International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 07 | July - 2021 ISSN: 2582-3930

ARTIFICIAL INTELLIGENCE AND COVID-19: DEEP LEARNING APPROACHES FOR DIAGNOSIS AND TREATMENT

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Abstract - COVID-19 has put the entire world in an unprecedented tough situation, bringing life to a terrifying standstill and claiming thousands of lives all across the planet. COVID-19 is a genuine threat to the public health system since it has spread to 212 countries and territories, with a growing number of infected patients and death tolls of 5,212,172 and 334,915 (as of May 22 2020). The ever-increasing volume of data, known as big data, that researchers and decision-makers must deal with poses a significant barrier to their efforts to combat the virus. With AI's growing use in clinical settings, it can help reduce the amount of unwanted deletions while also increasing productivity and efficiency in research. If the decisions made by this layer are confirmed by physicians, the third layer's proposed approaches take the appropriate photos. As a result of the previously acquired results, one or more imaging approaches may be suggested. Magnetic Resonance Imaging (MRI), Computed Tomography Scan (CT scan), Positron Emission Tomography (PET), Optical and Digital Microscopic Images are all used to evaluate each patient. The most recent related articles and medical reports were reviewed with the goal of selecting network inputs and targets that could aid in the development of a dependable K-Mean based tool for COVID-19 difficulties. 89 percent of the time, the set algorithms or optimize the analyzed data for dealing with the infection with greater speed and accuracy.

Key Words: COVID-19, Machine Learning, Artificial Intelligence, Big Data, Bioinformatics, Deep Learning, Biomedical Informatics, Treatment.

1.INTRODUCTION

SARS-CoV-2, a novel Corona virus, emerged in December 2019 to start a pandemic of respiratory illness known as COVID-19, which has shown to be a challenging condition that can manifest in a variety of forms and severity levels ranging from moderate to severe, with the danger of organ failure and death. Multiorgan failure can range from a little, self-limited respiratory infection to a severe, progressive pneumonia. With the pandemic's growth and the rising number of confirmed cases and people suffering from severe respiratory failure and cardiovascular issues, there are good reasons to be concerned about the virus's repercussions.

The importance of determining acceptable techniques to solving COVID-19-related challenges has gotten a lot of attention. However, another major issue that researchers and decision-makers face is the ever-increasing volume of data, often known as big data, which poses a difficulty in the fight against the virus.

2. LITERATURE SURVEY

Artificial Intelligence (AI) intent is to facilitate human limits. It is getting a standpoint on human administrations, filled by the growing availability of restorative clinical data and quick progression of insightful strategies. Motivated by the need to highlight the need for employing AI in battling the COVID-19 Crisis, this survey summarizes the current state of AI applications in clinical administrations while battling COVID-19.

All suspected 2019-nCoV patients in Wuhan were admitted to a special hospital. We used real-time RT-PCR and next-generation sequencing to collect and analyze data on patients with laboratory-confirmed 2019-nCoV infection.

Machine learning (ML)-based forecasting techniques have demonstrated their use in predicting perioperative outcomes and improving decision-making about future actions. machine learning

models. To deal with forecasting challenges, a variety of prediction approaches are widely utilized. This work illustrates the ability of machine learning models to predict the amount of forthcoming COVID-19 cases, which is now regarded a possible threat to humanity.

In this study, four conventional forecasting models were utilized to anticipate the dangerous elements of COVID-19: linear regression (LR), least absolute shrinkage and selection operator (LASSO), support vector machine (SVM), and exponential smoothing (ES).

Each of the models makes three types of projections in the next 10 days: the number of newly infected cases, the number of fatalities, and the number of recoveries. The study's findings show that using these strategies in the current COVID-19 pandemic scenario is a promising mechanism. The results show that the ES outperforms all other models, followed by LR and LASSO, which excel at forecasting new confirmed cases, death rates, and recovery rates, respectively, while SVM performs badly in all prediction scenarios given the provided information.

In order to overcome the limits of traditional computer-aided diagnosis, researchers developed algorithms that mimic expert human thinking. Although hopes that such a technique would result in therapeutically helpful programs were dashed, many of the challenges that awaited the creation of effective artificial intelligence programs were overcome. Pathophysiologic reasoning has been incorporated into strategies to minimize the number of possibilities that a computer must investigate. The latter advancement enables a software to examine scenarios in which one condition has an impact on the presentation of another. Prototypes that contain this logic can explain their conclusions in medical language, which the user can review. Despite these gains, considerable research and development efforts will be required before computer-assisted expert performance becomes a reality.

Importance In various nations and continents, the coronavirus disease 2019 (COVID-19) is causing an increase in confirmed cases and mortality rates. There is a scarcity of data on the impact of cardiovascular complications on fatal outcomes. Objective The goal of this study was to see if there was a link between underlying cardiovascular disease (CVD) and myocardial damage and death outcomes in COVID-19 participants. Participants, Design, and Setting Patients with COVID-19 were studied in this retrospective single-center case series.

All suspected 2019-nCoV patients in Wuhan were admitted to a special hospital. We used real-time RT-PCR and next-generation sequencing to collect and analyze data on patients with laboratory-confirmed 2019-nCoV infection. Data was collected using WHO and the International Severe Acute Respiratory and Emerging Infection Consortium's standardized data collection forms. Researchers also spoke with patients or their families directly to get epidemiological and symptom information. Patients who were admitted to the intensive care unit (ICU) and those who were not were compared on their outcomes.

3. REQUIREMENTS

3.1 Hardware Requirements

- Pentium IV 2.4 GHz processor
- 40 GB hard drive
- 15-inch VGA color monitor
- Logitech Mouse
- Memory: 512 MB
- Standard Keyboard

3.2 Software Requirements

- Windows XP is the operating system.
- Tool: Anaconda, Python 3.6
- Platform: PYTHON TECHNOLOGY
- Spyder for the front end
- Python anaconda script for the back end

4. PROPOSED SYSTEM

The RNN, also known as the Auto Associative or Feedback Network, is a type of ANN that uses connections between units to create a directed cycle. RNNs, as a well-liked DL family, have shown promising outcomes in a variety of machine learning and computer vision problems. However, quantifying qualitative inputs such as nation and location is a significant effort when using this approach. Because of the real-time data provided by RNNs with real-time learning capabilities, updating the model is possible.

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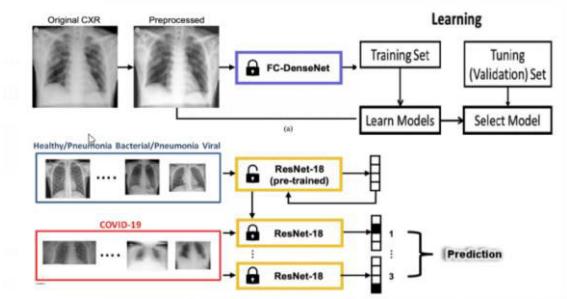
4.1 ARCHITECTURE DIAGRAM



The figure shows the proposed system architecture diagram 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.

5. CONCLUSION & FUTURE WORK

This work investigates the newly developed conceptual structures and platforms in the field of AI-based techniques that are ideal for dealing with COVID-19 difficulties. Various algorithms using COVID-19's diagnostic systems, such as RNN, LSTM, GAN, and ELM, have been created. The key concerns were geographical issues, high-risk populations, and identifying and radiology. We also demonstrated a mechanism for selecting relevant models for parameter estimate and prediction using a variety of clinical and non-clinical datasets. These platforms aid AI professionals in analyzing large datasets and assisting clinicians in training machines, setting algorithms, or optimizing the examined data for faster and more accurate virus detection. We emphasized how appealing they are since they have the ability to create a workspace where AI experts and physicians may collaborate. While AI speeds up the methods for conquering COVID-19, real tests should be conducted since a complete knowledge of the benefits and limitations of AI-based methods for COVID-19 has yet to be reached, and fresh approaches must be developed.

The goal is to use artificial intelligence (AI) and medical research to create a classification tool that can detect Covid-19 infection and other lung diseases.
Covid-19 pneumonia, non-Covid-19 pneumonia, pneumonia, and normal lungs were the four conditions studied. There are two steps to the suggested AI system. Pneumonia and non-pneumonia are classified as Stage 1 chest X-ray volumes. Stage 2 uses the information from stage 1 to determine whether the X-ray belongs to the pneumonic class and then categorizes it as Covid-19 positive or Covid-19 negative.

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