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COVID-19 Confirm Cases, Death Rate, Vaccine &Predication: Virus Detect by Gogle Net & Dense Net Model

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ABSTRACT

In this paper, our major aim will be to concentrate on Covid-19 (Daily death and confirm new cases, prediction for Virus) and different types of vaccine through Visualization data. Additionally, Detection of human diseases Covid-19 from medical images (X-Ray). For Image classification, we have used GoogleNet & DenseNet model. For this work, we used two different datasets. For the Covid- 19, Everything all over the world has been changed. The absence of effective legal treatment or vaccination is the primary cause of the disease's severity. During a pandemic, early detection of patient mortality concerns can help to reduce death by ensuring effective resource allocation and treatment planning. Through our work, people will know about the affected rate (confirm case), death rate, vaccination process, and compare the many countries. The general public will be more aware of the Covid-19 Virus as a result of the prognosis.

Keywords: Covid-19, Predication, Vaccine Progress, GoogleNet & DenseNet, Data Mining.

I. INTRODUCTION

The breakout of Covid-19, has inspired more study into several areas like data mining, machine learning, image processing as well as medical science. The identification of pneumonia (one of the major COVID-19 consequences) using imaging techniques and the application of artificial intelligence as an auxiliary tool has been successful. Covid-19 has probablybeen heard about by virtually everyone on the planet at some point. It has been nearly 2 years since the first case of Covid-19 was reported throughout the world. Fortunately, we have developed a variety of vaccinations to combat the epidemic [1].Covid-19 data must be seen and heard if you regularly update daily news. This paper is appropriate for you if you're curious about how others operate with it.

First and foremost, we have shown newly confirmed daily cases and deaths reported from January-2021 to August-2021. Secondly, we made an estimate for Covid-19. Predicting its frequency and incidence across the world is critical in assistinghealth professionals in making critical decisions. Thirdly, we areprimarily concerned with analyzing data pertaining to vaccination progress. We'll do it step by step to get to the end outcome. We will discuss here the biggest vaccination progress country as well as small vaccination progress country. Finally, we have used two data sets for detecting Covid-19 from the X-Ray images.

The present gravity of the COVID-19 epidemic prompted this article. It is not, however, meant to be used as a medical resource in any way. Instead, the goal of this exercise is to review classic machine learning based image processing and investigate the amount of confidence in chest x-ray analysis as a pneumonia detection tool. Imaging diagnostics, in addition to physical examination, is critical in the identification of pneumonia. Chest radiographs are commonly employed in diagnostic procedures and are a quick and inexpensive way to map the nature, characteristics, and extent of lunginflammations. Opacity patches on X-ray radiographs are frequently linked to pneumonia-affected areas.

Recent Work

Corona Virus Disease 2019 (Covid-19 or SARS-CoV-2) caused chaos in a number of nations throughout the world in thefirst half of 2020, still it's going on. Covid-19 is an infectious illness caused by the most recently found corona-virus, formallyknown as 'severe acute respiratory syndrome corona virus (SARS-CoV-2), which was previously unknown prior to an epidemic in Wuhan, China [1][6].

The Chinese authorities announced the death of one patient and the hospitalization of 41 others in Wuhan on December 8, 2019. The new coronavirus (Covid-19) pandemic respiratory illness was started by this cluster. While early instances were connected to the wet market, the virus had expanded nationally due to human-to-human transmission. Covid-19 was declared a public health emergency of international concern (PHEIC) by the World Health Organization (WHO) on January 30, 2020 [11][6].

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In humans, COVID-19 is infectious. Physical contact and respiratory droplets from coughing or sneezing are the most common ways for SARS-CoV-2 to spread among people. By attaching to the angiotensin receptor converting enzyme two (ARCE two), the virus seizes human cells (ACE two) [9]. As of August 26th, 2021, 05:37 GMT, the Covid-19 pandemic has affected 220 nations and territories throughout the world, as well as 2 international conveyances, with 214,721,447 confirmed cases, 192,049,607 recovered cases, and 4,475,693 fatalities [6]

Fever, dry cough, and tiredness are the most frequent COVID-19 symptoms. Loss of taste or smell, conjunctivitis, sore throat,headache, muscle or joint discomfort, skin rash, nausea or vomiting, diarrhoea, chills, or dizziness are some of the other symptoms. Some people may only experience minor or nonspecific symptoms, while others may experience more serious symptoms such as shortness of breath, chest discomfort,or disorientation [10].

Respiratory failure, acute respiratory distress syndrome (ARDS), sepsis and septic shock, thromboembolism, and/or multi-organ failure, including heart, liver, and kidney damage, are all possible complications. People over the age of 65, as well as those with underlying medical issues (such as hypertension, heart and lung disease, diabetes, obesity, or cancer), are more likely to acquire severe illnesses [9][10].

For getting well, Scientist are trying to invent the Vaccine of Covid-19. Already, They discovered many vaccine, namely, Pfizer–BioNTech Moderna, ZyCoV-D, Oxford–AstraZeneca, Sinopharm (BBIBP), CoronaVac etc. Through, our paper, we can discuss Covid-19, newly confirm cases & death rate, along with Covid-19 Predication and vaccine processing. Also, Humanillness detection Covid-19 was created using medical pictures (X-Ray) [3][10].

Google Net Model

GoogLeNet is a deep convolutional neural network built by Google researchers that is a version of the Inception Network. Computer vision problems such as picture categorization and object recognition were accomplished using the GoogLeNet architecture presented at the ImageNet Large-Scale Visual Recognition Challenge 2014 (ILSVRC14). The efficiency of GoogLeNet is achieved by reducing the input picture while keeping essential geographical information [12].

It creates deeper architecture by employing a variety of techniques such as eleven convolution and global average pooling. A few of these techniques will be discussed in the below two sectors:

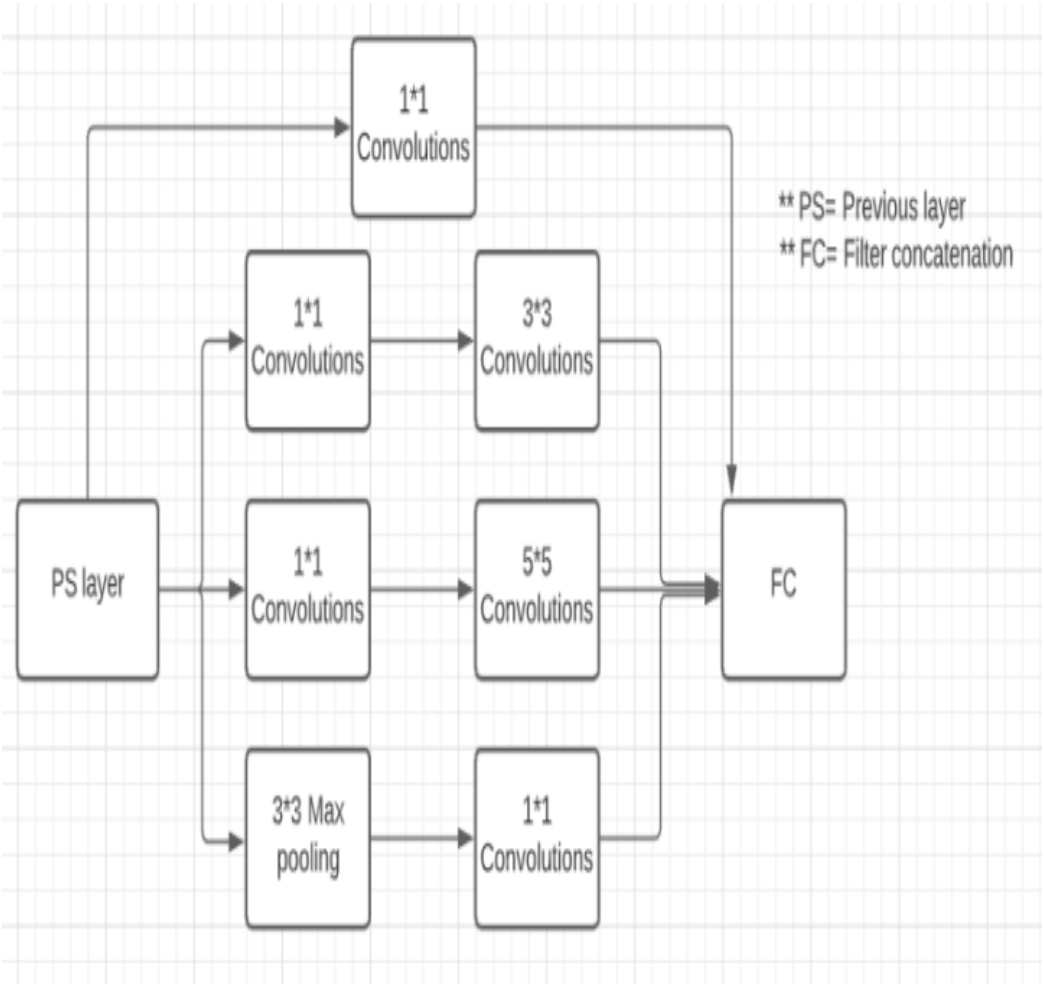

Figure 1: GoogleNet Basic Architecture

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II. METHODOLOGY

We worked with two separate data sets in this article. One data set, The Johns Hopkins University COVID-19 databases provide information on COVID-19 instances in variousgeographic locations from January 2021 and are updated daily [3].

We wanted to combine two dataframes to determine the proportion of completely vaccinated persons in a country's population. As can be seen, there are 228 countries included in the world population dataset, but only 219 countries mentionedin the country vaccines dataset. That implies we'll have to tidy up and eliminate any nations that have been referenced more than once. The goal is to select the necessary columns, concatenate the selected dataframes, filter out values that appear more than once in the new dataframes (remove values that appear only in one of the two dataframes, indicating that they areredundant data), drop duplicated values (keep the last and first in order to keep the necessary data), and reset their index.

Another data set - Chest X-Ray Images (Pneumonia) was theKaggle dataset. Anterior-posterior chest X-ray pictures were chosen from retrospective cohorts of children patients at Guangzhou Women and Children's Medical Center in Guangzhou. All chest X-ray imaging was done as part of the patients' regular medical treatment. The dataset is divided into three folders (train, test, and val) with sub folders for each picture type (Pneumonia/Normal) [3]. There are 5,863 X-Ray pictures (JPEG) in total, divided into two groups (Pneumonia/Normal). To analyse chest x-ray pictures, all chest radio-graphs were first checked for quality control, with any scans that were low quality or illegible being removed. After that, the diagnoses for the photos were assessed by two experts before being approved for use in the AI system. A third expert examined the assessment set to make sure there were no grading mistakes. On this data set, Applied GoogleNet and DenseNet model to detect Covid-19 images. Below showed the details about two models [12].

DenseNet Model

A DenseNet is a form of convolutional neural network that uses Dense Blocks to link all layers (with similar characteristics-map sizes) directly to each other, resulting in dense connections betweenlayers. Each layer gets new inputs from all preceding levels and passes on its own feature-maps to all following layers to maintain the feed-forward nature. After performing a composite of operations, traditional feed-forward neural networks connect the output of the layer to the next layer. We've previously seen that a convolution operation or pooling layers, batch normalization, and an activation function are usually included in this composite [5][12]. Below picture showed the architecture of the DenseNet Model (D_N_M). All pre-trained models require input photos that have been normalized in thesame way, namely mini-batches of 3-channel RGB images of form (W x H x 3), where W and H will be the least.

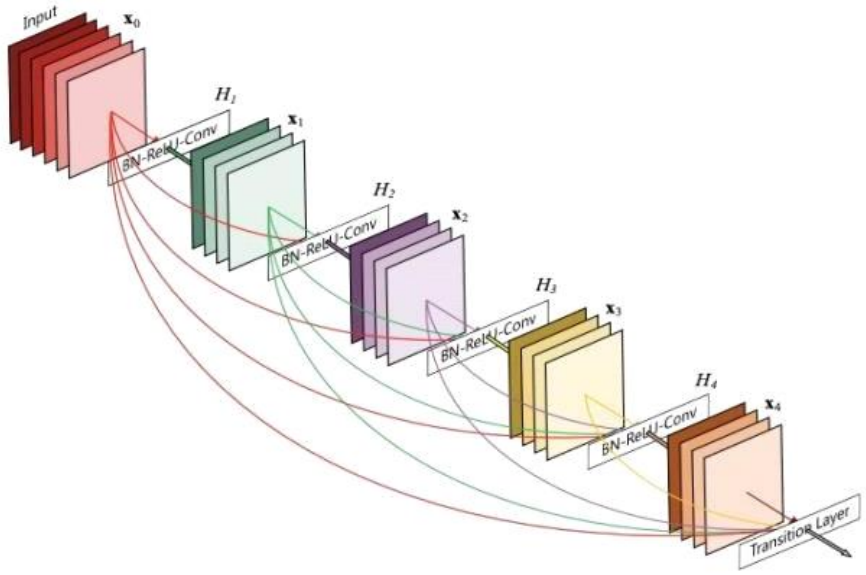

Figure 2: DenseNet Layer Architecture

Python was chosen as the major programming language for this study because of its extensive toolkit, which makes data processing a breeze. The following are some of the Python packages I used: Plotly is a collection of tools for creating interactive graphs that are simple to understand and customize. Numpy is a popular package for manipulating arrays and performing vector operations. It's often used in python projects that need scientific computation. Pandas is a data science library that is just as popular as numpy. It provides data structures and methods that are simple to use for manipulating structured data.

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III. RESULT & ANALYSIS

In the graph 3 & 4, we have shown daily new confirmed cases and daily death rates reported from data set-1 within data visualization. The time started from January-2021 and September-2021. There were enormous data in the data set one. From the data set, we just used a little bit time duration.

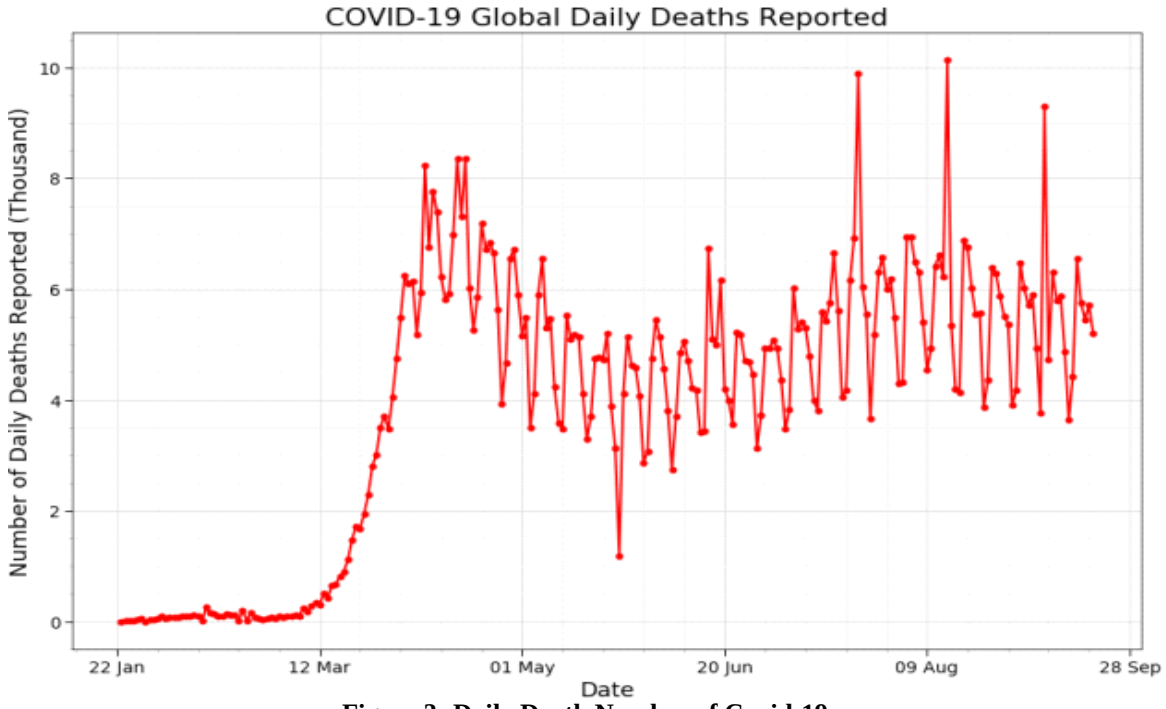

Figure 3: Daily Death Number of Covid-19

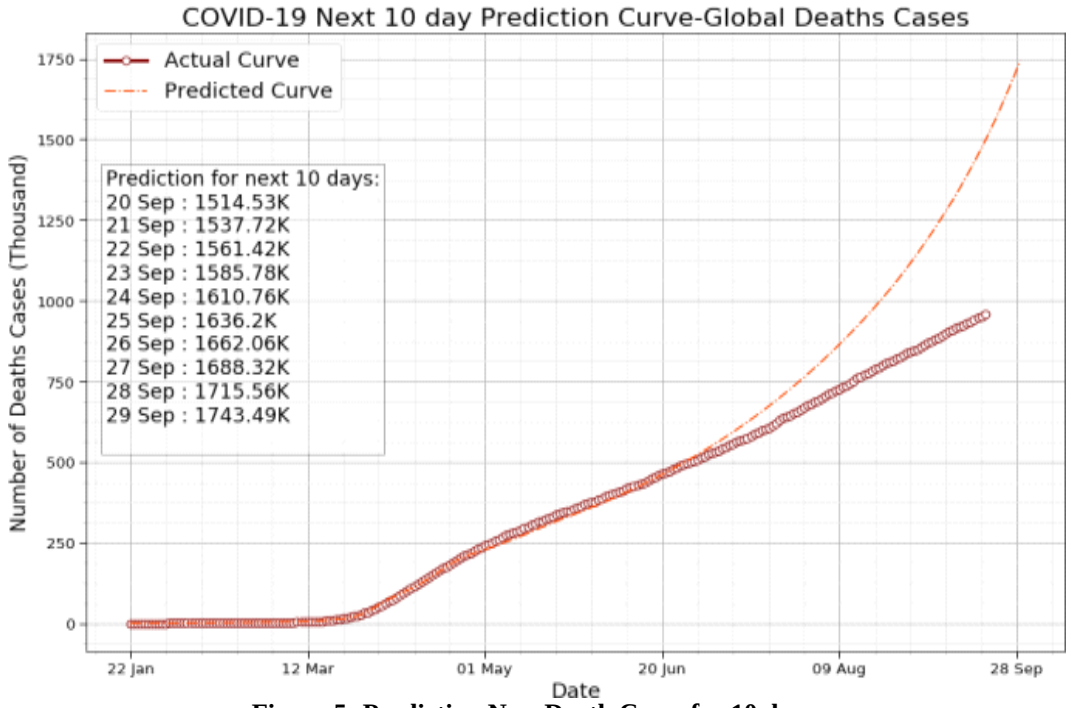

Figure 5: Prediction New Death Cases for 10 days.

From the figure 5 and 6, We have predication for the Covid-19, for 10 days, from the dataset-1. Additionally, also used data visualization. In our Prediction death and new confirm cases increased.

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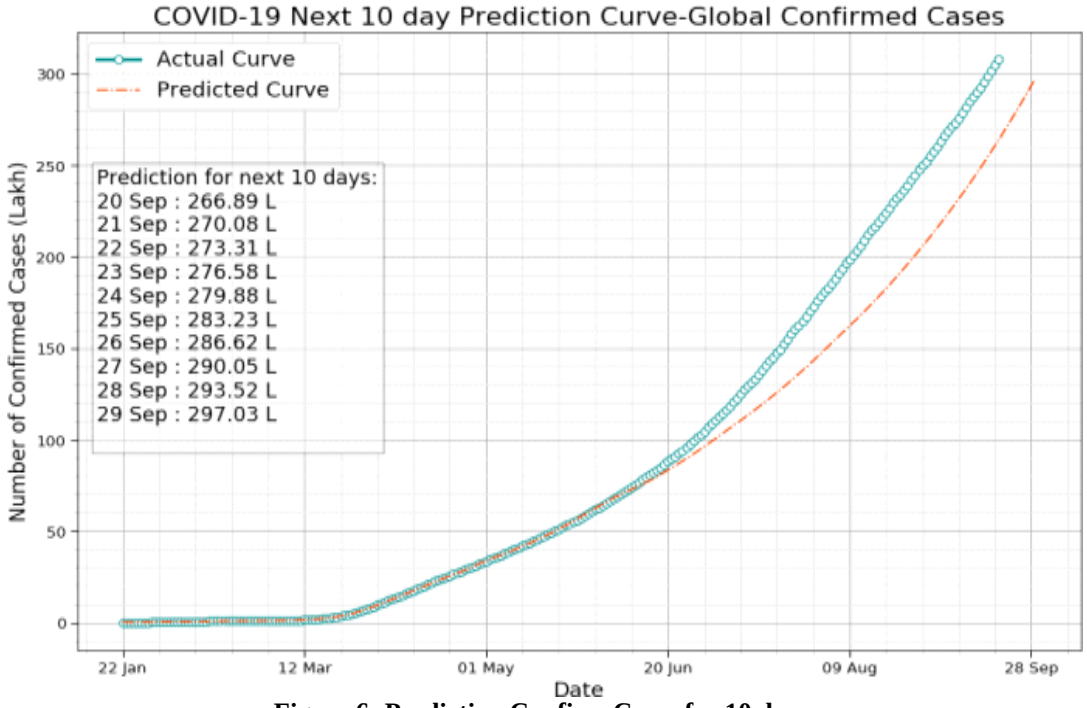

Figure 6: Prediction Confirm Cases for 10 days.

Vaccination Analysis

Let's explore the popularity of vaccines by summing their total up. In this case, like the total_vaccinations column in the country_vaccinations dataset, the value in the total_vaccinations in country_vaccinations_by_manufacturers are cumulative. Therefore, I used max function to take out the latest value of each vaccine. For the vacation processing, undoubtedly, china have been upper position compare the other country.

Figure 7: Vaccinations of middle countries

Upper picture, showed the five countries (Pakistan, India,Indonesia, Malaysia, Bangladesh, Nigeria & Vietnam)

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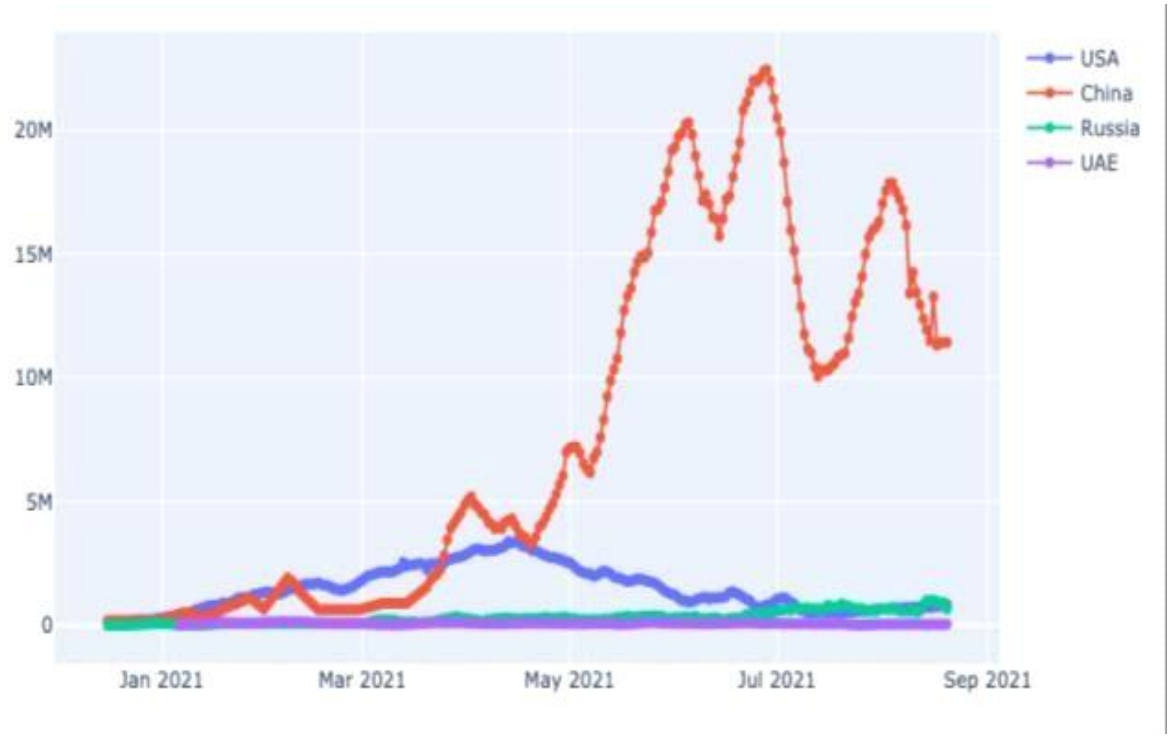

Figure 8: Comparison of Daily Vaccinations

Figure 9: Comparison of Daily Vaccinations

Here, first figure 8, we are comparing USA, China, Russia,& UAE for the vaccination process, on the other figure 9, we are differentiating France, UK, Germany, Italy for vaccination process.

More than thirty nations are listed in the dataset. Nonetheless,deducing that Pfizer/BioNTech and Moderna are the race's leaders is adequate. The two Chinese vaccines (CanSino and Sinopharm/Beijing) do not appear to be particularly popular. Because various countries employ different vaccines.

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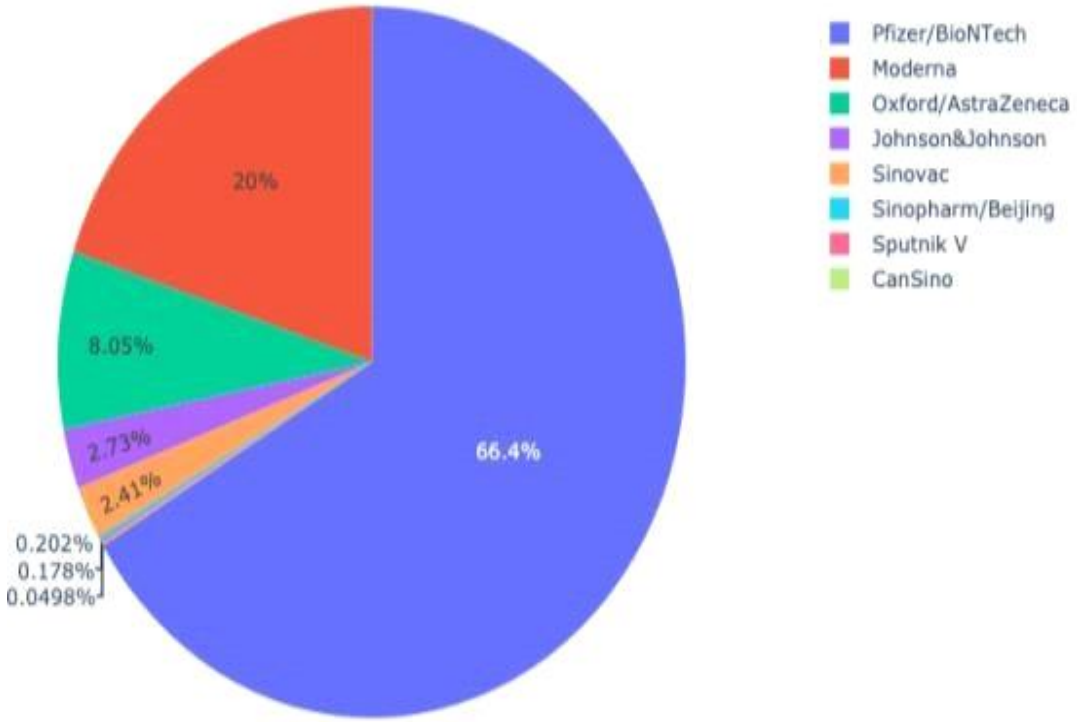

Figure 10: Vaccine Occupancy-1

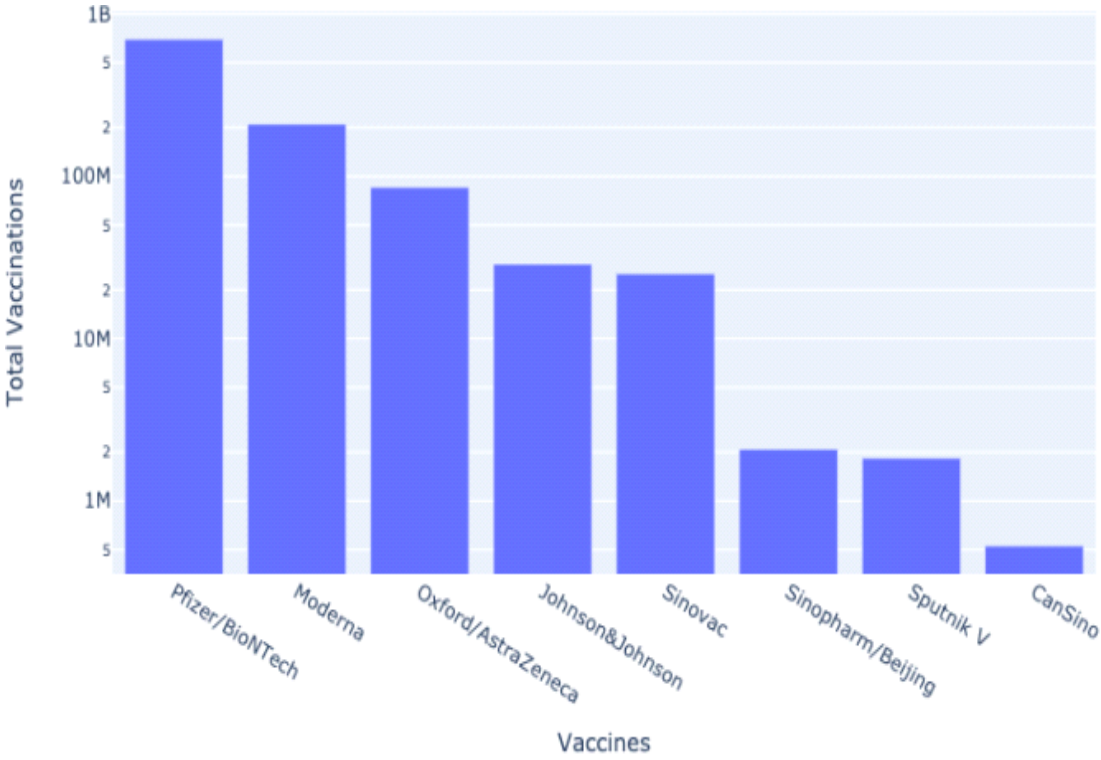

Figure 11: Overview of the Vaccine.

Five biggest and lowest countries with vaccinations progress, I looked for the top five countries with the most vaccines. The figures are cumulative since I saw it in the total vaccination's columns. Instead of using the sum method, I utilized the max function to get the most recent number. You may also use the sum function, but you'll be working with the daily vaccination's column in this instance. Below Showed twopictures;

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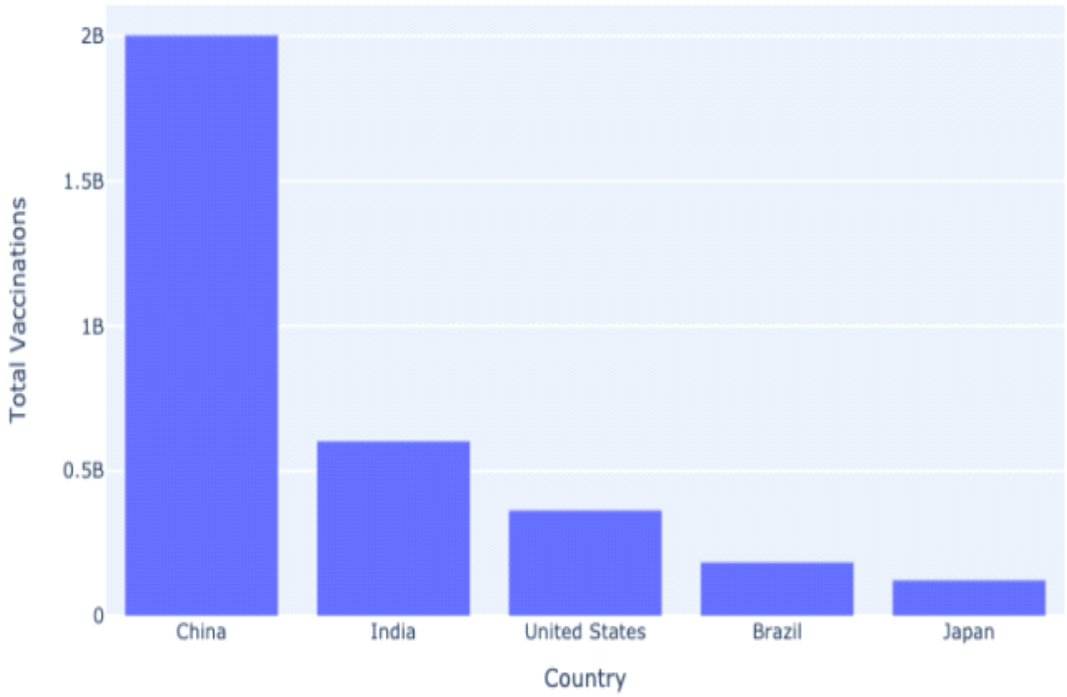

Figure 12: Five biggest country for Vaccination.

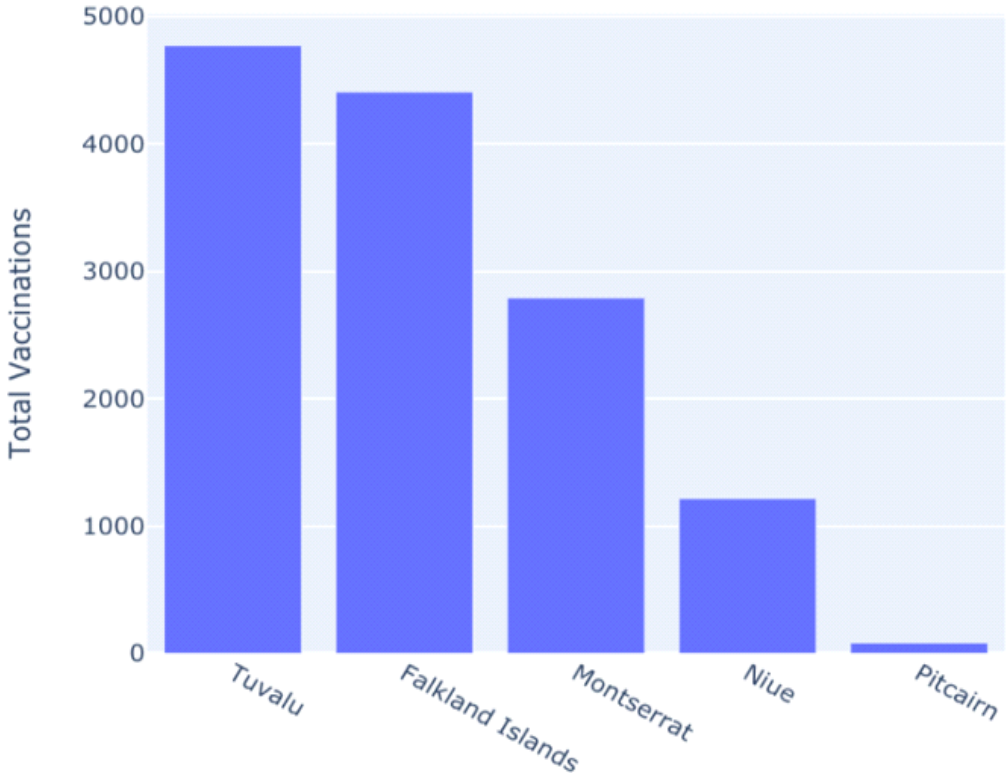

Figure 13: Five are lowest country for Vaccination.

GoogleNet

After the training and testing sets have been created, it's time to look at the photos. To alter the training and validation sets, you must first understand their structure. The first batch in the training set has been effectively augmented, according to the study. Some pictures have been gently flipped vertically, zoomed in, and/or shared. It's also clear that we're working with grayscale pictures now, which is to be expected. 'fit generator' is our method of choice for fitting purposes

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because we are working with a pretty large dataset and augmentation has been implemented. In 100 epochs, the model will be trained.

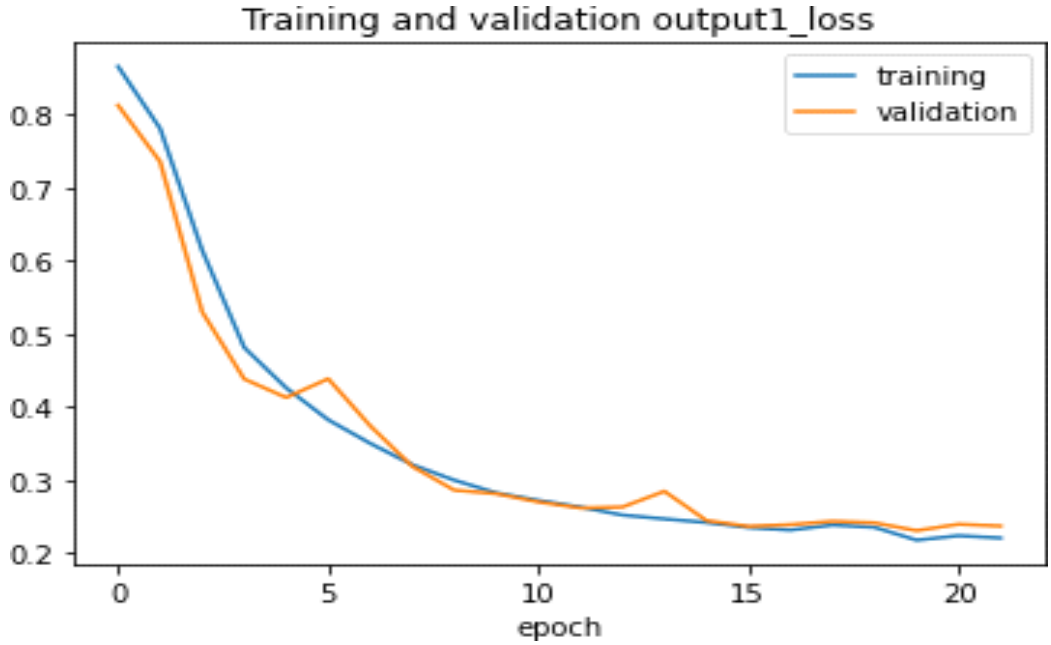

Figure 14: Training & Validation Loss.

In the dense output-1, Correct prediction was 2075 and wrong prediction was 145. In the dense output-2, Correct prediction was 2081 and wrong prediction was 139. In the denseoutput-3, Correct prediction was 2102 and wrong prediction was

120. Percentage of the detection accurate was (91-96%) and wrong was (1-4%).

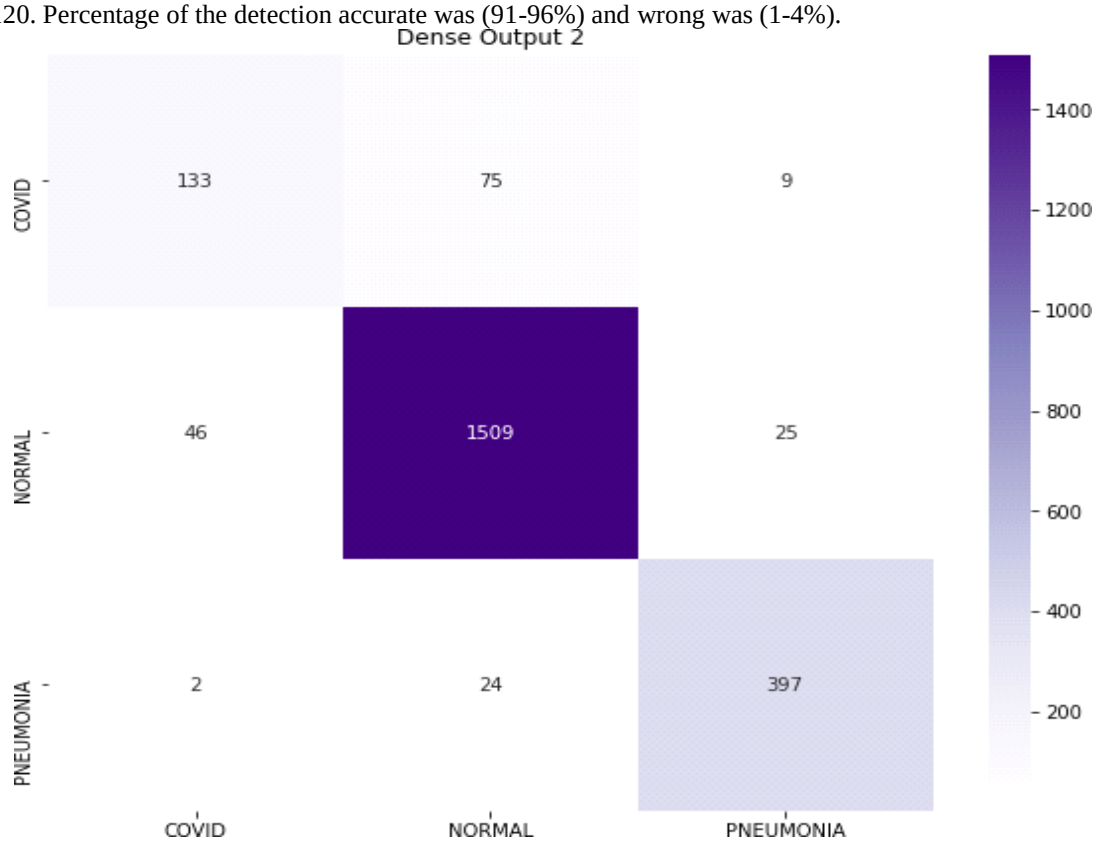

Figure 15: Dense Output

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DenseNet Results

In the data set two, where have applied DenseNet Model. The result was outstanding. Below given the training and validation (TV) los with accuracy, finally.

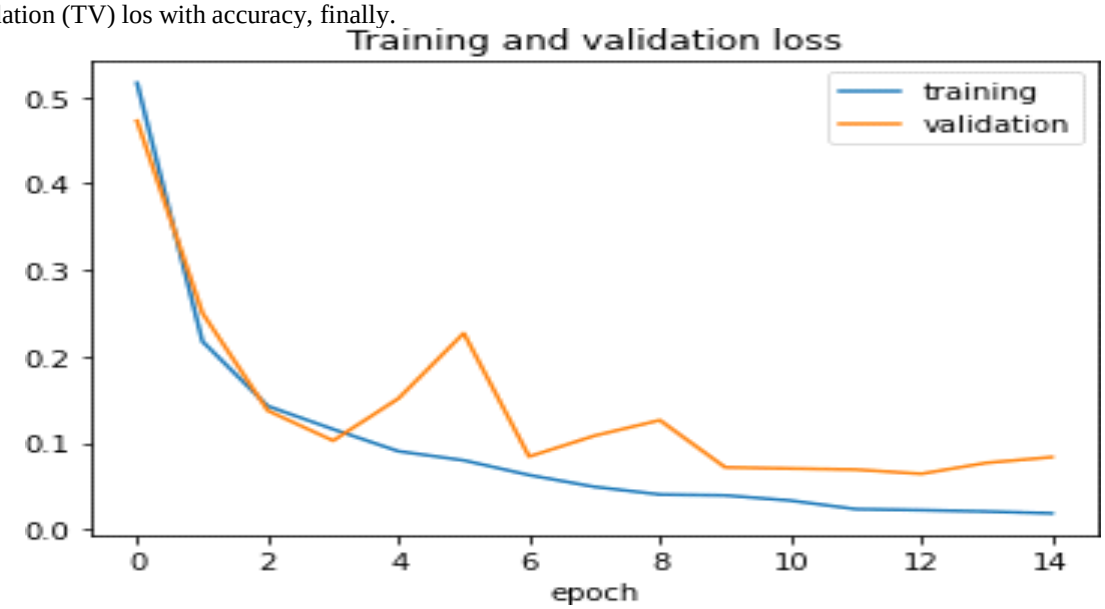

Figure 16: TV Loss

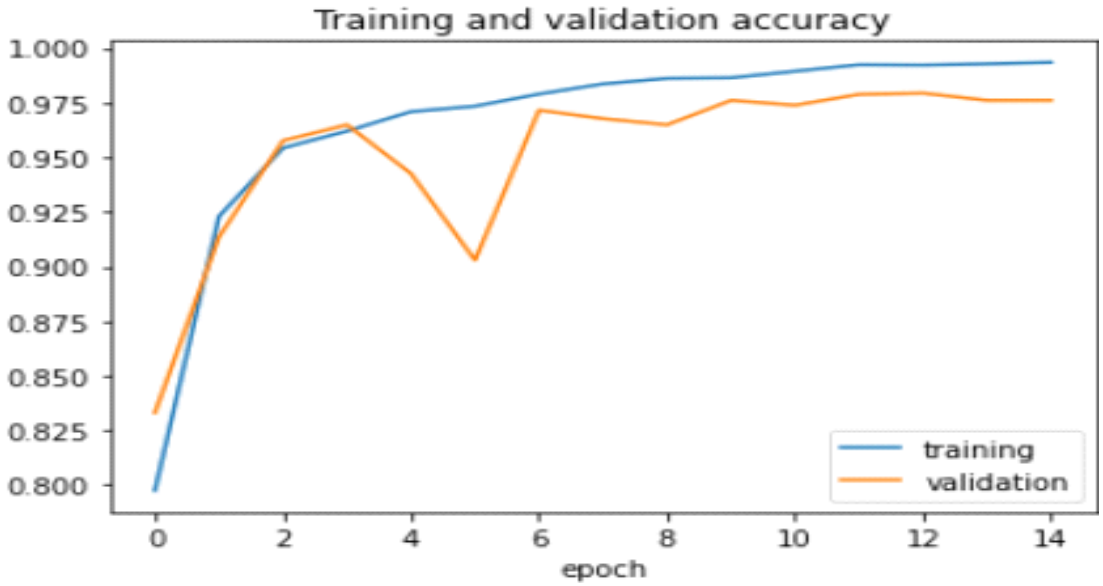

Figure 17: TV Accuracy

IV. CONCLUSION

In this paper, we examine Covid-19 in light of recent confirmed cases and fatality rates. Besides, we are predicated for this disease. Another main focus was that Vaccines analyze the spread trend of this virus all over the world, we have discussed which country is the more progressing for the vaccination. In the progress list, China is the champion. On the other hand, from the dataset, we have seen that there are a variety of vaccines on the market, though Pfizer/BitNTech is primarily used by ordinary people all around the world. Last but not least, we have used GoogleNet and DenseNet approaches for detecting the Covid-19 virus.

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