DAYANANDA SAGAR UNIVERSITY



# A MINOR PROJECT REPORT

## ON

**“SOLUTION TOWARDS COVID-19:AN ARTIFICIAL INTELLIGENCE APPROACH TO DETECT FACES WITH AND WITHOUT MASKS”**

# BACHELOR OF TECHNOLOGY

## IN

**COMPUTER SCIENCE & ENGINEERING**

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**CERTIFICATE**

***This is to certify that Mr/Ms. -----------bearing USN--------, has satisfactorily completed their Minor project Report as prescribed by the University for the Fifth semester B.Tech. Progrwam in Computer Science & Engineering during the year 2020 at the School of Engineering, Dayananda Sagar University, Bangalore***

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**ACKNOWLEDGEMENT**

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# Table of Contents

SL.NO Page No

|  |  |
| --- | --- |
| Cover Page | i |
| Certificate | ii |
| Acknowledgement | iii |
| Contents | iv |
| 1. Introduction |  |
| 1.1 Problem Statement |  |
| 2. Literature Survey |  |
| 3. Requirement Analysis |  |
| 1. Design Methods   4.1 Algorithm  4.2 Architecture Diagram  4.3 Flow chart/ DFD/ UML Diagrams |  |
| 1. Project Breakdown |  |
| 6. Implementation |  |
| 7. Testing |  |
| 8. Results/Output Screenshots |  |
| 9. Prototype |  |
| 10. Conclusion and Future work  References |  |

1. **INTRODUCTION**

In the present scenario due to Covid-19, there are no efficient face mask detection applications which are now in high demand for transportation means, densely populated areas, residential districts, large-scale manufacturers and other enterprises to ensure safety. Intrusion detection method have been proposed in our project to prevent the intruders which could degrade the credibility of security services, e.g. data confidentiality, integrity, and availability.

This system can therefore be used in real-time applications which require face-mask detection for safety purposes due to the outbreak of Covid-19. This project can be integrated with embedded systems for application in airports, railway stations, offices, schools, and public places to ensure that public safety guidelines are followed.

In this project, we’ll discuss a two-phase COVID-19 face mask detector, detailing how our computer vision / deep learning pipeline will be implemented. From there, we shall review the custom-built data set to test and train the model for face mask detection.

To tackle these problems, we distinguish two different tasks namely: face mask recognition and masked face recognition. Firstly, to check whether the person is wearing a mask or not. This can be applied in public places where a mask is compulsory. Secondly, the masked face recognition, aims to recognize a face with a mask based on the eyes and the forehead regions. We handle the second task using a deep learning-based method by using a pre-trained deep learning-based model in order to extract features from the unmasked face regions (out of the mask region). It is worth stating that the occlusions in our case can occur in only one predictable facial region (nose and mouth regions), which can be a good guide to handle this problem efficiently**.**

Considering the covid-19 outbreak our proposed project would be very useful for the society. Today everyone is aware of taking precautions and safety measures regarding covid-19. So, face mask detection will play a huge role to control the spread of the deadly corona virus.

This project helps us to spread awareness among the people in-order to use the face mask properly. It detects whether the person is wearing his/her face mask or not. It avoids the intruders as it recognizes the face. It also checks if the face mask properly covers your face both nose and mouth.

* 1. PROBLEM STATEMENT

Our project “Solution towards COVID-19 :An artificial intelligence approach to detect faces with and without masks” includes:

1. Detecting if the face-mask is worn or not.
2. Recognizing the face of an individual with face-mask and determining if the person belongs to the organization

This system will be designed to serve the purpose of detecting the presence or absence of face-mask and also to recognize faces of the employees of the organization despite the presence of face masks and detect if the person belongs to the organization or not. If the detected person is an outsider then necessary action can also be taken.

In the first stage of the project face-mask detection happens which predicts ‘mask:yes’ if mask is worn by the individual else outputs ‘mask:no’ and a alert mail is sent to the security to not allow the person inside the organization along with the persons captured picture.

In the second stage we go on with face recognition of the entered individual and find out if the recognized face of the individual belongs to the organization or not by comparing his image with the already existing employees database (images) .If he/she is found to be belonging to the organization the the employee is let in , else again a security alert is sent saying that an intruder has entered the organization and necessary action to handle the intruder has to be taken.

**2 . LITERATURE REVIEW**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.NO.** | **REFERENCE** | **PAPER TITLE** | **ADVANTAGES** | **LIMITATIONS** |
| 1. | Toshan Meenpal  et al.(2019) | Facial Mask Detection using Semantic Segmentation | Great results in recognizing non-frontal faces. Along with this it is also able to detect multiple facial masks in a single frame.  At least two people were in each image. | When number of people increases then the pixel accuracy decreases (according to fit position of people to the size of cam window) to detect face.  FCN to CONV layer replacement means great reduction in the number of parameters.  Loss of flexibility. |
| 2. | Sukhada Chokkadi  NMAMIT, India  et al.(2019) | A Study on various state of the art of the Art Face Recognition System using Deep Learning Techniques | Photo-photo identification in facial recognition system.  Focused on the implementation of deep learning techniques for facial recognition system using forensic sketches to facial photograph matching. | Cannot handle pose variations, video data etc.,  Difficult when the face image has too many occlusions. |
| 3. | Vinitha.V,  Department of Master of Computer Application, AMC Engineering College Bangalore, Karnataka, India  et al.(2020) | Covid-19 facemask detection with deep learning and computer vision | Uses OpenCV, tensor flow, keras, Pytorch and CNN to detect whether people were wearing face masks or not. The accuracy of the model is achieved and, the optimization of the model is a continuous process. It is a novel face mask detector which can possibly contribute to public healthcare.  This reviews major efforts and advances in face recognition techniques focusing on all types of variations in facial images. | In order to extract more robust features, we need a large data set.  The process of monitoring large groups of people is more difficult. |

1. **REQUIREMENT ANALYSIS**

**3.1 FUNCTIONAL REQUIREMENTS**

The face mask recognition system uses AI technology to detect the person with or without a mask. It can be connected with any surveillance system installed at your premise.The authorities or admin can check the person through the system to confirm their identity. The system sends an alert message to the authorized person if someone has entered the premise without a face mask. The data has been transferred and stored automatically in the system to enable reports whenever you want.

**3.2 SOFTWARE REQUIREMENTS**

1. Tensorflow 2.0
2. Keras 2.4.3
3. Open CV
4. Python 3.8.5

1. SMTP and SSL Python modules
2. Google colaboratory notebook
3. VSDC software

**3.3 HARDWARE REQUIREMENTS**

1. A fully functional computer or laptop consisting of:
2. Processor
3. Ethernet connection

c. Hard Drive

d. Memory (RAM)

1. Mobile camera

**4 . DESIGN METHODS**