AI COVI- DIAGNOSTER

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Abstract— The Idea of this project mainly deals with the combined techniques of AI and deep learning we have to combine Artificial intelligence (AI) has the potential of detecting significant interactions in a dataset and also it is widely used in several clinical conditions to expect the results, treat, and diagnose. Artificial intelligence (AI) is being used or trialed for a variety of healthcare and research purposes, including detection of disease, management of chronic conditions, delivery of health services, and drug discovery. In this chapter, we will discuss the application of artificial intelligence (AI) in modern healthcare system and the challenges of this system in detail. Different types of artificial intelligence devices are described in this chapter with the help of working mechanism discussion. Alginate, a naturally available polymer found in the cell wall of the brown algae, is used in tissue engineering because of its biocompatibility, low cost, and easy gelation. It is composed of α-L-guluronic and β-D-manuronic acid. To improve the cell-material interaction and erratic degradation, alginate is blended with other polymers. Here, we discuss the relationship of artificial intelligence with alginate in tissue engineering fields. Machine learning (ML) builds the data investigative algorithms to extort characteristics from the data. Inputs to machine learning (ML) algorithms consist of patient 'characters' and occasionally therapeutic effects of concern. A patient's characters generally contain bottom line data, for example, gender, age, disease history, and also disease explicit data, for instance, gene expressions, analytical imaging, electrophysiological data (EP) test, objective test results, medication, and medical symptoms. In addition to the attributes of the patients medical results are frequently composed for medical investigation. Here we have to utlise these integrated technologies to diagonise covids in rapid growing regions.

Keywords: Artificial Intelligence, BigData, BioInformatics, Machine learning

I. INTRODUCTION

The study, recently published in Nature Communications, shows the new technique can also overcome some of the challenges of current testing.

Researchers demonstrated that an AI algorithm could be trained to classify COVID-19 pneumonia in computed tomography (CT) scans with up to 90 percent accuracy, as well as correctly identify positive cases 84 percent of the time and negative cases 93 percent of the time.

CT scans offer a deeper insight into COVID-19 diagnosis and progression as compared to the often-used reverse transcription-polymerase chain reaction, or RT-PCR, tests. These tests have high false negative rates, delays in processing and other challenges. Another benefit to CT scans is that they can detect COVID-19 in people without symptoms, in those who have early symptoms, during the height of the disease and after symptoms resolve.

However, CT is not always recommended as a diagnostic tool for COVID-19 because the disease often looks similar to influenza-associated pneumonias on the scans.

The new UCF co-developed algorithm can overcome this problem by accurately identifying COVID-19 cases, as well as distinguishing them from influenza, thus serving as a great potential aid for physicians, says Ulas Bagci, an assistant professor in UCF's Department of Computer Science.

Bagci was a co-author of the study and helped lead the research. "We demonstrated that a deep learning-based AI approach can serve as a standardized and objective tool to assist healthcare systems as well as patients," Bagci says. "It can be used as a complementary test tool in very specific limited populations, and it can be used rapidly and at large scale in the unfortunate event of a recurrent outbreak."

Bagci is an expert in developing AI to assist physicians, including using it to detect pancreatic and lung cancers in CT scans. He also has two large, National Institutes of Health grants exploring these topics, including $2.5 million for using deep learning to examine pancreatic cystic tumors and more than $2 million to study the use of artificial intelligence for lung cancer screening and diagnosis. To perform the study, the researchers trained a computer algorithm to recognize COVID-19 in lung CT scans of 1,280 multinational patients from China, Japan and Italy. Then they tested the algorithm on CT scans of 1,337 patients with lung diseases ranging from COVID-19 to cancer and non-COVID pneumonia.

When they compared the computer's diagnoses with ones confirmed by physicians, they found that the algorithm was extremely proficient in accurately diagnosing COVID-19 pneumonia in the lungs and distinguishing it from other diseases, especially when examining CT scans in the early stages of disease progression

II. RELATED WORK

The present section focuses on the introduction of some applicable AI-based strategies that can support existing standard methods of dealing with COVID-19 in health care systems around the world.

With the aim of foregrounding the enhanced effectiveness of these strategies and techniques, their formation has been informed by and based on the most recent AI-related published medical updates as well as the latest updates on COVID-19.

Therefore, this section presents ideas that can enhance and speed up ANN-based methods obtaining process to improve treatment methods and health management as well as recognition and diagnosis. However, the optimal effectiveness of AI tools during COVID-19 pandemic depends on the extent of human input and collaboration in different roles humans play. The knowledge of capabilities and limitations of AI, however, stays with data scientists who play an important role simply because they are the ones who code AI systems [19].

III. EXISTING SYSTEM

Currently there is no such existing methods to track out the mix of deep learning and AI, Currently, ongoing efforts have been made to develop novel diagnostic approaches using machine learning algorithms. For example, machine learning-based screening of SARS-CoV-2 assay designs using a CRISPR-based virus detection system was demonstrated with high sensitivity and speed (6). Neural network classifiers were developed for large-scale screening of COVID-19 patients based on their distinct respiratory pattern an effective therapeutic strategy is urgently needed to treat rapidly growing COVID-19 patients worldwide. As there is no effective drug proven to treat COVID-19 patients, it is critical to develop efficient approaches to repurpose clinically approved drugs or design new drugs against SARS-CoV-2.

IV. PROPOSED SYSTEM

Focusing on the possibility of the ANN application for analyzing COVID-19-related infection problems, such as high-risk patients, control of the outbreak, recognizing and radiology, we used RNN, LSTM, GAN and ELM to suggest several AI-based methods. Advanced machine learning algorithms can integrate and analyze large-scale data related to COVID-19 patients to facilitate a deeper understanding of viral spread pattern, improve the speed and accuracy of diagnosis, develop fresh, effective therapeutic approaches, and even identify individuals who, depending on their genetic and physiological features, are most susceptible to the disease [75]. Despite much praise that such data has received because of its role in improving efficiency, productivity and processes in different sectors, it has been criticized for its small number of users who collect, store, manage the data and have access to them [76]. However, as Heyman maintains AI 109588 VOLUME 8, 2020 M. Jamshidi et al.: AI and COVID-19: Deep Learning Approaches for Diagnosis and Treatment FIGURE 9. The process of viral gastrointestinal infection probability estimation using a combination of GAN and rRT-PCR testing for SARS-CoV-2 from feces to determine the transmission-based precautions for hospitalized SARS-CoV-2 inspired by [68]. makes it possible to tell when wrong things are happening, or actions are to be taken regarding COVID-19 because it monitors and collects data coming from social media, newsfeeds, and airliner ticketing systems [77]. A large bulk of various information coming from the most recent advancement and publications in the relevant case can be covered by the suggested methods. Nevertheless, while a variety of inputs exist, clinical data remains as the input shared by almost all the techniques. When it comes to groups that are defined as high risk, overviewing COVID-19 patients' clinical characteristics throughout pregnancy or disease period is particularly important. The model proposed here is mainly focused on patients with heart failure during the hyper-inflammation phase of this illness and individuals for whom systematic recordings of clinical variables and cardiovascular complications exist. These ideas, however, yield themselves to be extended to other high-risk patients because there are similarities between the structure of ML or DL techniques in complex data estimation and prediction. ELM algorithm is suggested for predicting suitable drugs because it is highly advantageous in problem-solving, but the gradient-based learning algorithms like back-propagation are good to feedforward neural networks with more than one hidden layers. In the case of SLFNs, the present form of the ELM algorithm is valid. We proposed an LSTM equipped model for the second case, which is the classification of the best treatment method. LSTM networks seem to be good options for classification, process, and prediction according to time series data because lags of unknown duration may take place between major events in a time series. Exploding and vanishing gradient problems that may appear in training traditional RNNs can be effectively dealt with by LSTMs

Predicting the epidemiology and outbreak by AI was another subject discussed in this paper. The model that we suggested here is based on RNN with a comprehensive set of inputs that can be completed by the database presented in [45]. RNN can be considered a class of ANNs is in which a directed graph along a temporal sequence is formed by connections between nodes making the exhibition of temporal dynamic behavior possible. RNNs' prediction of the future is influenced by their remembering of past events before learning the underlying relationship of the data when trying to reach the hidden layers RNNs run in a loop. Considering that Imaging workflows can inspire advances in machine learning methods capable of assisting radiologists who seek an analysis of complex imaging and text data, we described models that can analyze medical imaging facilitating the completion of a process that recognizes COVID-19-related infections and reinforcement learning [81]. While GANs learn to map from a latent space to a data distribution of interest, the discriminative network discriminates candidates that the generator creates from the true data distribution. The second case of recognizing includes an LSTM approach that estimates cardiac involvement caused by the virus infection. LSTM units come with multiple architectures. One common architecture consists of a cell and three ''regulators'' or information flow gates inside the LSTM unit: an input gate, an output gate and a forget gate. Keeping track of the dependencies between the elements in the input sequence is done by the cell. While controlling the extent of a new value flow into the cell is the responsibility of input gate., the extent to which a value remains in the cell is controlled by the forget gate, and the extent to which the value in the cell is used to compute the output activation of the LSTM unit is controlled by the output gate. It is recommended, however, that in the third case of recognizing, ELM network does the estimation of Remdesivir's behavior in patient's treatments, hospital stay, ICU stay and symptomatic period. Generally, the black-box character of neural networks and ELM network are major concerns that put engineers on guard when it comes to application in unsafe automation tasks. However, there are a variety of techniques available, such as reducing the dependence on random input, to approach this particular issue [82], [83]. In the last case of recognizing a GAN predicts the probability of viral gastrointestinal infection. Candidate generation is done by the generative network, and evaluation of the candidate is completed by the discriminative network [57]. The contest operates in terms of data distributions.

While the generative network learns to map from a latent space to a data distribution of interest, the discriminative network discriminates candidates that the generator creates from the true data distribution and hence the benefits of using this characteristic into an approximate viral gastrointestinal infection. Although the proposed techniques have not been utilized yet to evaluate their effectiveness, there are many medical reports and valid sources of information proven the efficiency and accuracy of these methods in many different kinds of similar diseases.

V. Application

Currently, ongoing efforts have been made to develop novel diagnostic approaches using machine learning algorithms. For example, machine learning-based screening of SARS-CoV-2 assay designs using a CRISPR-based virus detection system was demonstrated with high sensitivity and speed (6). Neural network classifiers were developed for large-scale screening of COVID-19 patients based on their distinct respiratory pattern (10). Similarly, a deep learning-based analysis system of thoracic CT images was constructed for automated detection and monitoring of COVID-19 patients over time (5).

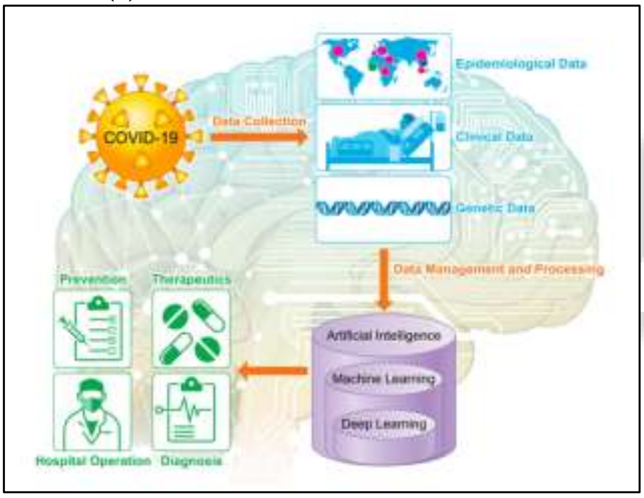

Fig. 1:

VI. Conclusions

The introduced conceptual structures and platforms in the research field of AI-based techniques, which are suitable for dealing with COVID-19 issues, have been studied in this paper. Different techniques have been developed, incorporating COVID-19's diagnostic systems, such as RNN, LSTM, GAN, and ELM. The geographical issues, high-risk people, and recognizing and radiology were the main problems with COVID-19 and have been studied and discussed in this work. Also, we showed a mechanism for selecting the appropriate models of estimation and prediction of desired parameters using a number of clinical and non-clinical datasets. Considering these platforms assists AI experts to analyze huge datasets and help physicians train machines, set algorithms or optimize the analyzed data for dealing with the virus with more speed and accuracy. We discussed that they are desirable because of their potential for creating a workspace while AI experts and physicians could work side by side. However, it should be noted while AI speeds up the methods to conquer COVID-19, real experiments should happen because a full understanding of advantages and limitations of AI-based methods for COVID-19 is yet to be achieved, and novel approaches have to be in place for problems of this level of complexity. Succeeding in the combat against COVID-19 toward its eventual demise is highly dependent on building an arsenal of platforms, methods, approaches, and tools that converge to achieve the sought goals and realize saving more lives.

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