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FACE MASK DETECTION

A

DISSERTATION OF Submitted in Partial Fulfillment for the requirement for the Award of Degree of Bachelor of Engineering/Technology in Computer Science & Engineering

Submitted To

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL (M.P)

Submitted By

NAME	ENROLLMENT
Anshu Kumari	0526CS191020
Mariya Khatun	0526CS191049
Kajal Kumari	0526CS191040
Devendra Kumar	0526CS191030
Devraj Bavan	0526CS191031

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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I

IES INSTITUTE OF TECHNOLOGY AND MANAGMENT, BHOPAL (M.P)

Session 2022-2023

IES INSTITUTE OF TECHNOLOGY AND MANAGMENT BHOPAL (M.P)

Department of Computer Science & Engineering

CERTIFICATE

This is to certify that the work embodies in this Minor/Major Project entitled "**Face mask detection**" being submitted by "**Anshu Kumari"(0526CS191020)** for partial fulfilment of the requirement for the award of "**Bachelor of Engineering/Technology in Computer Science & Engineering**" to "**Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal(M.P)**" during the academic year 2022-23 is a record of Bonafide piece of work, carried out by him under my supervision and guidance in **IES INSTITUTE OF TECHNOLOGY AND MANAGMENT, BHOPAL(M.P)**.

Guide	H.O.D	Principal
Dr. Anita Soni	**Dr. Nikhat Raza khan**	**Dr. Anuprita Mishra**

II

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IES INSTITUTE OF TECHNOLOGY AND MANAGMENT BHOPAL (M.P)

Department of Computer Science & Engineering

APPROVAL CERTIFICATE

The Major Project entitled "**Face Mask Detection**" being submitted" Anshu **Kumari (0526CS191020)**" has been examined by us and is hereby approved for the award of degree "**Bachelor of Engineering/Technology in Computer Science & Engineering**", for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein, but approve the dissertation only for the purpose for which it has been submitted.

Internal Examiner

Date: …….

External Examiner

Date: ……

II

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IES INSTITUTE OF TECHNOLOGY AND MANAGMENT, BHOPAL (M.P.)

Department of Computer Science & Engineering

DECLARATION

I hereby declare that the work, which is being presented in Minor/Major Project, entitled "**Face Mask Detection**" partial fulfilment of the requirements for the award of degree of Bachelor of Engineering/Technology in Computer Science & Engineering branch, submitted in the department of **IES INSTITUTE OF TECHNOLOGY AND MANAGMENT** is an authentic record of my own work carried under the guidance of "Aishwarya ma'am**"** I have not submitted the matter embodied in report for award of any other degree.

Supervisor

NAME	ENROLLMENT
Anshu Kumari	0526CS191020
Mariya Khatun	0526CS191049
Kajal Kumari	0526CS191040
Devendra Kumar	0526CS191030
Devraj Bavan	0526CS191031

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I would also like to express my gratitude to **Dr. Anuprita Mishra** (Principal, IES Institute of Technology and Management, Bhopal), **Dr. Nikhat Raza** (Head of CSE Department), and **Dr. Anita Soni** for their motivation and unconditional support.

Finally, I wish to thank all those noble-hearted individuals who have, directly or indirectly, contributed to the successful completion of this project.

NAME	ENROLLMENT
Anshu Kumari	0526CS191020
Mariya Khatun	0526CS191049
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Devraj Bavan	0526CS191031

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:Chapter 1:-

1.1-Inroduction

In 2020, the largest pandemic in recent history spread across the world: COVID-19. As of May 1, 2021, there have been over 152 million cases and 3 million deaths worldwide. In many regions, these numbers are likely under-reported. Beyond the human toll, COVID-19 has had economic and social impacts due to distancing and protective measures. This project aims to create a mask detection system capable of recognizing whether people in surveillance-type video streams are correctly wearing their masks. This can be beneficial both during ongoing pandemics and in preparing for potential future ones.

1.2- Overview

Due to the real-time and practical deployment constraints of this task, we approached the problem with a focus on both performance and efficiency. The primary pipeline for accuracy uses a pre-trained face detector to extract faces from the frame, then passes the cropped faces to an image classifier. This mask-wearing classifier is trained on a large-scale synthetic dataset of 180,000 images divided into three classes: mask correctly worn, mask incorrectly worn, and no mask worn. We experimented with various models for this classifier, from traditional machine learning approaches such as random forest and Haar cascades to advanced computer vision architectures like DenseNet and ResNet.

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:Chapter 2:-

2.1. Related Works

Projects with similar objectives became quite popular during the pandemic. One method proposed using Haar-cascade-based feature detectors to identify the presence of the nose and mouth in a detected face. The logic is as follows: no mask is worn if a mouth is detected, the mask is worn incorrectly if a nose is detected but not a mouth, and the mask is worn correctly if neither the nose nor the mouth is detected. Although this approach is efficient and intuitive, it has limitations: it only works for fully frontal faces and can be easily fooled if a person covers their mouth and nose with their hand.

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-:Chapter 3:-

3.1 Hardware Requirements

- Working Webcam
- 4 GB RAM and above
- 1TB Hard disk
- 32-bit processor or more
- I3 processor or more
- Operating System

3.2 Software Requirements

- Python
- OpenCV
- TensorFlow
- Keras
- Imutils

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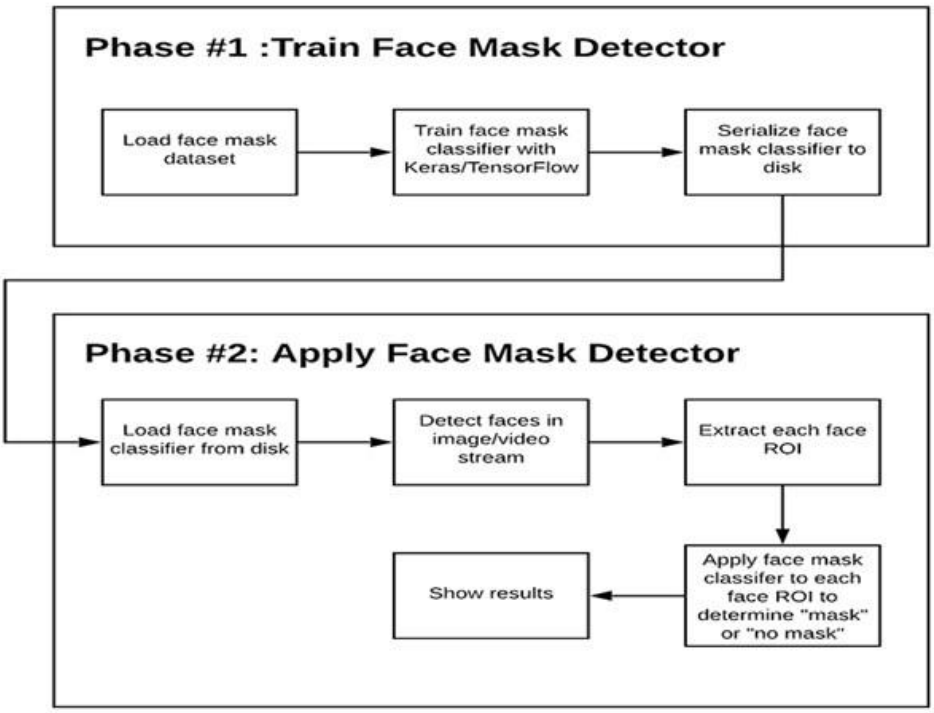
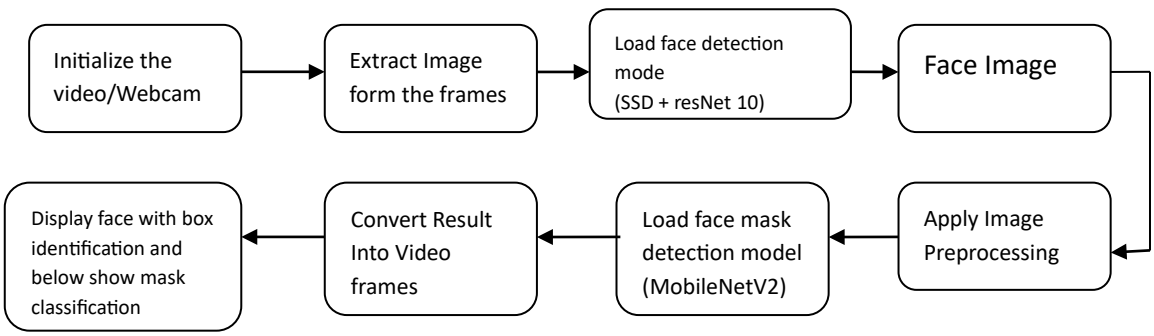
:Chapter 4:-

4.1 Use case diagram

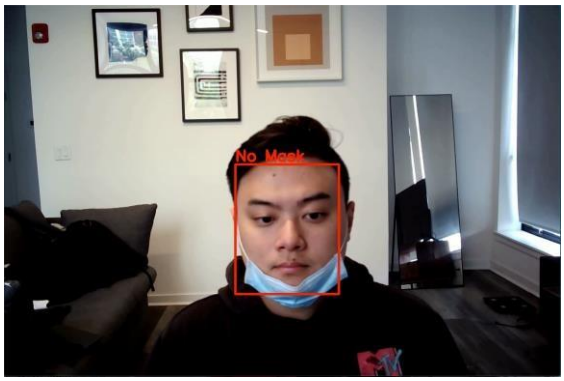


4.2 Face Mask Detection Flow from Webcam



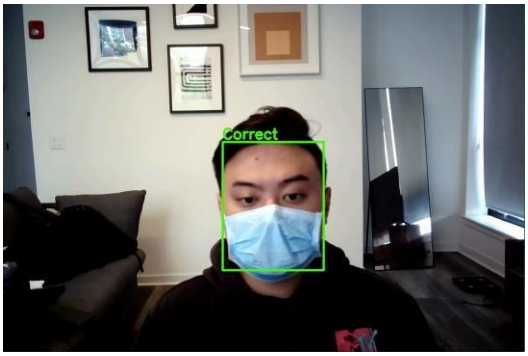
-:Chapter 5:-

5.1 Project Snapshots



Not Wearing mask Properly

Incorrect Style



Wearing Mask Properly

-:Chapter-6:-

6.1 Future Work

More than fifty countries worldwide have recently made wearing face masks compulsory. People are required to cover their faces in public spaces, supermarkets, public transportation, offices, and stores. Retail companies often use software to count the number of people entering their stores, and they may also want to measure impressions on digital displays and promotional screens.

We are planning to enhance our Face Mask Detection tool and release it as an open-source project. Our software can integrate with any existing USB, IP cameras, and CCTV systems to detect individuals not wearing masks. This live video feed detection can be implemented in both web and desktop applications, allowing operators to view notification messages. Additionally, operators can receive an image of any person not wearing a mask. An alarm system could also be integrated to sound an alert if someone without a mask enters the monitored area. The software could further connect to entrance gates to permit access only to people wearing face masks.

6.2 Conclusion

To help mitigate the spread of the COVID-19 pandemic, effective measures are essential. We developed a face mask detector using SSD architecture and transfer learning methods in neural networks. For training, validation, and testing, we used a dataset of images with both masked and unmasked faces. The model was then tested on both images and live video streams. This face mask detector can be deployed in high-traffic areas like shopping malls and airports to monitor the public and prevent disease spread by ensuring compliance with basic health guidelines.

6.3 References

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[5] Face mask detection
[6] Computer society conference on computer vision and pattern recognition. CVPR 2001, vol.
[7] COVID-19: Face MSask Detector with Opencv, Keras/Tensor flow, And Deep Learning