# Artificial Intelligence Role in the ERA of COVID 19

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**Abstract**: Artificial intelligence means intelligence in manmade system. which is the present and future of any technology. It is everywhere like God from houses to space. No one can imagine life without it at present and future because its application areas are healthcare, transport, education, entertainment, commerce, manufacturing, automotive industry and others. Corona virus is a family of viruses while latest one is the COVID-19. COVID-19 is a pandemic at present time causes millions of losses of lives and $8.8 trillion economical losses globally up to 15th May 15, 2020 and 86% fear job losses as par Economic Times. Machine learning, deep learning, Algorithms, Neural Network, Intelligent Agents etc. are used to solve the problem of health care system for diagnosis. Symptom checker, detection, personal assistant, developing new medicine etc. like cancer diagnosis by PathAI, symptom checker by Buoy health, streamlining radiology diagnosis by Enlitic, cancer detection by Freenom, personal assistant for radiologist by Zebra Medical Vision etc. Similarly, AI can be used for detection, prevention, response, recovery and testing COVID-19 cases also. Detection means early warning and diagnosis based on anomalies detection and pattern recognition respectively. Prevention means prediction, surveillance and information gathering based on EpiRisk, contact tracing and via social network respectively. Response means delivery and service automation based on drones and chat bots. Recovery means monitoring via satellite system, GPS, social media data. So, AI is very useful in every stage of COVID-19 cases and also saves millions of lives and trillions of economic losses.

*Keyword: Ai, Machine learning, robotics, GPS, Neural Network, drones, search engine, mobile app*

## I. INTRODUCTION:

AI is one of the fascinating and universal fields of Computer science which has a great scope in future. AI holds a tendency to cause a machine to work as a human. Artificial Intelligence is composed of two words **Artificial** and **Intelligence**, where Artificial defines "man-made," and intelligence defines "thinking power", hence AI means "a man-made thinking power. [1]

So, we can define AI as:
 "It is a branch of computer science by which we can create intelligent machines which can behave like a human, think like humans, and able to make decisions."

A lot of AI is already being utilized in the medical field, ranging from online scheduling of appointments, online check-ins in medical centers, digitization of medical records, reminder calls for follow-up appointments and immunization dates for children and pregnant females to drug dosage algorithms and adverse effect warnings while prescribing multidrug combinations. Summarized in the pie chart [Figure 1] are the broad applications of AI in medicine.



In the fall of 2018, researchers at Seoul National University Hospital and College of Medicine developed an AI algorithm called DLAD (Deep Learning based Automatic Detection) to analyze chest radiographs and detect abnormal cell growth, such as potential cancers (Figure 2). The algorithm's performance was compared to multiple physician's detection abilities on the same images and outperformed 17 of 18 doctors.[2]
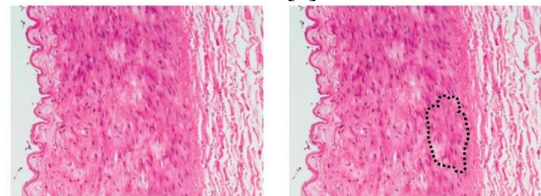


*Figure 2:* Applications of AI algorithms in medicine.

 The left panel shows the image fed into an algorithm. The right panel shows a region of potentially dangerous cells, as identified by an algorithm, that a physician should look at more closely.

The second of these algorithms comes from researchers at Google AI Healthcare, also in the fall of 2018, who created a learning algorithm, LYNA (Lymph Node Assistant), that analyzed histology slides stained tissue samples) to identify metastatic breast cancer tumors from lymph node biopsies. This isn't the first application of AI to attempt histology analysis, but interestingly this algorithm could identify suspicious regions undistinguishable to the human eye in the biopsy samples given. LYNA was tested on two datasets and was shown to accurately classify a sample as cancerous or noncancerous correctly 99% of the time. Furthermore, when given to doctors to use in conjunction

with their typical analysis of stained tissue samples, LYNA halved the average slide review time.

## 1.1 Wuhan Coronavirus – Introduction

- This is a new coronavirus that has been identified for the first time in the city of Wuhan, the capital of the Hubei Province in mainland China.
  - It was identified after people developed pneumonia without an evident cause and where current vaccines and treatment methods were not effective.
  - There have been around 80000 people infected with the virus in China. There have also been almost 3000 fatalities there, exceeding those from SARS.
  - Cases have also been reported outside China, in Hong Kong, South Korea, Iran, Italy, Australia, Thailand, France, Spain, Germany, the US, countries in West Asia, etc. totaling over 90 countries. India reported its first case towards the end of January 2020.
  - Worldwide, there have been more than 56 lakh cases and more than 3.5 lakh deaths.
  - Currently, the worst-affected country is the US, followed by the UK and Italy.
  - There is not much known about the new coronavirus, which has been designated 2019-nCoV.
  - It is considered a novel virus outbreak because the virus is novel (new – not seen earlier).

## 1.2 Symptoms of the new virus include:

- Fever
- Coughing
- Muscle pain
- Fatigue
- Breathing difficulties
- Can cause pneumonia (infection of one or both lungs)
- Can be fatal

## 1.3 Wuhan Coronavirus Outbreak Timeline

A timeline of the Wuhan virus outbreak is outlined below:

Dec 31, 2019: China alerts the World Health Organisation (WHO) to several cases of pneumonia.

Jan 1, 2020: The seafood market in Wuhan is shut down.

Jan 5, 2020: Chinese officials rule out the possibility of the SARS virus.

Jan 7, 2020: The new virus named 2019-nCoV is identified.

Jan 11, 2020: First death is announced by China.

Jan 13, 2020: The first case outside China is reported by the WHO, in Thailand.

Jan 23, 2020: The City of Wuhan is placed under quarantine. Air and rail traffic are suspended.

Jan 25, 2020: Travel restrictions imposed in another five cities in the Hubei Province.

Jan 30, 2020: First case detected in India, in the southern state of Kerala. Also, the virus outbreak declared a Public Health Emergency of International Concern by the WHO.

Feb 1, 2020: WHO declares the outbreak a global emergency. Read more on this at CNA dated Feb 1, 2020.

Feb 11, 2020: The death toll in mainland China crosses the one thousand mark.

Feb 12, 2020: The virus has officially been named **COVID-19** by the WHO.

Mar 03, 2020: New new cases detected in Delhi and Telangana.

Mar 05, 2020: 23 new confirmed cases in India, 14 of them being tourists from Italy.

Mar 08, 2020: The number of confirmed cases in India rises to 39.

Mar 11, 2020: The WHO declared the outbreak as a 'pandemic'.

Mar 12, 2020: The number of cases in India goes up to 60. The first death in India reported from Bangalore.

Mar 13, 2020: The number of cases in India is up to 75.

Mar 16, 2020: The number of cases in India goes up to 116. Uttarakhand reports its first case of COVID-19.

Mar 20, 2020: Total number of cases in India rises to 223. Four deaths so far.

Mar 23, 2020: Total confirmed cases 415; death toll 8.

Mar 24, 2020: All domestic commercial airline operations will cease from the midnight of 24th March. Cargo carrying flights are exempted. Nationwide lockdown begins from midnight.

Mar 26, 2020: The total death toll in India from COVID-19 rises to 13; number of cases 649.

Mar 30, 2020: Death tally in India crosses the 30 mark. Number of infections has risen to 1190. Worldwide, more than 7 lakh people have been affected by the virus.

Apr 2, 2020: Death toll in India reaches 50. The total number of infections rise to 1965 and this includes 151 cured/discharged/migrated cases[3]

## 1.4 What is Coronavirus?

Coronaviruses are a large family of viruses that are common in various species of animals, such as cattle, camels, bats, and cats. They cause diseases ranging from cold to SARS.

- In some cases, animal coronaviruses can infect humans, which can then spread from person to person.
- This happened in the case of the SARS and MERS coronaviruses. It is also suggested that this might be happening in the current China virus case.
- Coronaviruses cause respiratory infections in humans which are generally mild, but sometimes, can be fatal.
- Coronaviruses are physically large as far as viruses go (26 – 32 kilobases), having a surface of spike projections (which resembles a crown and hence the name 'corona').
- Like the influenza virus, the coronavirus spreads through both direct and indirect contact.
  - Direct contact happens through a physical transfer of the microorganism through close contact with oral secretions.
  - Indirect contact happens when a person infected with the virus sneezes or coughs, which spreads the virus droplets on surfaces.

Person-to-person spread occurred with MERS and SARS mainly via respiratory droplets produced when an infected person coughs or sneezes, quite like how influenza and other respiratory pathogens spread

### 1.4.1 Human Coronaviruses

There are seven strains of human coronaviruses. They are:

1. Human coronavirus 229E (HCoV-229E)
2. Human coronavirus OC43 (HCoV-OC43)
3. SARS-CoV
4. Human coronavirus NL63 (HCoV-NL63, New Haven coronavirus)
5. Human coronavirus HKU1
6. Middle East respiratory syndrome coronavirus (MERS-CoV)
7. Novel coronavirus (2019-nCoV) – Wuhan pneumonia or Wuhan coronavirus, COVID-19

Coronaviruses are known to cause a significant percentage of all common colds in human beings (adults and children).

Given below is a comparison of three coronaviruses that hit the headlines:

| Coronavirus name | COVID-19 | SARS | MERS |
|---|---|---|---|
| Full form | Novel coronavirus | Severe acute respiratory syndrome | Middle East respiratory syndrome |
| Country of origin | China | China | Saudi Arabia |
| Primary host | Probably bats (unconfirmed) | Bats | Bats |
| Intermediate host | Not identified | Masked Palm Civets | Camels |

## II. OBJECTIVE:

The main objectives of this

- To study of Artificial Intelligence & Pandemic disease
- To collect patient data & economic data due to lock down
- To identify the area where AI can be used

## III. STUDY AREA

A **pandemic** is a disease outbreak that spreads across countries or continents. It affects more people and takes more lives than an epidemic. The World Health Organization (WHO) declared COVID-19 to be a pandemic when it became clear that the illness was severe and that it was spreading quickly over a wide area.

The number of lives lost in a pandemic depends on:

- How many people are infected
- How severe of an illness the virus causes (its virulence)
- How vulnerable certain groups of people are
- Prevention efforts and how effective they are

The WHO's pandemic alert system ranges from Phase 1 (a low risk) to Phase 6 (a full pandemic):

- Phase 1: A virus in animals has caused no known infections in humans.
- Phase 2: An animal virus has caused infection in humans.
- Phase 3: There are scattered cases or small clusters of disease in humans. If the illness is

spreading from human to human, it's not broad enough to cause community-level outbreaks.

- Phase 4: The disease is spreading from person to person with confirmed outbreaks at the community level.
- Phase 5: The disease is spreading between humans in more than one country of one of the WHO regions.
- Phase 6: At least one more country, in a different region from Phase 5, has community-level outbreaks.

While presenting the Finance Bill for the year 2020-21, the Union Government on 01.02.2020 had reasonably estimated India's nominal GDP growth rate (i.e., real growth + inflation) of 10 percent, however, the same now seems far from reality and certainty. The slowdown in demand, closure of production activities, fall in the global price of crude oil, ban on foreign trade, price decrease in the commodities like energy, metals and fertilizers, restrictions on the aviation industry as also on tourism, amongst others, are bound to exert downward pressure on the inflation, thus adversely affecting the economy chart. It is believed that India's aggressive lockdown could bring the country's growth down to 2.5 percent from 4.5 percent it had earlier estimated. However, as per a statement released by Chief India Economist of Goldman Sachs on 09.04.2020, the economic growth of India has been estimated at a low figure of 1.6% only.

Overall uncertainty and lack of demand, coupled with no investment seen in near future, the Indian stock markets crashed. A UN report estimated a trade impact of more than USD 350 million on India due to this outbreak, making India one of the top worst affected economies across the world. During the same time, Asian Development Bank estimated the loss to Indian economy due to this outbreak upto USD 29.9 billion. The worst crash of Indian stock market by2352.6 points on one single day on 12.03.2020 is a cause of concern for all the Indian economists and economic advisors. However, after the declaration of complete lockdown, Sensex and Nifty gained a little, adding a value of about USD 66 billion to investors' wealth. The trend however reveals that the curve has been meandrical with absolute uncertainty.

Corona virus had its impact in the industry in general, which has seen, not only cutting the salaries but also laying off its employees. The hotels are vacant and airlines have closed their wings. The live events industry has also estimated a loss of more than Rs. 3000 crores.

The manufacturing, an important part of any economy, suffers from total lack of clarity. Lockdown has put great stress on the supply chains of essential commodities, and therefore, many of the Indian companies have focused on the production and supply of essential items only, thereby stopping all other production activities, thereby bringing down the production graph. Likewise, the other sectors like agriculture being the primary sector and the tertiary sector

are also not free from its impact. There is hardly any manpower available for the agricultural purposes in different states. Lockdowns have manifestly made the farmers difficult to take their produce for sale to the markets. Informal sector of India, the backbone of its economy, will be hardest hit in view of economic activities coming to a total standstill. These lockdowns and restrictions on commercial activities and public gatherings are necessarily likely to strongly impact domestic growth. As estimated by Centre for Monitoring Indian Economy (CMIE) on 07.04.2020, the overall unemployment rate may have surged to 23 per cent, with urban unemployment standing at nearly 31 per cent. International Labour Organisation (ILO) has estimated about 40 crores workers of unorganised sectors to be unemployed.

The United Nations Conference on Trade and Development (UNCTAD), has suggested that India's trade impact due to the COVID-19 outbreak could be around USD 348 million. For India, the overall trade impact is estimated to be at 129 million dollars for the chemicals sector, textiles and apparel at 64 million dollars, the automotive sector at 34 million dollars, electrical machinery at 12 million dollars, leather products at 13 million dollars, metals and metal products at 27 million dollars and wood products and furniture at 15 million dollars. As per UNCTAD estimates, exports across global value chains could decrease by USD 50 billion during the year in case there is a 2% reduction in China's exports of intermediate inputs. What is also worrisome is the effect of all the circumstantial conditions on the Rupee value which is at its lower value of more than Rs. 76 per USD, exerting extra burden and pressure on the cost of import of commodities and services in India, and on the accumulated foreign reserves.

To minimise the effect in the economy caused by the COVID -19 outbreak, the Union Finance & Corporate Affairs Minister, on 24.03.2020, announced several important relief measures taken by the Government of India, especially on statutory and regulatory compliance matters related to several sectors. The Central Government, amongst others, announced much-needed relief measures in areas of Income Tax, GST, Customs & Central Excise, Corporate Affairs, Insolvency &Bankruptcy Code (IBC) Fisheries, Banking Sector and Commerce, intended to boost the economy.
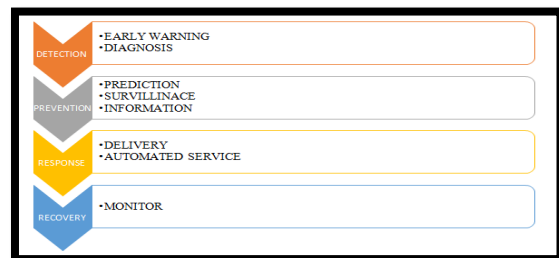
## IV. METHODOLOGY
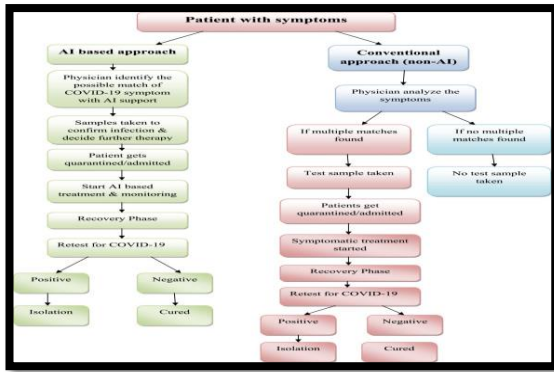


Figure:4.1 AI based activities

Figure: 4.2 General procedure of AI and non-AI based applications that help general physicians

to identify the COVID-19 symptoms

V. RESULTS AND DISCUSSIONS

## 5.1 AI BASED EARLY WARNIG SYSTEM:

AI-powered early warning systems can help detect epidemiological patterns by mining mainstream news, online content and other information channels in multiple languages to provide early warnings, which can complement syndromic surveillance and other healthcare networks and data flows (e.g. WHO Early Warning System, Bluedot).The Vivace Health Solutions' AI VFusion platform has proven to be highly reliable in identifying early-stage signs of the primary causes of coronavirus mortality: Acute Respiratory Distress Syndrome (ARDS) and sepsis. An artificial intelligence (AI) warning system run by digital health firm BlueDot (Toronto, Canada) was among the first in the world to identify the emerging risk from COVID-19 in Hubei province and notify its clients via the company's Insights platform.[4]



## AI BASED DIAGNOSIS:

Rapid diagnosis is key to limit contagion and understand the disease spread. Applied to images and symptom data, AI could help to rapidly diagnose COVID-19 cases. Attention must be given to collecting data representative of the whole population to ensure scalability and accuracy.AI-based CT assessment is seen as one of the promising techniques that might lift some of the heavy weight of the physicians' shoulders.[17] Rapidly, research groups are demonstrating deep learning-based proof-of-principles[18] or

building prototype AI-algorithms that can help detect COVID-19 on chest CT scans.

## AI BASED SURVILLIANCE:

A number of countries are using population surveillance to monitor COVID-19 cases (for example, in Korea algorithms use geolocation data, surveillance-camera footage and credit card records to trace coronavirus patients). China assigns a risk level (colour code – red, yellow or green) to each person indicating contagion risk using cell phone software. While machine learning models use travel, payment, and communications data to predict the location of the next outbreak, and inform border checks, search engines and social media are also helping to track the disease in real-time.

Vidooly, a Noida-based online video analytics firm, has recently launched COVIDSHIELD, which offers five AI enabled surveillance solutions that allows organizations, campuses and other institutions to detect and track any Covid-19 violations as a preventive measure.

## AI BASED CONTRACT TRACING:

Many countries, including Austria, China, Israel, Poland, Singapore and Korea have set up contact tracing systems to identify possible infection routes. In Israel, for example, geolocation data was used to identify people coming into close contact with known virus carriers, and send them text messages directing them to isolate them immediately.

- Larsen & Toubro (L&T), India's biggest engineering conglomerate, is using new technologies, artificial intelligence and its digital platforms to support local authorities in 20 cities so that they can monitor and implement measures to help combat the spread of Covid-19.
- The Aarogya Setu app uses contact tracing to record details of people who may have come in contact with a coronavirus patient.

## AI BASED AUTOMATION

Semi-autonomous robots and drones are being deployed to respond to immediate needs in hospitals such as delivering food and medications, cleaning and sterilization, aiding doctors and nurses, and performing deliveries of equipment.The Partners Covid-19 Screener provides a simple, straightforward chat interface, presenting patients with a series of questions based on content from the U.S. Centers for Disease Control and Prevention (CDC) and Partners HealthCare experts.

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## AI BASED MONITORING

AI tools can help identify virus transmission chains and monitor broader economic impacts. In several cases, AI technologies have demonstrated their potential to infer epidemiological data more rapidly than traditional reporting of health data. Institutions such as Johns Hopkins University and the OECD (oecd.ai) have also made available interactive dashboards that track the virus' spread through live news and real-time data on confirmed coronavirus cases, recoveries, and deaths.

The robot assists hard-pressed laboratory technicians with Covid-19 testing work



Singapore Is Using a Robotic Dog to Enforce Proper Social Distancing During COVID-19

## AI BASED RESPONSE & RECOVRY

• To fight misinformation – the COVID-19 "infodemic" – social networks and search engines are using personalized AI information and tools and relying on algorithms to find and remove problematic material on their platforms.

• Virtual assistants and chat-bots have been deployed to support healthcare organizations, for example in Canada, France, Finland, Italy, the United States and by the American Red Cross. These tools help to triage people depending on the presence of symptoms. The United States' Center for Disease Control and Prevention and Microsoft has developed a coronavirus self-checker service to help users self-assess COVID-19 and suggest a course of action.

• Identifying, finding and contacting vulnerable, high-risk, individuals. For example, Medical Home Network, a Chicago-based non-profit, has implemented an AI platform to identify Medicaid patients most at risk from COVID-19 based on risk of respiratory complications and social isolation.

• AI may eventually play a role in accelerating training and education of healthcare personnel

## RESULTS

• Prevention of the disease



• Reducing the workload of healthcare workers

• tracking and forecasting the nature of the virusfrom the available data

• Development of drugs and vaccines easily, early and cheaper

• less mortality rate

• less economic loss

## CONCLUSION

Artificial Intelligence is an upcoming and useful tool to identify yearly infections due to coronavirus and also helps in monitoring the condition of the infected patients. It can significantly improve treatment consistency and decision making by developing useful algorithms. AI is not only helpful in the treatment of COVID-19infected patients but also for their proper health monitoring. It can track the crisis of COVID-19 at different scales such as medical, molecular and epidemiological applications. It is also helpful to facilitate the research on this virus using analyzing the available data. AI can help in developing proper treatment regimens, prevention strategies, drug and vaccine development.

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