Covid-19 Detection Using Image Processing

Covid
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Introduction :

Artificial intelligence and image processing has been a great contributor to the field of medical diagnosis and the design of new medications. Experts believe that Artificial intelligence and image processing will have a huge impact by providing radiologists with tools for faster and more accurate diagnoses and prognoses, resulting into more effective treatment. Big data and Artificial intelligence and image processing will change the way radiologists work because computers will be able to process huge amounts of patient data, enabling them to become experts on very specific tasks . In the past, Artificial intelligence has succeeded in overcoming different challenges such as chronic diseases and skin cancer. Currently, scientists are expecting Artificial intelligence and image processing to have a significant role in the search for a treatment to the emerging corona virus, and hence in alleviating the associated panic that is affecting people worldwide.Recently, the health-care system has been facing strenuous challenges in terms of supporting the ever-increasing number of patients and associated costs due to the COVID-19 pandemic. Thus, the recent impact of COVID-19 mandates a shift in the health-care sector mindset. As such, it becomes essential to benefit from modern technology such as Artificial intelligence and image processing , in order to design and develop intelligent and autonomous health-care solutions. When compared to other viruses, COVID-19 is characterized by its fast spreading ability, which made it a worldwide pandemic in a record time. The medical and health-care systems are still studying and investigating it in order to gain reliable information and more insight about this serious problem of fast spreading. Accordingly, the objective of successfully modeling the COVID-19 spread remains a high priority in fighting this virus. Currently, the commonly used diagnosis method is the real-time reverse transcription–polymerase chain reaction (RT-PCR) detection of viral RNA from sputum or nasopharyngeal swab. However, these tests need human intervention, present low positive rate at early infection stages, and need up to 6 h to give results. Thus, to speed up the control of this pandemic, there is a need for fast and early diagnosis tools, especially that for the long term, when lockdowns measures are completely lifted, tests should be done at a large scale to prevent the rebound of such a pandemic . Due to limited resources and

technologies, testing has been limited in some countries to patients exhibiting symptoms and, in many cases, multiple symptoms. Needless to point out, the large strain that the situation has imposed on the national health-care systems and workers, even those in the most developed countries, feeds into the difficulties of identifying and tracking possible cases.

Artificial intelligence and image processing algorithms, which are approaches used to implement AI systems, help with many questions concerning the pandemic, starting from vaccine and drug research, tracking people mobility, and how and whether they adhere to the social distancing guidelines, to ending in evaluating lung CT-scans and X-rays for faster diagnosis and for tracking the progression of such patients.

Feasibility Study:

The medical sector is seeking, in this global health crisis, innovative solutions to track and contain the COVID-19 (coronavirus) pandemic. Artificial intelligence is a technology that scientists can rely on, since it can quickly classify high-risk patients, monitor the progression of this virus, and effectively manage this outbreak in real time. This technology also has the power of estimating the severity of cases by examining previous patients' records, but still the rates of accuracy, true negatives, and false positives can be further enhanced to avoid misinterpretation in medical treatment [1] . many researcher have produce a image processing technique for solving such kind of problems. But can't find accurate one. There are various factor which we have to consider like choosing image dataset, AI algorithm and Dynamic model of the problem.

Methodology/ Planning of work:

A. Dataset

I am using data set which is provided by Kaggle as well as hospital data of covid-19 and normal dataset . This dataset contain image file more than 2 GB and which is divided on two groups normal and covid-19 person x-ray data .

B. Studied Algorithm

In the process of developing this model, various regression algorithms were studied. CNN, ANN, Transfer Learning , VGG-16 , Gan all were tested upon the training dataset. The decision to choose the algorithm highly depends upon the dimensions and type of data in the data used.

C . Feature Extraction:

In this step I am going to extract all the feature as well as image preprocessing task for effective accuracy then only apply ANN.

D. Statistical Analysis

For this purpose, I am going to analysis the result from different model and analysis them with different angle with proper visualization.

Module & Team Member wise Distribution of work:

Bibek Rawat (18BCS6728) since I am alone in this project. I divided the project into two parts:

1. Learning Phase.
2. Implementation Phase.

I am currently in the Learning phase as i introducing myself to the core concepts which make up the project. Before the next submission, I am sure that I would have been started the Implementation part and will show some progress towards the goal.

Innovations in Project :

As we know, covid -19 recognition is a new topic and Convolutional Neural Networks (CNNs), which are used to solve problems related to object recognition and classification, have produced some quite successful results. As a result, CNN-based deep models have been developed using large datasets. In the current study, the weights of pre-trained deep architectures were used instead of training a model from scratch. As there are only a few images in the dataset used in the current study, developing a model from scratch would prove more difficult to train So, I did lot of research for this project. The cost of covid test is so much high I am trying to reduce the cost of covid test using image processing and transfer learning. We have made this project because it is cost effective and the software is user friendly. The interface is been made to make the user comfortable and easy to understand and the project is futuristic in nature as all the things are getting digital day by day.

Software and Hardware Requirements:

Hardware Specifications: (Below are the specification of my laptop a nominal laptop with camera is more than sufficient)
Processor: i5 7th   **RAM: 8 GB**   **Storage: 400GB SSD   Graphics Card : 4GHz**

Software Specifications: As of the Language I choose the Python, which is rich of machine learning libraries. I have used jupyter notebook Co-lab and different packages like pandas, numpy, and matplotlib are used while making this project. I have used GitHub to know where the work is been progressing per day by our team member .flask ,html and css is used to build the webapplication. GitHub helped us to make my project in a simpler way and helped out to perform our way of project in a well-mannered way well distribution.

Bibliography:

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