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Recent Advancements in Human Behavior Recognition and AI in the Construction Industry

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ABSTRACT

Recent advancements in Human Behavior Recognition (HBR) and Artificial Intelligence (AI) are reshaping management practices within the construction industry. This paper explores the intersection of emerging technologies and construction management, emphasizing how AI-driven behavior analysis supports decision-making, workforce optimization, and safety management. From real-time monitoring of worker activities to predictive analytics for risk mitigation, HBR technologies are enabling data-informed strategies that enhance operational efficiency and compliance. The study examines the managerial implications of integrating AI systems, including challenges related to organizational change, ethical data use, and employee acceptance. Through the analysis it was found that there is resistance among workers towards adoption of AI on site. This maybe addressed by conducting awareness campaigns to the low level workers.

***Keywords**: Artificial Intelligence, Human Behaviour Recognition, Construction Industry, Safety, Profitability and Human Resource Allocation.*

Introduction

Construction is the oldest and one of the largest industries in the world with its market size of about ten trillion US dollars. Construction is traditionally a contracting business right from the good old days, the industry comprises of a very large number of small firms. Now the construction industry is one of the largest industries in any economy. It makes a significant contribution to the national economy and provides employment to a large number of people. The construction industry encompasses the planning, design, building, renovation, and maintenance of structures like buildings, infrastructure, and civil engineering projects, essentially shaping the built environment and playing a vital role in economic development by creating jobs and facilitating societal growth; it involves diverse sectors like residential, commercial, industrial, and civil construction, each with its own specialized practices and project types.

The construction industry has evolved from primarily manual, blueprint-based methods to a progressively technology-driven landscape, with Artificial Intelligence (AI) playing a pivotal role in optimizing design, planning, construction management, and safety, enabling significant improvements in efficiency, accuracy, and project outcomes across the entire building lifecycle.

Scope of the Study

This study focuses on exploring the recent advancements in Human Behavior Recognition (HBR) and Artificial Intelligence (AI) technologies within the construction industry. It aims to investigate how these innovations are being applied to improve safety management, workforce efficiency, and operational decision-making on construction sites.

Need of the Study

This study is needed to understand how recent advancements in AI and HBR can be effectively harnessed to address critical challenges in construction management. By examining emerging tools and

techniques, the study seeks to highlight how AI-driven behavior recognition systems can transform traditional safety practices, reduce human error, and improve overall project outcomes. Additionally, it aims to fill the knowledge gap between technological potential and practical implementation in the construction sector, guiding future research and industrial adoption.

Objective of the Study

- The primary objective of this study is to ensure the effectiveness of AI in construction industry with reference to human behavior.
- To analyse the attitude and perception of low level workers towards adoption of AI.
- To ensure the availability of manpower in various construction sites with help of AI inreal time.
- To ensure the efficiency of workers on construction sites with help of AI

Review of Literature

- Understanding managers' attitudes and behavioral intentions towards using artificial intelligence for organizational decision-making Guangming Cao, Yanqing Duan, John S Edwards, Yogesh K Dwivedi Technovation 106, 102312, 2021

  Research Gap: The attitude and perception of low level workers towards adoption of AI is not considered.
- Roles of artificial intelligence in construction engineering and management: A critical review and future trendsYue Pan, Limao Zhang Automation in Construction 122, 103517, 2021

  Research Gap: The research failed to address that AI can be used to collect data of various projects sites on real time
- Opportunities and adoption challenges of AI in the construction industry: A PRISMA review Massimo Regona, Tan Yigitcanlar, Bo Xia, Rita Yi Man Li Journal of open innovation: technology, market, and complexity 8 (1), 45, 2022

  Research Gap: The cost of human resources on construction sites maybe reduced with the help of AI
- Artificial intelligence (AI)-Based technology adoption in the construction industry: a cross national perspective using the technology acceptance model Seunguk Na, Seokjae Heo, Wonjun Choi, Cheekyung Kim, Seoung Wook Whang Buildings 13 (10), 2518, 2023

  Research Gap: Factors Affecting the adoption of AI in construction sites
- Artificial intelligence and the UK construction industry–empirical study Haddy Jallow, Suresh Renukappa, Subashini Suresh, Farzad Rahimian Engineering Management Journal 35 (4), 420-433, 2023

  Research Gap: AI may also used to ensure the efficiency of workers on construction sites.

Research Methodology

The research methodology for this study was designed to provide a comprehensive understanding of the Recent Advancements in Human Behavior Recognition (HBR) and Artificial Intelligence (AI) in the Construction Industry. A Descriptive research design was employed to gather and analyze data, ensuring a holistic approach to the study. Primary data was collected through structured questionnaire method. Likert's 5 point scale was used in the questionnaire. The population size is 110 and the sample size was 30. The sampling area was SPACE ASPIRE ARCHITECTS. Convenience sampling was used in this study. Data Analysis was made through SPSS software. The study was analyzed through correlation, regression, anova and chi-square.

Data Analysis and Interpretation

Correlation: Resistance of Workers Vs Allocation of Human Resources

	There is resistance from workers toward AI driven monitoring and automation	The use of AI allows for better allocation of human resources on - site
There is resistance from workers toward AI driven monitoring and automation	1	0.462*
The use of AI allows for better allocation of human resources on - site	0.462*	1

Interpretation

The correlation analysis implies that while the immediate concern of worker resistance and the potential future benefits for Human Resource Allocation are somewhat distinct in this group's view.

ANOVA: Role of the Employee and Project Profitability

ANOVA: Single Factor

Summary				
Groups	**Count**	**Sum**	**Average**	**Variance**
Primary role in the company	30	70	2.333333333	2.16091954
Project profitability	30	109	3.633333333	1.067816092

ANOVA						
Source of Variation	**SS**	**df**	**MS**	**F**	**P-value**	**F crit**
Between Groups	25.35	1	25.35	15.70274119	0.000205541	4.006872886
Within Groups	93.63333333	58	1.614367816			
Total	118.9833333	59				

Findings

57 % of respondents are under the age category of below 25 years, 53 % of the respondents hold UG degree & 47 % have completed their PG, 60% of the respondents are male & 40% of the respondents are female, 33% of the respondents are been designated as engineers, 40% of the respondents are been designated as project manager, 7% of the respondents are been designated as safety officer & 20% of the respondents are been designated as AI developer.

The data indicates a strong level of familiarity and awareness of AI – driven automation in the construction industry among the respondents, survey responses indicate strong adoption and feasibility of AI in the construction industry. The overall perception of AI's benefits in safety and profitability is strong, with moderate support in other areas, the survey indicates that cost, privacy, resistance, job loss and tech limits hinder AI use in construction. Most of the respondents agree that ethical guidelines, worker consent, government regulation, audits and training are essential for responsible AI use in construction. Most of the respondents expect rising AI use in construction, with benefits like task automation, improved safety, and client preference for AI – driven companies.

There is a moderate positive correlation, which is statistically significant at the 0.05 level. This means that there is a tendency for the resistance from workers toward AI – driven monitoring and automation and the use of AI for human resource allocation on – site. The relationship is moderate in both strong and reliability. There is a statistically significant difference in mean scores between the two groups. This suggests that participants evaluate items differently depending on whether they consider their primary role or project profitability, with project profitability being rated more favorably on average.

Suggestions

- Conduct awareness campaigns to educate workers on how AI works and its benefits, especially around safety and efficiency, to reduce resistance.
- Establish clear data use policies and inform workers about what data is collected, how it's used, and who has access.
- Implement platforms that use AI to track, assign, and monitor workers in real time based on site needs and worker availability.
- Use AI to track and allocate resources efficiently, ensuring the right people, equipment, and materials are available when needed, reducing downtime and waste.

Conclusion

The dataset reflects a broad range of responses from professionals of various age groups, educational levels, job roles, and sectors such as commercial, residential, and industry. Notably, individuals below 25 years old—particularly males with engineering or project management roles and holding a master's degree—consistently demonstrate high levels of agreement and strong agreement across most survey items. This suggests a generally positive outlook or strong alignment with the values or conditions reflected in the statements. Their enthusiasm may stem from early-career motivation, optimism, or satisfaction with their roles and workplace environments.

In contrast, some female respondents, especially those in engineering roles and aged 25–34, show more moderate responses with increased instances of neutrality and disagreement. These patterns may point to different experiences or levels of satisfaction based on gender or role, possibly influenced by workplace dynamics, growth opportunities, or industry culture. The repeated neutrality from certain female participants in AI development roles also suggests potential disengagement, lack of clarity, or indifference toward specific survey areas.

Overall, while the dominant sentiment across the sample is largely positive—marked by high frequencies of agreement—the variability across demographic segments highlights the need for a more tailored approach to workplace policies and employee engagement strategies. Organizations might benefit from deeper analysis to identify the specific needs and concerns of less represented or more neutral respondent groups, ensuring inclusivity and improved satisfaction across all employee categories

References

1. Yuan, M., Wei, S., Zhao, J., & Sun, M. (2022). A systematic survey on human behavior recognition methods. *SN Computer Science, 3*(1), 6. https://doi.org/10.1007/s42979-021-00945-w
2. Farooq, N., Rafique, Z., Merchant, A., & Narejo, K. R. (2025). Investigating how artificial intelligence (AI) systems powered by emotional recognition technologies can assist in conflict resolution by understanding human emotions and behavior. *Review of Applied Management and Social Sciences, 8*(1), 193–205.
3. Regona, M., Yigitcanlar, T., Xia, B., & Li, R. Y. M. (2022). Artificial intelligent technologies for the construction industry: How are they perceived and utilized in Australia? *Journal of Open Innovation: Technology, Market, and Complexity, 8*(1), 16. https://doi.org/10.3390/joitmc8010016
4. Muhammad, K., Ullah, A., Imran, A. S., Sajjad, M., Kiran, M. S., Sannino, G., & de Albuquerque, V. H. C. (2021). Human action recognition using attention-based LSTM network with dilated CNN features. *Future Generation Computer Systems, 125*, 820–830. https://doi.org/10.1016/j.future.2021.07.041
5. Hsueh, Y.-L., Lie, W.-N., & Guo, G.-Y. (2020). Human behavior recognition from multiview videos. *Information Sciences, 517*, 275–296. https://doi.org/10.1016/j.ins.2020.01.033.