



## COVID DISEASE DETECTION USING ReLU VARIANTS

R. V. S. LALITHA<sup>1</sup>, D. HARITHA<sup>2</sup>, CHALLAPALLI SUJANA<sup>3</sup>  
and J. DIVYA LALITHA<sup>4</sup>

<sup>1,2,4</sup>Deptment of C.S.E.  
Aditya College of Engineering  
and Technology  
Surampalem, India  
E-mail: rvslalitha@gmail.com

<sup>3</sup>Deptment of I.T.  
Pragati Engineering College  
Surampalem, India  
E-mail: haritha.darisi@gmail.com  
sujana.challapalli@gmail.com  
lalitha517@gmail.com

### Abstract

Since long, the unexpected corona cases are being reported starting from Wuhan to all parts of the world. COVID-19 epidemic is spreading all over the world and became mysterious to track its root cause. The purpose of the research is to identify the highly affected areas and the cause for spreading the disease based on the current day statistics. The root cause of the disease is detected based on test reports and epidemiology is estimated using ReLU variants. This research is useful to the society or Government in analyzing the health status of Corona patients.

### I. Introduction

Corona viruses cause illness ranging from cold to Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The situation will be typical if the infection spreads across lungs. UK Research and Innovation identified seven types of corona viruses. They are

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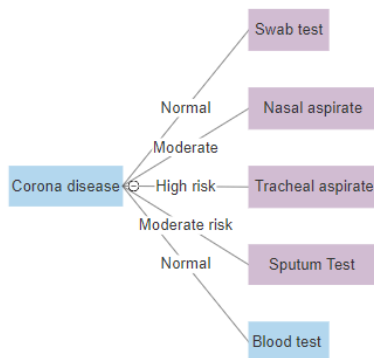
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ARS-CoV-2, SARS-CoV, MERS-Cov, HCoV-NL63, HCoV-229E, HCoV-OC43 and HKU1. Among these viruses, ARS-CoV-2, SARS-CoV and MERS-Cov influence lungs more. Other types of viruses create mild illness [1-5]. There are several tests available for coronavirus: Swab test to take sample from nose or throat, Nasal aspirate – a saline solution is injected to nose and then sample will be taken, Tracheal aspirate-thin tube (bronchoscope) is put into mouth and collects sample from lungs, Sputum test-The sputum is collected from nose using swap, Blood test - a sample is taken from vein in the arm [6]. Out of the mentioned test sputum test is more precarious and spreads disease more.



**Figure 1.** Symptoms of corona disease.



**Figure 2.** Selection of test based on the severity.

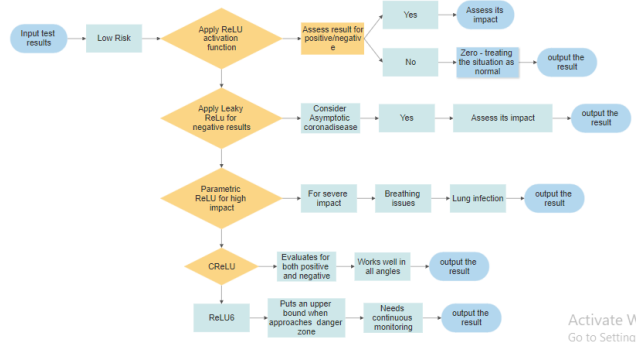
There are various tests available for the detection of corona virus. In swab test special swab used to take sample from either nose or throat. In Nasal aspirate sample solution is injected into the nose and sample is taken by light suction. In tracheal aspirate test a thin tube with torch is put into mouth to reach lungs and then sample is collected. In sputum test sputum is used to take sample from nose. In blood test blood sample is taken from vein in the arm. Figure 1 exploits various symptoms and Figure 2 explores the tests and their risk.

## II. Related Work

Kakde discussed performance metrics like sensitivity, specificity and  $p$ -score with regards to ReLU activation function. The evaluation is done based on transfer learning approach [8]. Ali Narin carried out the study of corona disease using ResNet50, ResNet101, ResNet152, InceptionV3 and Inception-ResNetV2 convolutional neural network classification models [9]. Saddam Hussain analyzed chest X-ray images using convolution neural networks [10]. Penwar  $H$  proposed nCOVnet for fast detection of corona disease. This method is used for detecting COVID-19 by analyzing chest radiography images [11].

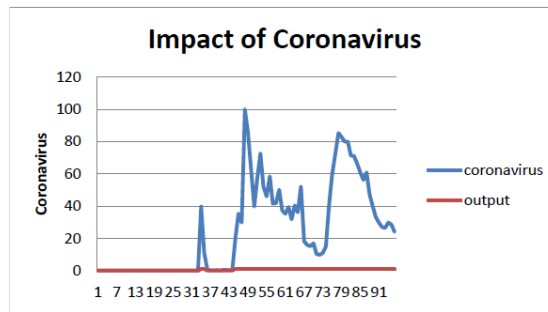
## III. Methodology

Rectified Linear Unit (ReLU) activation function computes output based on the weights. It does not use back propagation algorithm to modify weights using  $y = \max(0, x)$ . ReLU is used in Convolution Neural Networks (CNN). ReLU is linear for all positive values and zero for negative values. The problem with the ReLU is the downside is zero for all negative values. This problem is rendered as “dying ReLU.” This problem is notified dying ReLU. ReLU activation function does not work properly for negative side values. Leaky ReLU has small slope when  $x$  value is less than 0. Hence this can be used for negative values. Parametric ReLU is another variant of ReLU function in which coefficient is calculated based on the values arrived. Parametric ReLU can be evaluated using  $y = \alpha x$ . Exponential ReLU saturates for negative values and obeys the formula  $y = \alpha(e^x - 1)$ . Concatenated ReLU(CReLU) produces two values one on positive side and the other on negative side. It concatenates both the values of  $y = \max(0, x)$  and  $\max(x, 0)$ . ReLU6 uses the value of  $Y$  as 6, the activation function output becomes constant. This outcome of ReLU is visualized in Figure 3.



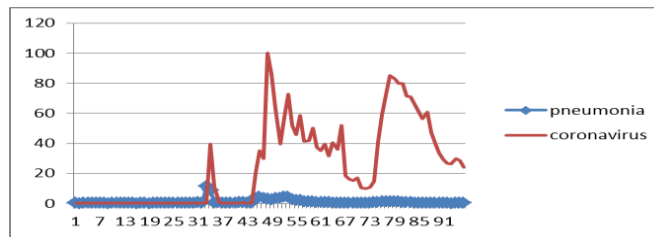
**Figure 3.** Corona detection using ReLU variants.

The trend.csv is downloaded from Internet and analyzed the symptoms of corona disease. The following graph (Figure 4) shows the number of people died off with the corona disease.



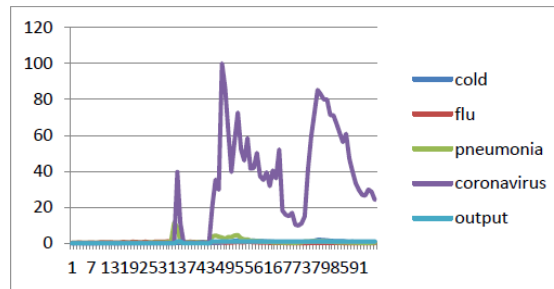
**Figure 4.** The number of people died off with the corona virus disease.

The following graph (Figure 5.) explores the impact of pneumonia with the corona virus. With the pneumonia most of the people affected with corona virus.



**Figure 5.** Coronavirus Vs Pnemonia.

Figure 6 deploys the effect of corona virus considering all the symptoms and the rate of deaths are also plotted.



**Figure 6.** The impact of corona virus disease by considering all the symptoms.

#### IV. Conclusion

The corona disease detection will be based on several symptoms and changes from time to time. The study of this research is for detecting corona disease by all means using ReLU variants based on the test reports. This gives in depth analysis of detection and identifying the root cause of disease based on the tests underwent by the patients.

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