

**Raosaheb Wangde Master Charitable Trust's
Dnyanshree Institute of Engineering & Technology, Sajjangad Road, Satara.
BTech Computer Science and Engineering
Project Synopsis**

Title: Automated detection of COVID-19 cases using deep neural networks with X-ray images.

Category of Project: - In Campus.

1. Area/Domain: Artificial Intelligence.

2. Introduction:

The novel coronavirus 2019 (COVID-2019) has caused a very devastating effect on lives of people along with the global economy. It is critical to detect the cases as early as possible to prevent the further spread of the disease. Recent findings obtained suggest that radiology imaging techniques help in finding salient information of COVID-19 virus. Advanced Artificial Intelligence applications when coupled with radiology imaging techniques can be helpful in accurate detection of positive cases. A deep learning model is proposed for the automatic diagnosis of COVID-19, with the model having an end-to-end architecture without using any feature extraction methods, and it requires raw chest X-ray images to return the diagnosis.

3. Literature Survey: -

[1] Tulin Ozturk, Muhammed Talo, Azhra Yildirim and Ulas Baran Baloglu proposed “2020 Computers in Biology and Medicine, April, 2020- Automated Detection of COVID-19 Cases Using Deep Neural Networks with X-ray Images”, in which the feature extraction methods are replaced by end-to-end architecture that can process raw image dataset.

[2] Sohaib Asif, Yi Wenhui published “2020 medRxiv, Automatic Detection of COVID-19 Using X-ray Images with Deep Convolutional Neural Networks and Machine Learning” the use of deep convolutional neural networks for feature extraction and classification of those features.

[3] Ayoub Benali Amjoud, Mustapha Amrouch proposed “2020 International Conference on Image and Signal Processing - Convolutional Neural Networks Backbones for Object Detection”, which defines the different networks used for the object classification task.

4. Problem Definition: To develop automated detection model of COVID-19 cases using deep neural networks with X-ray images.

5. Objectives:-

1. To develop the model that can assist the radiologists for the initial screening of cases.
2. To build an assistive model to overcome the problem of a lack of specialized physicians in remote villages.
3. To build a model that can predict whether the cases are of COVID, Pneumonia or are not infected.
4. To develop an effective detection model for COVID-19 cases.

6. Specification:

Software:

1. Anaconda Prompt
2. Jupyter Notebook
3. DarkNet

Hardware:

Ram with 4GB, Processor i3 generation.

7. Significance:

In this model, raw chest X-ray images can be used for automatic detection of cases. The proposed model is developed to provide accurate diagnostics for COVID, Pneumonia or No-findings. The DarkNet model is used as a classifier for the You Only Look Once (YOLO) real time object detection system, so that the model can accurately predict the cases with performance efficiency.

8. Proposed Platform:

Sr.no.	Platform Tools	Availability	
		In Campus (Laboratory/Workshop)	Out of Campus (Name of Industry)
1.	Anaconda	Laboratory	-
2.	Jupyter Notebook	Laboratory	-
3.	DarkNet	Laboratory	-

9. Selection Criteria for Platform /Tools:-

Anaconda: It is free for open source projects and for some educational uses.

Jupyter Notebook: It is an open-source web application that is widely used for creating the models with access to python libraries.

DarkNet: It is an open source neural network tool written in C and CUDA. It is a mostly used in real-time object detection system.

10. Estimate Budget and Cost:-

11. References:

[1] 2020 Computers in Biology and Medicine, April, 2020 - Automated Detection of COVID-19 Cases Using Deep Neural Networks with X-ray Images.

[2] 2020 International Conference on Image and Signal Processing - Convolutional Neural Networks Backbones for Object Detection.

[3] 2020 medRxiv preprint - Automatic Detection of COVID-19 Using X-ray Images with Deep Convolutional Neural Networks and Machine Learning.

[4] Arun Sharma, Sheeba Rani, Dinesh Gupta, 2020, International Journal of Biomedical Imaging – Artificial Intelligence based classification of Chest X-ray images into COVID-19 and other infectious Diseases.

[5] Khalid El Asnaoui and Youness Chawki, 2020, Journal of Biomolecular Structure and Dynamics – Using X-ray images and deep learning for automated detection of coronavirus disease.

Name and Signature of Students:-

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