COVID-19 Epidemic Analysis using Deep Neural Network

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Abstract : coronavirus (COVID-19) is an irritation infection from another infection. The infection causes respiratory disease (like flu) with indications, for instance, cool, hack and fever, and in logically genuine cases, the issue in relaxing. COVID-2019 has been seen as an overall pandemic and a couple of assessments are being driven using distinctive numerical models to foresee the presumable headway of this epidemic. These numerical models subject to various components and examinations are needy upon likely tendency. Here, we introduced a model that could be helpful to foresee the spread of COVID-2019. We have performed direct relapse, Multilayer perceptron and Vector auto regression strategy for want on the COVID-19 Kaggle information to envision the epidemiological case of the infirmity and pace of COVID-2019 cases in India. Foreseen the expected examples of COVID-19 impacts in India reliant on information accumulated from Kaggle. With the regular information about affirmed, demise and recuperated cases across India for over the time length helps in foreseeing and assessing the not all that removed future. For additional evaluation or future point of view, case definition and information mix must be kept up determinedly.

KEYWORDS **–** covid-19, preprocessing, classifier algorithm ,feature extraction Convolutional neural network(CNN)etc.

INTRODUCTION

In India, the episode of coronavirus as upset the working of life in general. all were pushed to remain back to shield from the terrifying transmission. In the underlying stages, the affirmed cases are those come back from administers followed by transmission by means of nearby transmission. More alert is given to the older and invulnerability less individuals. The segment of the tainted individuals in India demonstrates that 39 years is the middle. Relatively, individuals somewhere in the range of 21 and 40 years are being influenced more. The ordinary prevalence data of COVID-2019 from January 22, 2020, to April 10, 2020, was accumulated from the site of Kaggle. Footnote2 Weka 3.8.4Footnote3 and OrangeFootnote4 is used to unravel the data.

Literature survey

[1] “Prediction of COVID-19 Outbreak in India adopting Bhilwara Model of Containment”

Author: Amit Bhati, Anurag Jagetiya

The epidemic of coronavirus disease-2019 (COVID19) establishes a medical emergency of worldwide concern with an exceptionally high danger of spread and affect the entire worldwide. In India, there has been a steady ascent in the infection with 20,080 cases on April 21 even after a countrywide lockdown Bhilwara lockdown & containment model flattens the infection curve of COVID-19 cases just within 10 days of initial spread...

[2] “Can the COVID-19 Epidemic Be Controlled on the Basis of Daily Test Reports”

Author: Francesco Casella

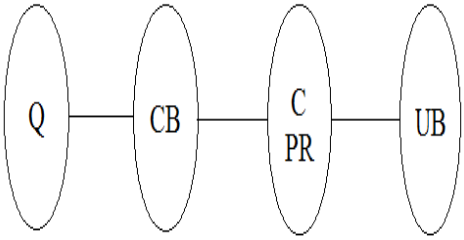
This letter studies if and to which extent COVID-19 epidemics can be controlled by authorities taking decisions on public health measures on the basis of daily reports of swab test results, active cases and total cases. To support the controllability analysis, a suitably simplified process model is developed, highlighting the presence of a significant time delay; the model is validated using data from several outbreaks.

[3] Accurate Screening of COVID-19 using Attention Based Deep 3D Multiple Instance Learning

Author: Zhongyi Han, Benzheng Wei, Yanfei Hong, Tianyang Li, Jinyu Cong, Xue Zhu, Haifeng Wei, Wei Zhang

AutomatedScreeningofCOVID-19fromchest CT is of emergency and importance during the outbreak of SARS-CoV-2 worldwide in 2020. However, due to the spatial complexity of 3D volumes, the difficulty of labeling infection areas, and the slight discrepancy between COVID-19 and other viral pneumonia in chest CT, accurate COVID-19 screening remains a major challenge.

MATHEMATICAL MODELING



Where,
Q = User entered input
CB = preprocess
C = feature selection
PR = apply cnn Algorithem
UB = predict outcome

Set Theory

1) Let S be as system which input image

S = {In, P, Op, Φ}

2) Identify Input In as

In = {Q}

Where,

Q = User entered input image(dataset)

3) Identify Process P as

P = {CB, C, PR}

Where,

CB = Preprocess
C = feature selection
PR = apply cnn Algorithem

4) Identify Output Op as

Op = {UB}

Where,

UB = Predict outcome
Φ=Failures and Success conditions.

Failures:

1. Huge database can lead to more time consumption to get the information.
2. Hardware failure.
3. Software failure.

Success:

1. Search the required information from available in Datasets.
2. User gets result very fast according to their needs.

3. **Space Complexity:**
4. The space complexity depends on Presentation and visualization of discovered patterns. More the storage of data more is the space complexity.

5. **Time Complexity:**
6. Check No. of patterns available in the datasets= n
7. If (n>1) then retrieving of information can be time consuming. So the time complexity of this algorithm is O(n^n).

8. **Proposed system:**
9. Since images shape essential data and knowledge in biological sciences, the proposed project uses image processing to detect and diagnose leaf infection. Digital image processing and image analysis technology, which is focused on developments in microelectronics and computers, has a wide range of applications in biology and avoids the issues that come with traditional photography.

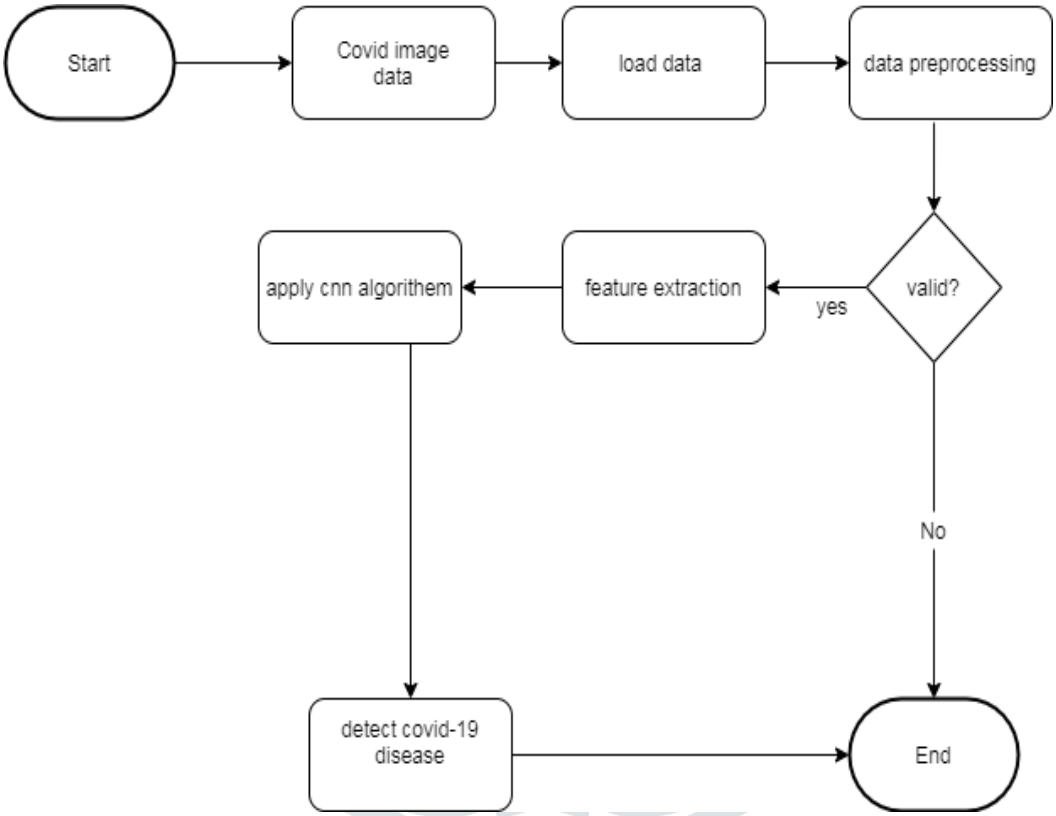


Figure: Advance System Architecture

CNN:

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm that can take an input image, assign importance (learnable weights and biases) to various aspects/objects in the image, and distinguish between them. As compared to other classification algorithms, the amount of pre-processing needed by a ConvNet is significantly less.

How CNN works

- Convolution
- Relu layer
- Pooling
- Fully connected

The integral of the product of the two functions after one is reversed and shifted is known as the convolution

$$s(t) = \int x(a)w(t-a)da \qquad s(t) = (x * w)(t)$$

of f and g, written fg:

Convolution is a commutative operation. At any time, it can be interpreted as a weighted average procedure (for this w need to be a valid probability density function).
Discrete Convolution (one-axis):

$$s[t] = (x * w)(t) = \sum_{a=-\infty}^{\infty} x[a]w[t-a]$$

Convolution and Cross-Correlation in Images
Convolution operator : G=H*F

$$G[i,j] = \sum_{u=-k}^{k} \sum_{v=-k}^{k} H[u,v]F[i-u, j-v]$$

Advantages:

Confirming those infected is essential to manage and contain the virus successfully. Without reliable testing, it would be hard to determine the actual rates of cases. Thus, it is vital to identify what these available tests can and can't do to use them appropriately Secure and efficient system

Disadvantages:

The max operator has at least two disadvantages. Firstly, it is only suitable for the instance-level approaches that require an instance classifier

CONCLUSION AND FUTURE WORK

The coronavirus disease continues to spread around the world on an unpredictable path. The speed and strength of recovery will be determined by countries' health, humanitarian, and socioeconomic policies. The coronavirus disease continues to spread around the world on an unpredictable path. The speed and strength of recovery will be determined by countries' health, humanitarian, and socioeconomic policies. The four-pillar policy framework presented in this brief by the International Labour Organization (ILO) provides guidance not only for countries as they progress through the various stages of the crisis, but also for the international community at large.

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