FIGHT COVID-19: ROLE OF ARTIFICIAL INTELLIGENCE

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ABSTRACT

We are all living in a deadly environment diseased by a newly discovered Corona virus which is highly infectious. The Corona virus disease (COVID-19) is a global pandemic and a great threat to this world. COVID-19 has not only affected the health of millions of people but also the global economy. According to facts, world trade can experience a downfall by 13% - 32% (in 2020) due to the disruptions caused by COVID 19 pandemic. So, clearly it is a tough situation for all of us to deal with. The Government is doing their best to tackle the situation with minimum loss. The Health care workers are contributing their life to save other people's life. This adverse situation can result in an immense pressure & burden on healthcare systems that might not be successfully dealt with by currently existing facilities. Artificial Intelligence (AI), Machine Learning (ML) and Data Analytics are the effective powerful tools that can help fight against the COVID-19 pandemic. AI models, Machine learning algorithms and big data can together help to control the outbreak of Corona virus. In this paper, we will discuss about some of the challenges in responding to COVID-19 and implementation of AI and ML tools/techniques into local, national and international healthcare systems can be a great contribution and save lives. Some of implementations have been already done and some are still pending, which will be mentioned later in this paper.

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Keywords: *COVID-19, Coronavirus, Machine Learning, ML, AI, Artificial Intelligence.*

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Introduction

The corona virus outbreak is first and foremost a human tragedy, which is affecting lakhs of people all over the world. It is also having a growing impact on the global economy. From this pandemic disease India is also not safe, as consequence more than 3029 deaths have occurred and more than 97000 infected cases are there. COVID-19 is a biggest health crisis which has already infected and taken the lives of lakhs of people all over the world.

The scientists, pharmacists and researchers are working on finding out solution to the problem. They are in search of some vaccine to put a break on spread of this pandemic disease. Till date many researchers have claimed that they have evolved the vaccine but when it came to implementation and testing on human beings all had failed but there is hope. In coming future we will be able to develop an effective vaccine and will be successful in putting an end to this disaster. In this conceptual research paper the researcher has tried to come out with various challenges in pathway of solutions to COVID 19 disaster and he has depicted the solution to these challenges using Artificial Intelligence as a powerful tool.

Challenges

- **Challenge 1: Predicting Risk Factors**

As we all know the Corona virus outbreak is spreading at very fast rate. There are daily thousands of new COVID-19 positive cases encountered. People are unaware of the symptoms at the beginning and become too late when known. There should be a way to predict the risk of an individual getting COVID-19. If the individual is aware of the risk then he/she can get a treatment as soon as possible and self quarantine therefore controlling further spread of infection.

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- **Role of AI in Predicting Risk?**

One of the main objectives of machine learning algorithms is prediction on the basis of input data which is divided into test sets and training sets. The data in this case should be related to COVID-19 which includes the symptoms observed in COVID -19 patients (under treatment) that may lead to risk of being infected by the Corona virus. The data can be obtained from the international Health care systems.

The strength of machine learning is the ability to learn from the given input dataset, in this case individual's features (risk factors) like:

- Age,
- Pre-existing condition,
- General hygiene habits,
- Social habits,
- No. of human interactions,
- What is the frequency of interactions,
- Location and the climate,

The final implemented model can predict if the individual is at a risk or is already infected. If the individual is already infected then it can help predicting whether the individual needs immediate medical care. The prediction model can also be helpful in predicting the outcome of the treatment which would be an extension to risk prediction. It would predict that how likely the patient is to survive (given specific symptoms). If we are able to determine the treatment outcome then the doctors could treat the patients more effectively.

- **Challenge 2: Vaccine Development**

There is still no confirmed vaccination for COVID-19 and in this pandemic situation it is really necessary to come up with a vaccine and a reliable treatment. As the drug development process takes a long time to get the results, we need a faster and accurate way to find the reliable and effective vaccine.

- **How AI can Help?**

It is interesting to know that a team of medical researchers (from Australia), Flinder university have developed an AI that is successful in creating a drug entirely on its own. The AI is named as Smart Algorithms for Medical Discovery (SAM). In order to create a vaccine for a virus we need to understand the virus itself. Proteins are an important part of viruses which are made of sequence of amino acids used to identify its unique 3-D structure and understanding a protein structure is important as it tells how it works. Once the shape is determined, we can develop the drug that works with the proteins unique shape. But it is not as simple as it sounds because it would literally take a long time to examine all the possible shapes of a protein and find its unique 3D structure. Here comes the role of AI.

AI models allow scientists to virtually examine vaccine and predict which treatment might work best. This way the process of vaccine & drug development can be accelerated and also resulting in less money spent on testing and trial process. Using artificial neural networks (ANN), models that can predict protein structure, can be built successfully. Researchers achieved great results with swine flu vaccine developed in 2009 during the swine flu pandemic, where clinical trials of a vaccine commenced within 3 months of discovery of the virus. We hope to achieve similar results with COVID-19 vaccine.

- **Challenge 3: Preventing the Spread using Social Networks**

In this pandemic situation we all are living in, it is essential for all of us to know **where we are**. We should know the answers to the questions like, **how many people are infected and where are these people?** But it is difficult to keep a track on all these kinds of information. Government has taken an initiative and developed an application called AROGAYA SETU which answers to all these questions and keeps a track of all the data including the total no. of COVID positive cases, no. of recovered cases, etc. It also tells whether we are in touch of a corona infected individual.

- **How AI can help?**

One of the problems here is that there might be a big gap (in time **&** space) between contracting the disease, developing the first symptoms, and testing positive. This gap can be filled with the help of AI. As soon as an individual tests positive or recovers or dies, the COVID-19 dataset is updated and can be seen by all of us by the means of AROGAYA SETU application. The dataset is used to find the clusters e.g. the cluster of places where risk of corona virus spread is more so that if any person goes nearby that place, he/she could be alerted. This could be explained more with the help of an example below:

A person who is starting to develop some symptoms assuming might live in a small village with no nearby health care facility. But in spite of that this farmer can still be able to access social networks and give a hint about his health and the spread of disease. Hints that a machine learning model can learn to process at scale.
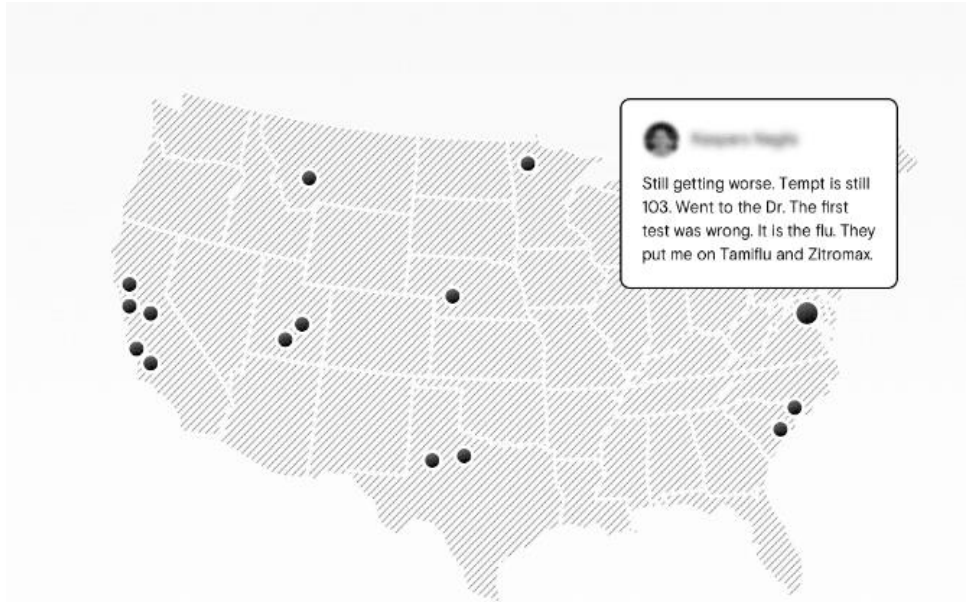
- **Challenge 4: Managing Uncertainty**

We still know very less about the COVID-19 pandemic, & the virus itself is mutable and may continue to change overtime. In the meantime, myths and some unproven hypothesis regarding the disease are propagating online on social media platforms which can impact individual behavior and cause systematic risk. No quantitative assessment has been done to calculate how much miss leading information is out there already. Thus it is very important to recognize false and misinformation to avoid bringing a wrong belief in citizens.

- **How AI help?**

Big AI companies like Google and Facebook are trying to battle these false miss leading information. YouTube on the other hand, directly links user to WHO for any needed information and the misinform videos are taken down as soon as they are uploaded.

There are tools to detect fake news that uses deep learning AI algorithm to determine if the claims made in the posts/story are supported by other posts/stories regarding the same topic or the subject.

Naïve Bayes machine algorithm is one of the best, accurate and easy way to implement the model. It is based on bayes theorem which is interested in only calculating posterior probabilities.eg. **What is the probability that the post is a fake news?**

- **Challenge 5: Controlling Population Movement**

Due to the Corona virus outbreak it has become very important to keep a track on the population movement, to which government came out with a solution i.e. Lockdown. There should be monitoring system that is able to check on population movement and acknowledge whether the rules are being followed by the people or not.AI enters.

- **How AI can help?**

AI has become a key tool which helps in tracking and maintaining the records of the cases in this pandemic. Government will need to build trust in AI and machine learning technologies for maintaining future protection. In order to keep a check on population movement government needs AI surveillance that can be used to break chains of virus transmission across the globe.

Russia, for example monitors citizens at large scale with the help of CCTV cameras to maintain COVID-19 quarantine. AI powered drones can be used to keep a track on population movement and social gatherings. They can also be used to monitor people if they are wearing masks or identify people with a fever.

- AI superpower robots can be used to sanitize the surroundings to ensure a clean and hygienic environment for other people.
- Robots or drones can also be used to deliver medication in healthcare systems ensuring no risk of virus spread.
- Face scanners can be used at the hospital gates to detect individual with a fever or not.
- Government can even use AI driven contact tracing algorithms to send citizens personal text messages, advising them to isolate themselves after being close to someone with a positive diagnosis.

Conclusion

Corona virus pandemic has turned up as one of the greatest challenges for the world to face. There is an immediate need of preventing the spread of this virus and treat it with effective vaccination. This situation is beyond the capacity of human intelligence alone to handle. Artificial Intelligence (AI) in this hard crisis can emerge as on if the humanity's ace cards. Some of the most essential advancements in the field of AI are Natural Language Processing (NLP), Machine Learning, Data analytics and some other features like Chatbots & facial recognition. These techniques have not only been utilized for diagnosis but also for vaccine development and contact tracing. AI has no doubt provided a helping hand to control the COVID-19 pandemic and helped to limit its worst effects.

The AI and Machine learning techniques, mentioned above are proven and well tested. Some have been already implemented in some countries & should be implemented in other too without any further delay. They are ready to be integrated, with only few alterations required. The data to support these techniques already exists. There is a plenty of information available in electronic health records. It is necessary to integrate this data in national, hospital and individual level. If we take a step now, we may be able to have these AI systems in place before our healthcare infrastructure is deeply affected. Doing so will save lives.

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