

Artificial Intelligence in Preventing Future Pandemics

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Abstract: *The number of pandemic diseases has created a tremendous change in the human history and the related cataclysm have caused a cynical impact on economic activities, health, business establishments and national security around the globe.*

The global upsurge of the coronavirus disease 2019 commonly known as COVID-19 pandemic has exposed the fragility of public health care, medical management, and wellness program against this epidemic or pandemic situation. With the rapid technological development, the world of artificial intelligence (AI) technology has shown a huge expansion in all sectors of the economy by pulling out the conventional system of computing. The incorporation of this smart software can make every piece of work straight forward. But the problem of seclusion and intimation have created a cosmic problem in this sector. The intelligent retrieval analysis become a controversial matter when the health care departments failed to secure the large database. The present situation of COVID-19 reminded the relevance of AI applications like location tracing apps, National Emergency Tele Critical Care Network (NETCCN)- A cloud-based health management system, which would have prevented this critical situation in a better way. This exhibit the need for an effectual evaluation strategy which is necessary to avert a future pandemic situation. This chapter proposes an Artificial Intelligence(AI) driven data mobilization strategy for assessing real time population for future epidemics or pandemics. To put a stop on this, a self organized freely available Countenance Response(CR) mobile application can be developed to model the mobility pattern of people in multiple areas of a City/town/village, so as to access the maximum amount of population in a stipulated period of time. The self generated face data which is connected with the Aadhaar card, the unique identification of each individual can be used by the employer or the concerned organization to acquire the personal details of each individual by using the face scanner option in the same application. By simulating this real time application and considering the worst case scenario, the data acquired from this application can prevent each locality from the risk of community spread. This AI enabled mobilization application can reduce the unassessed public size down to 1/5th of the unassessed public under any pandemic situation. Thus, the corroboration of COVID 19 has put a great impact in the passive health care system to adopt the modern technology of AI which can be a better course of action in future exigencies.

Keywords: COVID 19, Future Pandemic, Artificial Intelligence (AI), Countenance Response, Health care system.

Introduction: In the real world of contagious diseases, a pandemic is the worst whammy scenario. A disease officially becomes a pandemic when an epidemic is spread from one country to another. Even though many contagious diseases existed during the past decades, the shift of people into a different community made epidemics more material through various diseases like malaria, tuberculosis, influenza, smallpox etc. The western African Ebola virus epidemic in 2014 exhibited the strength of pandemics and their aptness which led to the destruction of a large number of people. This widespread outbreak infected more than 28000 people, killing 11000 people around the globe. The outbreak also resulted huge economic repercussion both in Africa and other affected areas. The novel corona virus first categorized in the 1960's put a new strain to the family of viruses. Since 2003, a minimum of five new human coronaviruses where spotted including the other respiratory diseases which took the life of many people. Also, SARS epidemic has put animal coronaviruses into the picture. Since 2019, the newly emerged Coronaviruses known as COVID 19 has put a major threat to the lives of people and the World economy. COVID 19 which the disease caused by SARSCoV-2 that triggers respiratory issues that can further affect human windpipe and lungs. The other corona viruses that can affect people through mild cold or throat pain or sinuses.

Present situation of Covid 19: The month December 2019 marked the beginning of this viral outbreaks which was reported in Wuhan, China. The novel corona virus which is named as COVID-19 by The World Health Organization (WHO) and also named as SARS-CoVID-2 by the international committee on taxonomy of viruses is one of the most powerful and vigorous pandemics which the World has come across. Starting the first positive case in Wuhan, China by the end of November 2019, the virus was named as COVID -19 by the end of December. The situation was becoming rigorous day by day as the virus was spreading from person to person through the droplets that lingered in the air

for a long time. WHO was trying their best to control the pandemic in China but the inefficiency in the Medical healthcare system made them difficult to find the whereabouts of the people who tested corona positive? Starting case from one case, within a span of time, it got spread to everyone. The inability in management made the virus to spread throughout the countries through the people who got travelled across the places. As of now 213 countries in the World has been affected with corona virus with USA having the largest number of corona positive cases and the highest number of deaths. As, the situation got tranquil down in China, cases was showing a rapid increase in other countries. Countries started imposing lockdown in their region by considering the well beings of their citizens.

Use of Artificial Intelligence in Medical Science: India, a democratic country has an extensive healthcare system which provide a great access to healthcare facilities in rural as well as urban areas. The high standard of private hospitals in India have made a broad destination for medical tourists. The poor people in India faced lack of adequate health care units because of the high cost dispensed by the private health care centers. So, the medical care units were so relevant in India for all the people in the country as well as the Global citizens through the valuable resources supplied in India. But the use of artificial intelligence was still an interrogation point in the medical field. Medical AI usually perform clinical diagnosis using traditional system of computing, but still using computer AI techniques like data mining, machine learning was not feasible for clinical procedures(Yung-kuan-chan, 2018). According to Information Technology Act 2000, it is mandatory to use latest technologies for the medical service providers. National E-health authority, United States India Science and Technology Endowment fund together targeted expansion of health system as well as to help healthcare sectors to upgrade the quality of treatment through the capability of artificial intelligence in their house. The artificial intelligence in Indian healthcare market is expected to grow at the rate of 14% by 2021(Dublin, 2019). To ameliorate doctor's efficiency through AI application was seen as a challenge in accessing doctor patient ratio, Quality healthcare systems and tutoring doctors and nurses to pick up with modern medical facilities. In India AI has been significantly seen in many segments which include diagnostics, Hospitals, Pharmaceuticals, medical insurance, medical supplies and telemedicine. As our country work with a low patient doctor ratio, i.e.; a single doctor treating more than 1500 people, signifies the use of AI which help in offering more services to patients and to cover the gap between the demand and supply of the services.

Low cost AI accessed services can be provided in diagnostics to contrivance patient centric plans and also to eliminate the slow hospital procedures which can make efficacious improvement in healthcare facilities in India. AI provides an immense scope in treatment of cancer patients through cancer screening as the number of cancer patient is increasing at a faster rate. NITI Aayog was seen as an advanced opportunity which help the pathology services to move into Digital pathology system to provide high magnification and comprehensive annotations for the patient's care.

AI driven methods was also very relevant in Diabetic Retinopathy screening, Chronic Obstructive Pulmonary Disease Diagnosis for asthma patients and high-resolution CT scans through the advanced Computational Fluid Dynamics made AI a promising future in the medical sector. The non-standardized measures taken by healthcare systems in India made the use of AI less coherent. Also, the AI companies which was maintaining health sector was not certified and new startups which made the applications of AI less valuable in the medical care Industry.

Is AI a better option during a pandemic: AI is changing our lifestyle planning to impersonate human intelligence through machine learning. With the rapid enhancement in technology, the use of AI has been so significant in the health care sector of the economy to structure the human issues more efficiently and at a cheap cost. The ability of AI has been tested during pandemics as AI mechanism included the ease of access of past and present data to handle sophisticated. During a pandemic AI can perform various roles such as predicting the outbreak of diseases, giving admonition and warnings, analyzing the rate of infection, monitoring patient's coterminous diseases, discovering vaccines, giving efficient treatment etc. which can be performed with AI at a higher momentum. Using traditional analytics world health organization and various other organizations was able to collect data in the health care sector worldwide. With the advanced technology various task, including data collection can be availed through AI in real time. A large volume of data which include the details of the patients, medicines, doctors, health care workers, history of medications can predict in lively manner through AI model. The covid-19 pandemic was able to control through some methods of AI to a certain extend. The outbreak of zika virus in Florida was successful detected using an AI driven algorithm known as blue dot. Wuhan which spotted Covid-19 for the first time developed an AI diagnostic tool known as XG-Boost machine which was able to collect blood sample and further the test result to find the survival rates of COVID 19 positive patients and has been unerring more than 75%. Thus, the new tool initiated in China was also able to perform various other tasks such as taking CT scan of chest disease patients, upgrading early diagnosis, and refined treatment which was able to

control the epidemic. Google's Deep Mind software helped various researchers to find the characteristics of SARS-CoV-2 and also COVID-Net model analyzed chest X rays to find the positive cases. Several camera systems were also installed in China as well as many countries which helped to find the throng of people which aided the authority to restrict the people during lockdown. A contactless syndromic surveillance platform known as FluSense was also used to prognosticate such outbreaks. AI modelled robots were also very relevant in most hospitals which will help to assist the patients in their treatment, suggesting medicines and also to help various healthcare activities. Even though the AI models that were propagated by various countries were helpful in different ways, a pandemic like COVID-19 was difficult to be controlled through the existing AI powered technologies because of the insufficient data available in the sector. As it is the biggest pandemic situation the World has ever seen, AI had the ability to control the pandemic which was not available in the present economy. Therefore, AI is always a better option during a pandemic which uses less human power and which can make the situation in a lighter way and control in an efficient manner.

Challenges in effectively controlling AI: As we have seen the applicability of AI driven approaches and the datasets, but the accuracy of this has become less worthy globally. Models built by various researchers show that a pandemic like COVID-19 will be able to control to certain extent if AI driven technology was relevant in the field of medical science. But the unavailability of historical data as well as the problem of transparency has shown a huge disadvantage in the health sector in promoting AI and robotics. The deficiency of inconsistent data is treacherous as the aftermath of this algorithm will be very important in making managerial decision. However, this can be reduced if sufficient data was open to the public for inspecting as well as scrutinizing. The ethical implications and privacy policies will be important to prevent the outbreak of fatal disease. Also, it will be appreciable if there is an alliance between countries and the initiated policies which will give a proper standard for setting up things.

How AI can prevent a future pandemic? As we have seen the prevalence of AI in the field of medical science, AI technology and big data can help in controlling pandemic to certain level. With the World in the clasp of COVID-19, this technology has seen an upturn in the current economy. (Podder, 2020) has mentioned in his article about the use of data analytics like XG booster and logistic regression in finding the accuracy of patients affected by COVID-19. Even though it helped in finding the people infected by this virus, the partiality in data analytics towards AI has seen as a drawback in preventing a pandemic situation. Various other researchers are also still testing on diverse aspects in treating and diagnosing these diseases as well to prevent a future epidemic/pandemic. Machine learning techniques were also used in controlling the spread of these diseases worldwide. The refinement in technology has effectively been seen as the best part in managing a pandemic like COVID-19 which will greatly help in preventing a future pandemic/outbreak. The availability of vast data helps in making accurate predictions and also analyses this data to avoid a future outbreak. The high access and speed which AI provides help in collecting this boundless data in a span of time. The intercession of AI can relieve the delusion in data which is a challenging factor with this technology. The various examples of software currently available is a great example to understand the standard and quality which AI provides. The pace, exactness and regulation help this technology user oriented which pursues in preventing a future epidemic/pandemic. Many companies are using various machine learning techniques as well as data mining to develop various models to create warning signals. The early prediction provided by this method can be so helpful for the concerned authorities to plan in a better way to control in the spread of this disease. Thus AI technology can help in preventing a pandemic in the future period as the World is running behind the extensive technology being coming up.

Initiation of countenance response application: As we have seen the various functionality of AI driven technologies, we have decided to come up with a simple application which will ease the health sector, medical authorities, public, to get an appropriate data which will be helpful in controlling a pandemic situation in future. Even though there were many outbreaks which affected the public in various ways, COVID-19 has reported over 1.58M cases and 35000 deaths worldwide. Regardless of various AI learning techniques it was unable to provide an easy access for data collection in the healthcare sector. The introduction of Countenance response application will help build a model to access mobility pattern of people in multiple areas of a City/town/village, which will provide suitable data to handle a critical situation. The application will be known by the name 'Vyakthikathu' meaning 'face', as the application will revolve completely in collecting face data. The application will be AI driven and it is a software which will collect all the data from public which will be helpful in controlling a pandemic situation. The application will be linked to Aadhar card or any other unique identification card with proper data or details of people. It is an application which is a scanner basically and works similar to a barcode scanner. The application can be set up at a lower cost and can be used by any

organization and can be installed as an application in their mobile. The specialty of this application is that it can be used by anyone who is using a smartphone. It will be made mandatory for all the people in the country to install this and register it through a personal identification card. Each person residing in the country should scan their face just like face recognition in smartphones and that data will be recorded in the application. Each organization/business enterprises are also required to install this application. The people entering any place whether it be any shop/organization, the same application will be used as to scan the face of people entering the shop. Each person's face will be registered in the concerned organization. Each shop or the establishment can store the details of the people visiting their shop. The big data collection will be controlled by an AI mobilization technology which will be accessible to health society or medical care unit. The AI managed application will be helpful in controlling a pandemic situation through the availability of data. The data collected can be used in a critical situation, if any disease or outbreak is reported in the country which will reduce the spread of the disease through the data acquired from the present patient. It will help to collect the data of the people who visited that place in that particular time and date. The pandemic situation can be reduced to a great extent through this method, as this helps in isolating the places which will reduce the spread of the disease to a larger extent. This method is more securable as this software will be government controlled and can be only used if any such situation happens. The high transparency and accuracy it provides serve as its benefits and also the suitability and compatibility helps the organization to use it in an easier way.

Conclusion: Thus, integrating human technology with the power of AI machine learning and big data will direct a new path to confront a future pandemic. The COVID 19 outbreak is a great example for testing the potentiality of emerging technologies to set up a better rehabilitation to preserve humans. The current technology is as important to give various tests for diseases and also to understand the significance of the ailment. AI interventions in the current world are very few such as providing feature mapping, national telecommunications system etc. The introduction of Countenance response application can also help in acquiring large data through AI, which can help in preventing a pandemic in future.

However, AI has taken a good part in health care before and these attempts are necessary to find a proper data which is available in the society which will be able to give a relief and to prevent a future epidemic or pandemic.

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