



# Prediction of 3<sup>rd</sup> Wave of COVID Using Artificial Intelligence

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## Abstract

Artificial intelligence (AI) can be defined as the intelligence demonstrated by machines and is divergent to the natural intelligence showcased by humans or animals, it can also be described as any task performed by a program or a machine. Understanding AI can be a complex task, even with the current technology in hand, it can take several hours or days and depending on the task to be performed it can take even years to perfect an AI.

AI technology provides us with an invaluable prospective to develop early recognition and alert systems that are highly required, especially for rapid and dynamic decision-making skills to reduce risk and ambiguity under the current pandemic of COVID-19 virus.

Keywords: AI, intelligence, prediction, COVID-19, virus, COVID-ResNet

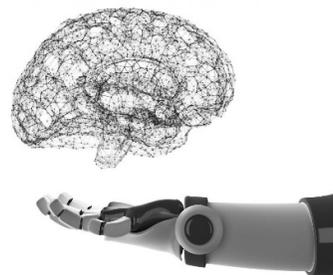
## Introduction

Artificial intelligence (AI) is one of the most important and yet a vital technology that has never seemed to stop evolving and growing. Even though it might be still be anonymous to a lot of people, but with the

gradual evolution of technology, it has quickly become a part of our human lives.

In 1955, John McCarthy, an American computer scientist coined the term Artificial Intelligence (AI). He is also credited as the Father of AI.

From providing users with the right recommendations on songs or shows or in certain cases, suggestions on what consumers might need to buy from an e-commerce store, to even predicting the next wave of a deadly virus, both Artificial intelligence (AI) and Machine Language (ML) are playing an important role in



almost every sector around the globe.

## Why AI?

Even though in the past, the present and the future, Artificial intelligence has been impacting the future of effectively almost every industry and every human being. Emerging technologies such as big data, robotics and (IoT)Internet of Things, AI has been acting as the main driver and will continue to act as a technological trendsetter for the foreseeable future.

One of the most recent examples on the brilliance of Artificial Intelligence (AI)-based algorithm which was used to predict the 3<sup>rd</sup> wave of COVID-19 in the provinces of South Africa, was designed by the University of the Witwatersrand (Wits University) in partnership with the York University, iThemba LABS, and the Provincial Government of Gauteng, providing an aftermath that there was a low risk for a third wave of COVID-19 infection in all provinces of South Africa.

An AI-based algorithm works alongside the analysis of an already existing algorithm and is based on relatively, upon the data provided to it.



## Using AI for diagnosis and Predictions

According to the research paper published by Neelima Arora, Amit K Banerjee, and Mangamoori L Narasu on US National

Library of Medicine National Institutes Of Health.

AI was used for the detection and quantification of COVID-19 cases from chest x-ray and CT scan images.

Researchers have developed a deep learning model called COVID-19 detection neural network (COVNet), for differentiating between COVID-19 and community-acquired pneumonia.

On the basis of the visual 2D and 3D features extracted from the volumetric chest CT scan, Singh *et al* (describes a novel function for autophagy in regulating lipid metabolism), developed a novel deep learning model using Multi-Objective Differential Evolution (MODE) and convolutional neural networks for COVID-19 diagnosis.

COVID-ResNet developed using automatic and discriminative learning rate together with progressive image resizing performed better than COVID-Net in diagnosing COVID-19.

Upon perceiving how the research has helped and improved the different ways by which the virus can be predicted, we find it to be more useful than ever especially in saving lives.



## Prediction of the 3<sup>rd</sup> wave

With the pandemic happening around the world, everyone especially medical staff, scientists and all the people supporting them in various ways trying to help fix this situation as quickly as possible, but we are all limited to what we can do.

Although an AI may not give the impression that it may be capable of predicting or diagnosing a deadly virus, taking the above case of South Africa where AI was able to predict a 3<sup>rd</sup> wave of virus even though it was in its low-risk mode.

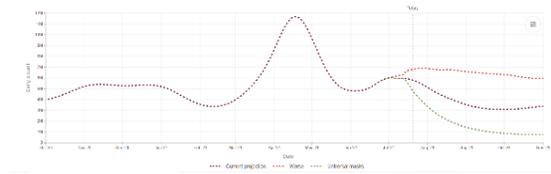
With the rise of the trend in learning AI and improving it the world performs an innovation each time an application or a product is created and is controlled by AI.

The graph for the number of cases of COVID-19 is still at a rise (according to an article published on Big-India) for countries having large population it becomes problematic as the spread of the virus is quicker and harder to control.

With almost 19.6 crore cases worldwide for COVID-19 and with a petrifying 3.15 crore cases in India alone. (Information as of 30<sup>th</sup> July 2021-Google COVID-19).

According to indiaai.gov.in, studying pandemics and disease outbreaks isn't new; but advances in AI can provide a new dimension to disease tracking. By applying advanced algorithmic calculations and predictive modelling, we can get an idea of the imminent problem at hand, allowing governments, healthcare workers and businesses to take appropriate preventive measures.

Scientists at IIT Kanpur, following a mathematical study, estimate that India will witness a third wave on October 2021.



(Graph-1)

Graph showcasing the daily infections and testing.

An AI-based predictive model will be essential to manage a third wave of COVID-19 and this continuous learning model would be based on a real-time and robust data that would aid governments and policymakers with guiding economies to a phased reopening.

For any AI expert, data is what lies at the core of comprehensive AI applications. The biggest challenge that countries face is gathering quality data to build robust pandemic prediction models, data like fatality rates, R-values, virus transmission rates and herd immunity levels are tough to collect and can only be used as an estimate in certain cases.



(Graph-2)

Graph showcasing the number of COVID cases in India.

productivity (based on how the AI is created to perform).

## Pros & Cons

Just like Emily Fisk Giffin once quoted, "Nothing is perfect, it is what you make of it". Even after years of development and technological advancements that has taken place, we can never say that an (AI)Artificial Intelligence is completely right, even though it can have its own benefits, just like the two sides of a coin an AI too has its own shortcomings and benefits.

The benefits of AI may include:

1. Performing Faster Decisions:  
With the 21<sup>st</sup> century witnessing the different changes of technology evolving throughout the years, AI has also evolved alongside it and is now a part of several unique technologies in almost all major sectors of our lives.  
According to the App Developer Magazine, during one of their experiments the team succeeded in training two popular deep neural networks called AlexNet and ResNet-50 in just 4 minutes and 6.6 minutes respectively.
2. Improving Efficiency:  
Automation using AI is possible in many spheres of business and productions. With the help of artificial intelligence, you can automate certain manufacturing processes which ultimately increases efficiency and

3. Less room for errors:  
Since some of the AI is created with the idea that it should perform certain purposes and actions, an AI should be able to use its intelligence based on how the AI's path for thinking has been created.
4. Always Available:  
An AI is apparently not a human so it neither gets tired or feels overwhelmed, hence it is always available 24/7.
5. Allows humans to extend their experiences:  
Provided human beings use AI in the right ways, it allows us human beings to extend our experiences.

The limitations of AI may include:

1. Steep Price Tag:  
An AI is never cheap, since building, coding, creating, planning goes behind the creation of an AI, therefore the better the AI, the greater will be its cost. Maybe in the future AI might be cheaper than what it is today.
2. Reducing Creativity:  
An AI is created to perform certain tasks which might help make human lives easier and allow us to focus on certain things, but since an AI is performing the work, it is foreseeable that the creativity in human beings ultimately gets reduced (In this case, creativity is

based on experiences, the work to be performed and actions taken).

3. Cannot be precise at all times:

Calculations of large amounts of data is not easy and not a lot of ordinary computers are capable of performing high amounts of calculations (excluding super computers). Hence the value given can only be considered as an estimate. Even for the prediction of the COVID wave, we believe no matter what the outcome might be it can only be considered as an estimate.

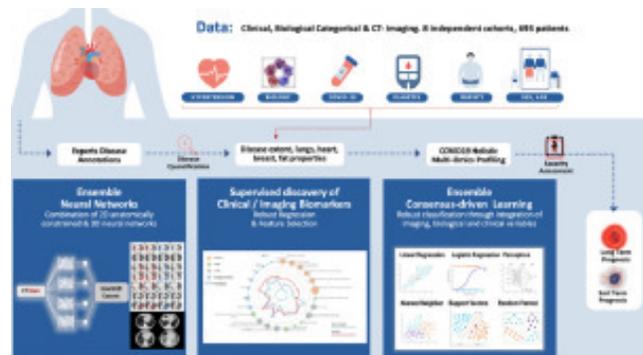
4. Loss of Data:

Data is a major factor in today's world and storing it, is another crucial yet tiresome task. Data loss may occur at any time and at any computer (computer here refers to any technological device that uses data and performs some operation on it) without any kind of warning. Hence it is always advised storing data backups separately.

5. Reduces Employment

Opportunities:

Since the growth of AI allows development of technology and once this technology is capable of performing tasks earlier performed by human beings, it automatically reduces the employment opportunities.



## Conclusion

At the end of the day, AI has developed to be a part of our daily lives. It has advanced to such a point where it is able to predict the rate of a deadly virus, the number of affected people, number of vaccinated people and even the number of deaths recorded.

With a cast-iron certainty we can surely say that artificial intelligence will continue to develop because of the increasing interest in it. Humans will continue to make new discoveries in the field of AI and discover new improved and superior things.

With all the evolutions in technology we find that AI has provided to be of more than just a new technology but rather a life saver.

Artificial intelligence (AI) was always considered or developed with the idea in mind, to be similar to a human intellect and to perform functions and operations

quicker and faster in a much more evolved way.

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