Applications:** This new innovative capability makes it possible to develop AI-powered mobile applications that transform and ease human needs.
- **Used to Enhance the Functionality and User Experience of AR (Augmented Reality) Apps:** AI can be used to enhance the functionality and user experience of AR apps. For example, use of AI in Augmented Reality App can improve the real-time recognition of objects and images within. Also help in creating more intelligent, responsive, and innovative applications.

Thus, we just discuss about those points which enhance user experience by using artificial Intelligence in the development of mobile apps and those are:

- Better Search Engine Optimization
- Increase level of Automation in mobile apps
- More Automated logical reasoning
- An Automatic Function of replying towards any call or message
- Integrate functionality of AI with IOT (Internet of Things)
- More enriched personalized user experience
- Enable real time translation for users
- Availability of more AI powered chatbots.
- Ensure Security to users with face recognition concept

On the Basis of these points we can say that AI use in different mobile apps enrich user experiences

There are some secondary data which explain about the Artificial Intelligence Market Size in Mobile App Development and those are:

Now, we just discuss about the Pros and Cons of Artificial Intelligence in Mobile App Development:

Pros/Advantages are:

- **A Complete a Complex or tedious task:** Use of AI in Mobile App development helps in Completing a tedious task in an easier way. Use of Integrated and careful automation in artificial intelligent machines can work for very long periods without a fall in its production capacity.
- **Lack of Error:** Artificial intelligence machines are especially important in those fields where a very high degree of accuracy and precision is required. One of such area is space exploration. In space exploration, there are no margins for error and any wrongly placed number could ruin the entire process. Artificially intelligent robots are programmed to help with space exploration. These robots are built to withstand the harsh atmosphere of space. They are acclimatised such that they cannot be broken down, modified or disfigured by the hostile space atmosphere.
- **Helps in Health Care Sector by Diagnosing and Treatment of Disease:** Artificial intelligence plays an important role in medicine or health care sector. Intelligent robots can be used in the diagnostic and treatment of diseases. They can also help inform doctors on the side effects of certain drugs. Also, they can be helpful in artificial surgery simulators. It make diagnosis process of severe disease very easy and accurate.
- **Makes Comfortable Life of Users:** Artificial intelligence takes place of daily use in every human being lives. In travel and tourism, artificial intelligent apps can be used to detect locations much easily using augmented reality. Augmented reality superimposes computer-generated images on the real world view of the user, improving his/her perception of the surrounding. Artificial intelligence can also be used for predictive writing and correction of human spelling. In the posting on photographs on social media, artificial intelligence programming can help to identify and detect a person's face and correctly tag the individual.
- **Helps in Difficult Exploration of Fuels from the Ocean:** As, the extreme pressure in the ocean floor is too high for humans and would crush anyone in seconds. Use of Intelligent robots, on the other hand, can be built with a unique material such as to withstand the pressure of the ocean floor. Intelligent robots can also be used for fuel exploration and other mining processes. These robots are built such that they can perform challenging jobs without tiring quickly.

Cons/Disadvantages are:

- **High Cost:** One of the major drawbacks of artificially intelligent machines for mobile app development company is high cost. These applications are very costly to build and even more costly to maintain and manage. There is always the need for upgrades so they can match the changing needs and environment. This usually requires more research. In the case of breakdowns, these machines can require a lot of processes for recovery of lost codes and reinstall the system. And, all these process leads to high cost to companies.
- **Create Unemployment:** Use of New Innovative techniques create unemployment in the country, because many low-skilled jobs have been lost due to replacement by intelligent machines. For this we can take an example of the assembly line in mobile app development company. A typical assembly line which would have given jobs to 30-50 people can be automated such that only 5 people will be needed for monitoring and supervision and in case of introduction of latest technology such as driverless cars can lead to loss of several jobs like taxi drivers and chauffeurs.
- **Lack of Faith or Confidence in the mind of Users:** There is no matter how smart an artificial intelligence robot is, it would still lack the judgment calls associated with humans. There are times when human judgment and calls are necessary and not something decided based on algorithms and calculations. A good example is the Sydney Australia shooting that took place in 2014. When people started calling Uber to escape from the affected area, rather than make a decision to help those in need, the algorithm made its decision on the economies of supply and demand and hiked the price of its rides.
- **Lack of Emotions and Originality like Humans:** When it comes to innovative creativity and imagination for mobile app development company, you can only find it in humans. Artificial intelligent machines will help to design and create but have no capacity for the original creative ability that is found in humans. These devices lack the sensitivity and feeling that is found in humans.
- **Lack of Skills or knowledge or Improvement in user Experience:** Artificial intelligent Machines can never work like an human being, because learning comes as a factor of experience, Mobile app development companies can store a lot of information, but they are unable to access this information in the same way as humans does. AI based machines cannot alter their reactions and responses according to a changing environment. They cannot make a distinction between someone who is hardworking and someone who is inefficient. They lack the human touch necessary for effective living.

Conclusion

On the basis of above study we can say that AI plays an important role in mobile app development in all over the world. If we see the statistic of India then according to Business Today report there will be 1 bn. Users of Smart phones in 2026. And about 7.13% of CAGR from (2022-27) in India. AI based Technology makes life of every human being easy and comfortable. Thus, we can say that Increase in no. Of mobile users leads to increase in Annual Growth Rate of AI based Mobile app development in all over the world, because it becomes one of the important part of everyone life in India also.

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12

Rehabilitation of Abdominal Muscles and Role of AI in Tracking Patients Improvement

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Introduction

Exercises such as sit-ups or strong twisting movements can lead to abdominal strains. Heavy coughing or sneezing can also cause abdominal strains. The main symptom of an abdominal strain is pain which varies in severity depending on which grade is experienced. It may also be sore to touch the area and local inflammation may be evident. Bruising and bleeding in the tissues may occur with more severe strains. Movements involving the abdominal muscles will be difficult to perform. In order to reduce the pain and inflammation associated with an abdominal strain, you should see a physiotherapist as soon as possible. You can also apply some crushed ice wrapped in a damp towel to the area. As part of artificial intelligence (AI), computer systems are developed that can perform human-like tasks such as decision-making and problem-solving. It has been possible to use AI-based tools in medicine to predict various factors, including risk stratification, diagnosis, and treatment choice. AI can also be beneficial in emergency departments, especially with patients' triage.[i]

The abdominal muscles form the abdominal walls, which are composed of skin, fascia, and muscles. The abdominal wall encloses the abdominal cavity and viscera. The abdominal muscles support the trunk, allow movement, hold organs in place, and are distensible (able to adjust to changes in abdominal volume). In addition to protecting the spine, the deep abdominal muscles and intrinsic back muscles form the core muscles.[ii]

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The most common causes of abdominal muscle strains are overstretching, overuse, or a violent movement of the trunk, improper technique while playing sports that require running, turning, and jumping, lifting heavy objects, laughing, coughing, or sneezing. Its main function is to stabilise the trunk and maintain internal abdominal pressure. This muscle lies between the ribs and the pubis at the front of the pelvis and has the characteristic bumps or bulges known as 'the six pack' when it contracts. Rectus abdominis is responsible for moving the body between the rib cage and the pelvis. There are external oblique muscles on each side of the rectus abdominis. The external oblique muscles allow the trunk to twist, but to the opposite side of the external oblique that is contracting.[iii]

It is located just inside the hipbone and flanks the rectus abdominis. The internal oblique muscles work in the opposite direction to the external oblique muscles. For instance, when twisting the trunk to the left, both the internal obliques and the external obliques must contract simultaneously. There are two main types of abdominal muscles: anterolateral and posterior. Anterolateral abdominal wall muscles: consist of:[iv]

There are two vertical muscles along the midline (bisected by the linea alba): the Rectus abdominis and the Pyramidalis

- The external abdominal oblique, internal abdominal oblique, and transversus abdominis are three flat muscles on the anterolateral side.
- QL assists with the diaphragm and fixes the 12th rib during inhalation as well as lateral flexion and extension of the vertebral column.
- Muscle fibres in the abdominal muscles have different orientations and act in all three planes during movements, and they are linked through a common site of connection or through fascia. It is not uncommon for abdominal muscles to work in harmony with others when controlling their action. Physical activity involves a nearly infinite number of variations, all regulated by the brain. For instance, the abdominal muscles control the spine, the pelvis, and the body as a whole. During normal gait, the upper and lower parts of the rib cage counterrotate, and the arm and leg move in opposite directions.

When the hip extends on one side, the rectus abdominis and external obliques act eccentrically to decelerate anterior pelvic tilting. When the shoulder is extended, the RA and external obliques of the other side work eccentrically to control thoracic extension and rotation. Even when the body is at rest, the abdominals (along with other core muscles) help keep it stable and balanced. The abdominals are involved in almost every activity, including biking, running, walking, swimming, swinging a golf club, and playing chess. Those with so-called "six-pack abs" look that way because of low belly fat, which shows muscle detail very well. However, the abdominals won't bulk up to the same degree as other muscles because they are relatively thin

structures. However, reducing this fat won't happen by performing sit-ups. It is better to improve the metabolism, which is largely determined by diet. Intentional and exhalatory movements are active in forced breathing. Exhalation involves contractions of the intercostal and abdominal muscles during forced breathing. Exhalation is primarily performed by the expiratory muscles during exercise. When the rib cage muscles contract, the abdominal muscles gradually relax, and vice versa during expiration.[v]

Physiotherapy and AB

Overstretching, improper technique while playing sports that require running, turning, and jumping, lifting heavy objects, laughing, coughing, and sneezing are all causes of abdominal muscle strains. It is difficult to treat an abdominal muscle injury. There is no way to splint the abdomen, and it is nearly impossible to fully rest these muscles. The following are basic things that can be advised to clients.[vi]

- Allow the injured muscle to heal by avoiding exercise.
- Exercises that cause abdominal pain or spasm should be avoided.
- Stretching shouldn't be painful or excessive, as this may slow the healing process.
- Ice should be applied to the injured area during the acute phase, or within 48 hours after the injury. Ice should also be applied after exercise.
- To loosen muscles, apply heat before activities.[vii]

Our back is affected by a deficit in the transverse abdomimis, a deep abdominal muscle that contributes to lumbopelvic stability. A deficit in its function can result in low back pain (LBP). In addition to core stability and Pilates, this muscle is often used in rehabilitation and rehabilitation programs. See Core Strengthening and Lumbar Motor Control. Abdominal draw-ins are easy to apply and target the transversus abdominis and diaphragm - two important respiratory muscles. Exercises can be progressed by introducing external resistance, or incorporating upper and lower limb movements while expelling air from the abdomen. Research has shown this exercise to be beneficial for those with lumbar hyperlordosis, as it increases activity in the gluteus maximus, thus providing support for the lumbar spine and pelvis. As part of curl up exercises, you target your rectus abdominis, transverse abdominis, obliques, hip flexors, chest, and neck. Start with slow movements and a few repetitions, and make sure your back is in contact with the floor. Eccentric curl ups work best at a 30-degree angle.[viii]

When compared to standard bridging, modified bridging with hip abduction or an unstable surface increases core stability, trunk control. The internal abdominis, rectus abdominis along with the erector spine are more activated in modified bridging. As an example, the William protocol of spine flexion has been shown to reduce

lumbar hyperhidrosis, back pain, hip flexor and back extension flexibility, abdominal strength, and hamstring flexibility. From a flat position with your knees in flexion, try to flatten your back without pushing down with your leg. In addition to strengthening abdominal muscles, planks and pilates exercises activate the core muscles.[ix]

Role of AI in Physiotherapy

The goal of artificial intelligence (AI) is to develop computer systems that can make decisions and solve problems as if they were human. Considering the effect of uncertainty on many medical decisions, AI solutions can be useful when it comes to predicting various factors in medicine, including risk stratification, diagnosis, and treatment choice. It is also possible to use artificial intelligence in emergency departments, especially during triage. Increasingly, emergency departments (EDs) have to use an efficient system to evaluate, manage, and prioritize patients as the number of patients seeking medical care has increased in recent years. Triage (7-9) is a structure used in crowded EDs to manage patients.[x]

Incorrectly applying triage techniques may lead to postponements, improper treatments and undesired results. The Emergency Severity Index (ESI) is a five-level system that has been used all over the world. This algorithm sets out distinct levels of care, from the most to the least urgent cases, with Levels 1 and 2 focusing on high acuity and Levels 3 to 5 taking into account resource needs. Iran currently uses ESI-version 4 (ESI-4) in most hospitals. Although ESI-4 as a rule-based model should be an easy method to adopt, estimating the number of resources needed in many cases is beyond the expertise of first-line responders and requires input from an expert emergency medicine physician.

An automated tool that eliminates the need for expert input would facilitate the assessment of patients by first-line responders and facilitate immediate communication with the nearest emergency department. The application of artificial intelligence is considered to play a key role in supporting a decentralized rehabilitation model in which intelligent connected tools will be used to assist clinical decision-making, and to monitor health outcomes. As a result of the future challenge of enabling assisted physical therapy and assessments in a minimally supervised and decentralized manner, ideally at the patient's home, many AI-based methods and solutions have been proposed in recent years. In some existing studies, machine learning algorithms have been combined with specific technologies to address rehabilitation issues, such as wearable sensors and vision-based motion capture technologies.

More specifically, a recent study emphasized the use of motion capture systems and machine learning techniques for movement evaluation in rehabilitation programs [19]. Other works introduced data analytics to enhance the efficiency and effectiveness of physical rehabilitation care and highlighted the advancements in

machine learning for automated patient performance and recovery evaluation. Man-made consciousness advances are viewed as critical in supporting a decentralized model of care in which helpful mediations are given from a good way. In recent years, a variety of strategies have been proposed to support smart assistance and remote monitoring in rehabilitation services. Because of the developing significance of man-made intelligence-based applications to help far off restoration systems, with the current work, interestingly, the creators mean to give concisely cutting edge about man-made intelligence-based AI arrangements supporting the advancement and conveyance of non-intrusive treatment from a good way.

In addition to all of these different kinds of motion capture technologies, recent advancements in the field of computer vision have made it possible to use low-cost RGB and depth sensors to analyze motion using human pose estimation algorithms that are based on deep learning frameworks. A subfield of computer vision known as "human pose estimation" aims to predict human body positions by extracting joints from images and videos for motion analysis [65]. AI-based human motion modeling, in contrast to wearable sensors, enables inexpensive and unobtrusive home-based monitoring of patients' daily activities using low-cost hardware, such as tablets and smartphones.[xi]

Conclusion

Machines that presentation "artificial intelligence" - the capacity to adjust to changing prerequisites and gain for a fact - are arising in an ever-increasing number of clinical settings today. Patients wear remote gadgets that assemble information; machines decipher the information and can gain from it to settle on suitable decisions. It's still early days, yet assuming this pattern toward artificial intelligence in exercise-based recuperation proceeds to develop and become open to additional patients, it can possibly at last change the job of the actual specialist.

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Artificial Intelligence Stewardship towards Employment Opportunities

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Introduction

It cannot be emphasised how important technology has been to India during the past two decades. The future of work in India is being redefined by blockchain, machine learning, artificial intelligence and deep learning, virtual reality, natural language processing, 5G technology, and other new technologies. This investigation is centred on AI. Intelligent software and computer algorithms are the products of the combination of science and engineering known as artificial intelligence. It is the outcome of scientific investigation and human inventiveness. AI software and computers are capable of thinking, acting, learning, and making decisions similarly to people, and they base their operations on the experience they get from interacting with others. In order to dominate the globe in AI technology, every nation in the world is making considerable investments in the field. China, the United States, and the United Kingdom are the major nations. India is also included. The Republic of China claims that by investing $150 billion in AI by 2020, China will already be the global leader in this field. A $10 billion venture capital investment in the field of AI has benefited the United States of America (USA). Private capital of $8.6 billion has been invested in the UK. As part of its digital transformation, India is making huge investments in cutting-edge technology, with AI at the forefront. The NASSCOM report estimates that 1.5% of all global investments in AI are made in India. With a CAGR of 30.8%, it is expected to reach $881 million by 2023. India is vying to dominate the world in technological advancement. The Department of Science and Technology launched the National Interdisciplinary Cyber-Physical Systems (NM-ICPS) in 2019 with funding from the Union Cabinet of INR3660 Cr ($494 mn). A "National Strategy on AI" was also published in 2018 by NITI Ayog (National Institute for Transforming India). The strategy's slogan was #AIforAll: Technological Leadership for Inclusive Development.

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The purpose of the study is:

- To look at the work economy as it is today from the standpoint of AI.
- To calculate how artificial intelligence may affect available job prospects in the future.
- To be up to date on artificial intelligence job trends.
- Increase public knowledge of the demands of the workplace of the future.

Review of Literature

(Singh et al., 2019). The researcher aims to show how artificial intelligence has the ability to generate jobs across many industries in India. The paper emphasises the change and employability brought on by technology. New technologies would alter the pattern of India's development and progress. The study found that because of AI's productivity, accuracy, and efficiency, needs have been growing across industries, including banking and finance, manufacturing, and health. AI has a beneficial and negative impact on employment. On the one hand, technology opens up new job opportunities, but on the other, it displaces occupations that need routine, repetitive work. The paper claims that AI might both "threaten and revolutionise" the labour sector in the future.

(Bhattacharya et al., 2019). With the advent of new technologies like AI, the goal of this study is to provide a sense of the future of work in the Indian context. The authors of the study employed a qualitative positivist methodology. The responses of 26 experts were analysed using the System Dynamic approach. The author found that because AI has replaced jobs requiring intermediate intellect and experience as well as lower-level repetitive activities, it would have a substantial impact on the future of employment. Additionally, they said that because of the rapid advancements in technology, people would need to constantly improve themselves and make learning a lifelong endeavour. The study is limited to an organisational perspective, particularly with regard to strategic human resources.

(C. Vijai, 2019). This essay mainly focuses on finance technology, blockchain, banking, and artificial intelligence. The researcher emphasises the advantages of AI in the Indian banking industry, the challenges it is now facing as a new technology, and the scientific advances made in this area so far. According to the study, technologies like blockchain and AI have a huge potential to boost business productivity and promote financial inclusion in India. (Malik et al., 2021). The researcher wants to know how AI affects Industry 4.0, technological stress, and employee experiences. The research focuses on the positive and negative experiences that employees have had as a result of Industry 4.0's emerging issues. Industry 4.0 employees are experiencing technological stress as a result of job displacement, job risk, and work instability brought on by digital transformation. New skill sets and technical abilities must be acquired to keep up with the expanding technology breakthroughs. According to the poll, businesses should implement strategic measures to enhance employees' proficiencies.

(Jaiswal et al., 2021). The study included crucial competencies needed to upskill MNC workers. (Multi-National Companies). The qualitative analysis approach was used. Twenty seasoned IT professionals from MNCs were interviewed. The study identified five key talents: decision-making ability, complex cognitive abilities, digital capabilities, and data analytic skills. According to the paper, people should work together rather than seeing AI as a danger to mankind. Both are advantageous to each other. The effectiveness of AI combined with human intelligence may make for a fantastic collaboration that helps both the local and global economy.

Research Methodology

The present study uses secondary data and is descriptive in nature. Data was gathered from many secondary sources, including websites and published work of the Government of India on several platforms, blogs, publications, and so on, to assess the study's objectives and the current employment environment in the context of AI in India. Also included were yearly papers and brochures on artificial intelligence from tech behemoths including PwC, Accenture, Microsoft, IBM, and others. In addition, published studies, publications, and online newspapers have all been taken into account.

Future Effects of AI Include

Artificial intelligence is used in every field in India due to its productivity and efficiency. Every industry, including banking, manufacturing, insurance, the financial sector, telecommunications, media, advertising, and marketing, is using AI in some capacity. Every company, whether it is a huge corporation, a firm, an organization, or a startup, is integrating AI technology to increase the profitability and efficiency of their operations and their ability to compete on a regional, national, or international level. AI technology has had such an influence that people are now being replaced by it, which is a serious threat to mankind.

Recent Developments in AI Include

There is a significant need for AI expertise across a variety of global businesses, including natural language processing, data mining, deep learning, machine learning, search engines, gaming, speech recognition, robotics, vision recognition, weapons, and expert systems. People who want to work in the AI field need to have technical skills as well as a thorough grasp of several programming languages, including Python, C++, R, SQL, and others. They should be knowledgeable about a variety of topics, including reinforcement learning, deep learning, machine learning, and natural language processing (NLP).

The $8 billion market for AI engineering is anticipated to grow at a 35% CAGR between 2023 and 2032. Edge AI that is generative, explainable, cloud-based, and adaptive the demand for AI and augmented working is rising among businesses that deploy AI technologies.

Tata Consultancy Services, Accenture, Infosys, Wipro, Amazon, Capgemini, Cognizant, and IBM India Private Limited are top Indian companies that deal with AI, data science, ML, and data mining. They are also the highest paying AI companies in India.

Demand of AI Skills

India has the greatest AI talent penetration factor of 3.09 among all G20 and OCED nations, according to the NASSCOM study, and is rated #1 in terms of AI talent concentration. India is a popular destination for talent from around the world due to its enormous pool of digital talent, which numbers about 1.6 million individuals. To advance their skills and become experts in the field, those who want to build a career in AI must learn about the requirements and complexities of the industry. The technical and non-technical skills listed below are necessary for employment in the AI and data science industries:

Technical Proficiencies

- Knowledge of programming languages (JavaScript, Python, R, C++, SQLL)
- The Domain Knowledge
- Mathematical Competence (Linear algebra, Probability, Statisstics)
- Automated Learning
- In-depth education
- Natural Language Processing (NLP)
- Neuromorphic Network Architecture
- the Shell Scripting
- Techniques for Signal Processing
- Analysis by Cluster

Non-Technical Competencies

- Communication
- Making Decisions
- Creativity
- Analytical Thought

Findings

- The need for a new task force with knowledge in AI, machine learning, IoT, blockchain, deep learning, and other fields will arise as the reliance on data increases in the near future.
- Only low-skill, knowledge-based occupations will be rendered obsolete by automation in the near future, not only blue-collar ones.
- Future generations could not be given long-term jobs, but rather shorter objectives to complete in a set amount of time.
- The largest problems that need quick solutions are data leaks, cyber security threats, and AI ethics.

- While there is still a lack of public awareness, there is a shortage of upskilled workers with machine learning and AI expertise.
- The majority of occupations that need routine and repetitive work are currently being replaced. Future jobs will only exist in those that have a feeling of innovation and novelty.
- The future generation might not operate in the same way we do now, with work from home being promoted rather than having a set physical workspace.
- In the future, freelancing (article creation, graphic design, etc.) will be encouraged.

Suggestions

- The government should make investments in AI-driven educational and training programmes that can help people get the new skill set they need.
- To ensure that people are prepared to adapt to changes and that policies are beneficial to them, technology implementation and government policy design should work hand in hand.
- Despite their fast expansion, the topics of data science, IOT, AI, and ML are largely understudied. To increase awareness, educate the public, and obtain new insights into these technologies, more research and development should be done in these fields.
- India should establish a national AI policy that encourages ethical AI, AI research, and increased awareness of AI standards, all of which would contribute to the development of India's AI ecosystem.
- In order to develop a fundamental understanding of emerging AI technologies, an AI component must be included in the curriculum of all Bachelor's and Master's degrees. To succeed in today's technologically based economy, students in many disciplines-not just engineering-should understand the foundations of data science.

Conclusion

In India, artificial intelligence is still in its early stages; it will take some time before it completely develops into a flower. Without a doubt, artificial intelligence will increase labour productivity and efficiency in the future, creating revenue over time and advancing the nation's economy. However, AI and automation are now causing a big upheaval in the employment sector. The majority of blue-collar and white-collar jobs are being lost as a result of automation, which is automating all time-consuming, repetitive, routine, lower-level tasks. It also creates new professional opportunities in disciplines like data science, machine learning, deep learning, data mining, and others. People who can't adjust to these emerging technologies or who can't keep up with the shifting demands of the technological environment are significantly more

likely to lose their jobs. In the current environment, automation and AI have led to a rise in unemployment. While AI can automate some processes, it cannot take the place of jobs that need high levels of emotional intelligence, critical thinking, creativity, innovation, analytical thinking, and decision-making. In the end, we can say that AI significantly contributes to the emergence of new prospects. However, it affects employment in both positive and negative ways. The work economy of today offers "threat and opportunity."

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