DIAGNOSIS AND DISEASE IDENTIFICATION BY MACHINE LEARNING TECHNIQUE

SMT. MANJULABAI BHADRASHETTY
ASSISTANT PROFESSOR
GOVT. FIRST GRADE COLLEGE, KALGI
Dist: Kalaburagi Stat:Karnataka

Abstract- It is evolving healthcare systems from conventional to more personalized healthcare systems through which patients can be diagnosed, treated, and monitored more easily. The current global challenge of the pandemic caused by the novel severe respiratory syndrome corona virus 2 presents the greatest global public health crisis since the pandemic influenza outbreak of 1918.

Our goal in this study is to determine the role of IoT-based machine learning technologies in COVID-19 tracking and control and review the state-of-the-art architectures, platforms, applications. As the entire world continues fighting the same enemy, consumers and organizations are embracing new technologies and discovering their perks. IoT sensor technologies have played a major role.

One of the best Machine Learning for Healthcare applications is a internet bot system that makes the treatment period much easier. A virtual nurse for patients acts as a voice-controlled healthcare assistant that provides information on many illnesses, health disorders, and medicines. An AI assistant is a very handy thing if the patient needs real-time advice and it might be difficult for him or her to get to the doctor. Data engineers are working on solutions for all medical activities that deal with overall health monitoring as well as helping cure or even prevent disease.

I. INTRODUCTION

WHO does not recommend self-medication with any medicines, including antibiotics, as a prevention or cure for COVID-19, WHO is coordinating efforts to develop treatments for COVID-19 and will continue to provide new information as it becomes available.

When we talk about human lives and health, any technologies that can give more efficient, helpful, and faster analysis to hand out a proper treatment plan in time are tremendously valuable. Artificial Intelligence and its subdivision Machine Learning is taking over the world right now.

Industries like finance and banking seem to be the best choices for the technology, Speaking of AI in the medical field; we must realize the tremendous potential and the changes Machine Learning can bring to the healthcare industry.

Algorithms are already doing a better job spotting malignant tumours than actual radiologists. Machine Learning for healthcare technologies provides algorithms with self-learning neural networks that are able to increase the quality of treatment by analyzing external data on a patient's condition, their X-rays,

CT scans, various tests, and screenings. Also, worth mentioning, deep learning is now largely used for

Clinical Data   **Machine Learning**   **Diagnostic Model**

detecting cancer cells.

However, we are very far off from the total replacement of humans in medicine.

After China, Taiwan was the most predictable to have more number of cases of COVID-19. However, Taiwan quickly militarized and instituted specific methodologies for any possible corona virus case identification, suppression, and resource provision to guard the health of the community. Taiwan provided and integrated its national health insurance database with its immigration department and took catalogue to instigate the creation of big data for analytics; it generated real-time warnings during a clinical visit based on travel antiquity and medical symptoms to aid case identification. They have also made use of this latest technology, which includes scanning of QR code, connected reporting of transport history, etc.
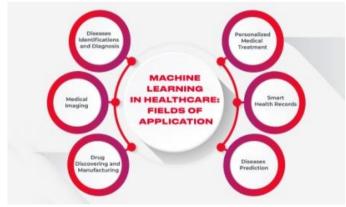
Vision and concept

Wearable devices such as bands, watches and even glasses were designed initially for fitness and healthcare needs, but they are rapidly becoming a great tool in creating early diagnoses for Covid-19. Wearable can immediately identify whether a patient is experiencing the onset of respiratory problems that may be associated with the disease, then act quickly to make a medical appointment before more serious symptoms appear. In other cases, devices can transmit a warning directly to a healthcare professional so that steps can be taken proactively.

It is fair to start with this point, because Machine Learning is very good at diagnosis; actually, this is one of the most effective areas. Summarizing the importance of the advantages of Machine Learning in Healthcare, the highest score goes to its powerful abilities in sorting and classifying health data as well as speeding up doctors' clinical decisions and any kinds of predictions that can save lives or make surgery less complicated. Isn't that already a lot? Human life is without a shadow of a doubt the most valuable thing. At the current moment, ML in Healthcare provides technologies that directly contribute to the future of advanced medical diagnostics as well as the future of medicine.

Discussion

Applications in Healthcare in 2020

Health records improvement.

Despite all these technological breakthroughs, keeping health records is still a hassle. Yes, it is much quicker today, but it still takes a lot of time. Records could be classified by vector machines and Machine Learning-based OCR recognition techniques. The leading examples of that is Cloud Vision API from Google and Machine Learning handwriting recognition technology from Math Works.

The prediction of diabetes.

Diabetes is of the most common, and very dangerous, diseases. It not only damages a person's health on its own, but it also causes many other serious illnesses. Diabetes mostly damages the kidneys, the heart, and nerves. Machine Learning could help to diagnose diabetes very early, saving lives. Classification algorithms like KNN, Decision Tree, and Naive Bayes could be a basis to build a system that predicts diabetes. Naive Bayes is the most efficient among them in terms of performance and computation time.

Predicting liver disease.

The liver plays a leading function in metabolism. It is vulnerable to diseases like chronic hepatitis, liver cancer, and cirrhosis. It is a very hard task to effectively predict liver disease using enormous amounts of medical data; however, there have already been some significant shifts in this area. Machine Learning algorithms like classification and clustering are making the difference here. The Liver Disorders Dataset or the Indian Liver Patient Dataset (ILPD) could be used for this task.

Finding the best cure.

Another great application is using Machine Learning at the first levels of drug discovery for patients. Currently, Microsoft is using AI-based technology in its Project Hanover, which aims to find personalized drug combinations to cure Acute Myeloid Leukemia.

Making diagnoses via image analysis.

Microsoft is revolutionizing healthcare data analysis with its Inner Eye project. This start-up uses Computer Vision to process medical images to make a diagnosis. As technology evolves, Inner Eye is making more waves in healthcare analytics software. Very soon Machine Learning will become more efficient, and even more data points could be analyzed to make an automated diagnosis.

Naïve Bayes algorithm is a supervised learning algorithm, which is based on Bayes theorem and used for solving classification problems. It is mainly used in text classification that includes a high-dimensional training dataset. Naïve Bayes Classifier is one of the simple and most effective Classification algorithms which helps in building the fast machine learning models that can make quick predictions. It is a probabilistic classifier, which means it predicts on the basis of the probability of an object. Some popular examples of Naïve Bayes Algorithm are spam filtration, Sentimental analysis, and classifying.

Discussion

Since early 2020, the world has been struggling with the pandemic caused by the novel severe respiratory syndrome corona virus 2 by striving to control the unprecedented spread of the virus and develop a vaccine. As most efforts to find a treatment or control the spread of the COVID-19 have not shown acceptable results so far, there is a high demand for global monitoring of patients with symptomatic and asymptomatic COVID-19 infection.

During the first phase of COVID-19, which is early diagnosis, there is an essential need for faster diagnosis due to the high rate of contagiousness of COVID-19 where even an asymptomatic patient can easily spread the virus to others. The sooner the patient is diagnosed, the better the spread of the virus can be controlled, and the patient can receive appropriate treatment. In fact, IoT devices can speed up the detection process by capturing information from patients. This can be implemented by capturing body temperatures using different devices, taking samples from suspicious cases, and so on.

The second phase, called quarantine time, is an important period of this disease after the patient has been diagnosed with COVID-19, and he or she should be isolated for the course of treatment. IoT devices in this phase can monitor patients remotely with respect to their treatments and stay at home orders by the authorities. They can also clean areas without human interactions. Examples of these types are the implementation of tracking wearable bands, disinfecting devices, etc.

According to the Centers for Disease Control and Prevention (CDC), most people with mild symptoms can recover while staying at home without getting treatments, but there is no guarantee those people will not be Reinjection after recovery. Reinjection might happen with different symptoms of COVID-19. Concerning these possible reinjection in the after recovery phase, the chances of returning symptoms and potential infectivity can be high. To prevent that happening, social distancing should be implemented by deploying IoT devices, including bands and crowd monitoring devices, to track people to ensure the appropriate distance is maintained. In short, IoT technology during the COVID-19 pandemic has proven its usefulness in assisting patients, healthcare providers, and authorities. In this section, we briefly explain the various IoT devices and applications including wearable, drones, robots, IoT buttons, and Smartphone applications that are mainly utilized in the forefront of combating COVID-19.

Conclusion and future work

According to the last report of the World Health Organization (WHO), as of September 2020, the number of confirmed COVID-19 cases passed 31 million people with an approximate huge death toll of 960,000 people. This disease has similar symptoms as the flu such as fever, cough, and fatigue, which are essential to recognize for early diagnosis. The incubation period of COVID-19 takes from 1 to 14 days. Surprisingly, a patient without any symptoms can possibly be a transmitter of the COVID-19 virus to others. This is when quarantining such people is necessary. Moreover, the recovery period of this disease varies and depends on the patient's age, underlying conditions, etc., but in general it can take between 6 to 41 days. While this disease has a high potential to be spread easily in comparison with similar diseases within the corona virus family, there are many ongoing efforts and much research to mitigate the spread of this virus. In this context, IoT technology has been shown to be a safe and efficient way of dealing with the COVID-19 pandemic.

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Summarizing the importance of the advantages of Machine Learning in Healthcare, the highest score goes to its powerful abilities in sorting and classifying health data as well as speeding up doctors' clinical decisions and any kinds of predictions that can save lives or make surgery less complicated (e.g., the prevention of hypoxemia during surgery). Isn't that already a lot? Human life is without a shadow of a doubt the most valuable thing. At the current moment, Machine Learning in Healthcare provides technologies that directly contribute to the future of advanced medical diagnostics as well as the future of medicine.

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