

MATHS PROJECT

BY

KARTHIK NAIR-AM.EN.U4AIE21138

R ARAVIND-AM.EN.U4AIE21151

VISHNU SHAJI-AM.EN.U4AIE21167

AKHILESH-AM.EN.U4AIE21108

MAMIDI SOWJI KRISHNA-AM.EN.U4AIE21181

INTRODUCTION

- The whole world today, is facing the COVID-19 pandemic. People are using various measures to control the spread of Corona virus.
- There are so many vital measures which are needed to fight against COVID-19 and one of such most important is face mask. Lots of research and studies on COVID-19 are still going on.
- Studies have also proved that wearing a face mask remarkably reduces the problem of viral transmission.
- Also, a person wearing a face mask recognizes a sense of protection. At our homes, we consciously take care of each and everything but when it comes to public places like offices, malls, colleges, etc., it becomes somewhat challenging to maintain the safety of people. However, it is not feasible to manually check whether a person is wearing a face mask or not. Technology comes into picture here. Machine Learning and Artificial Intelligence consist of various technologies which provide effective

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CHALLENGES

There are many challenges which limit the potential of a Facial Recognition System. They are:-

- **Illumination-** Illumination stands for light variations. The slight change in lighting conditions cause a significant challenge for automated face recognition and can have a significant impact on its results.
- **Pose –** Facial Recognition Systems are highly sensitive to pose variations. The pose of a face varies when the head movement and viewing angle of the person changes.
- **Occlusion-** Occlusion means blockage, and it occurs when one or other parts of the face are blocked and whole face is not available as an input image.

SOLUTION APPROACH

- As the virus outbreak continues, business leaders are producing innovative digital solutions.
- In order to prevent the spread of Corona virus, we have tried to develop a face mask recognition system using machine learning.
- This is an effective system to detect a face mask.
- It can recognize masked and unmasked faces..
- By the development of this system, one can detect if a person is wearing a face mask or not.

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- If the person is not wearing a face mask, then system will show some message like “NO Mask” otherwise it will show “Mask Detected” message.
- Also, allowing the entry of those who are wearing a face mask, will be of great help towards maintaining the safety among people.
- Ultimately, we are trying to contribute some effective system to detect a face mask with the help of technology for the battle against Covid-19.

IMPLEMENTATION

Face mask detection had seen significant progress in the domains of Image processing and Computer vision,

since the rise of the Covid-19 pandemic. Many face detection models have been created using several algorithms and techniques.

The proposed approach in this paper uses deep learning, TensorFlow, Keras, and OpenCV2 to detect face masks.

This model can be used for safety purposes since it is very resource efficient to deploy.

We'll be fine-tuning the MobileNet V2 architecture, a highly efficient architecture that can be applied to embedded devices with limited computational capacity

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Steps:

- 1) Using transfer learning to train a model which can differentiate between masked and unmasked face.

Transfer learning (TL) is a research problem in machine learning (ML) that focuses on storing knowledge gained while solving one problem and applying it to a different but related problem.

- 2) By using an already existing model we trained it using a dataset, so that it can differentiate masked and unmasked faces.

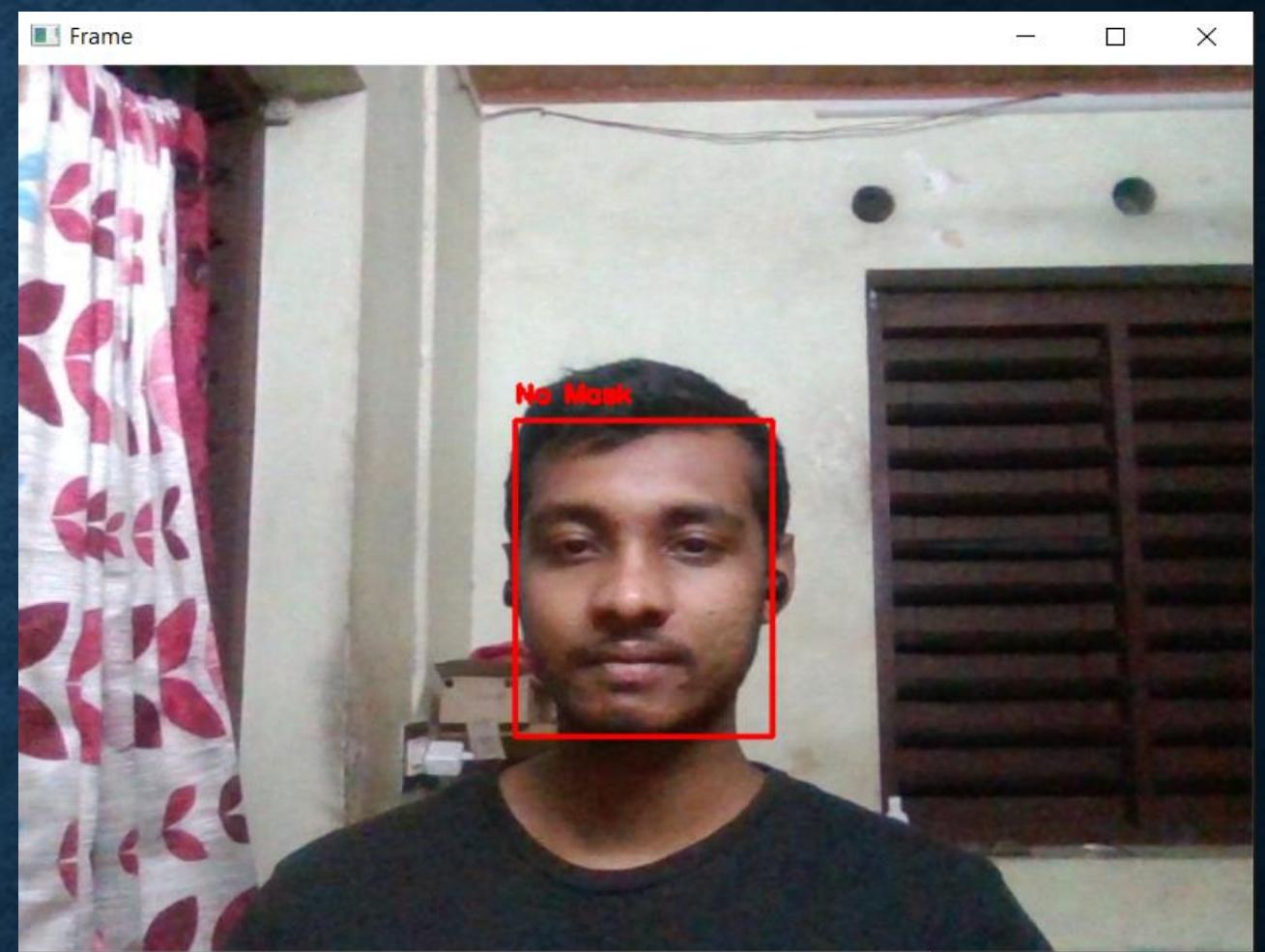
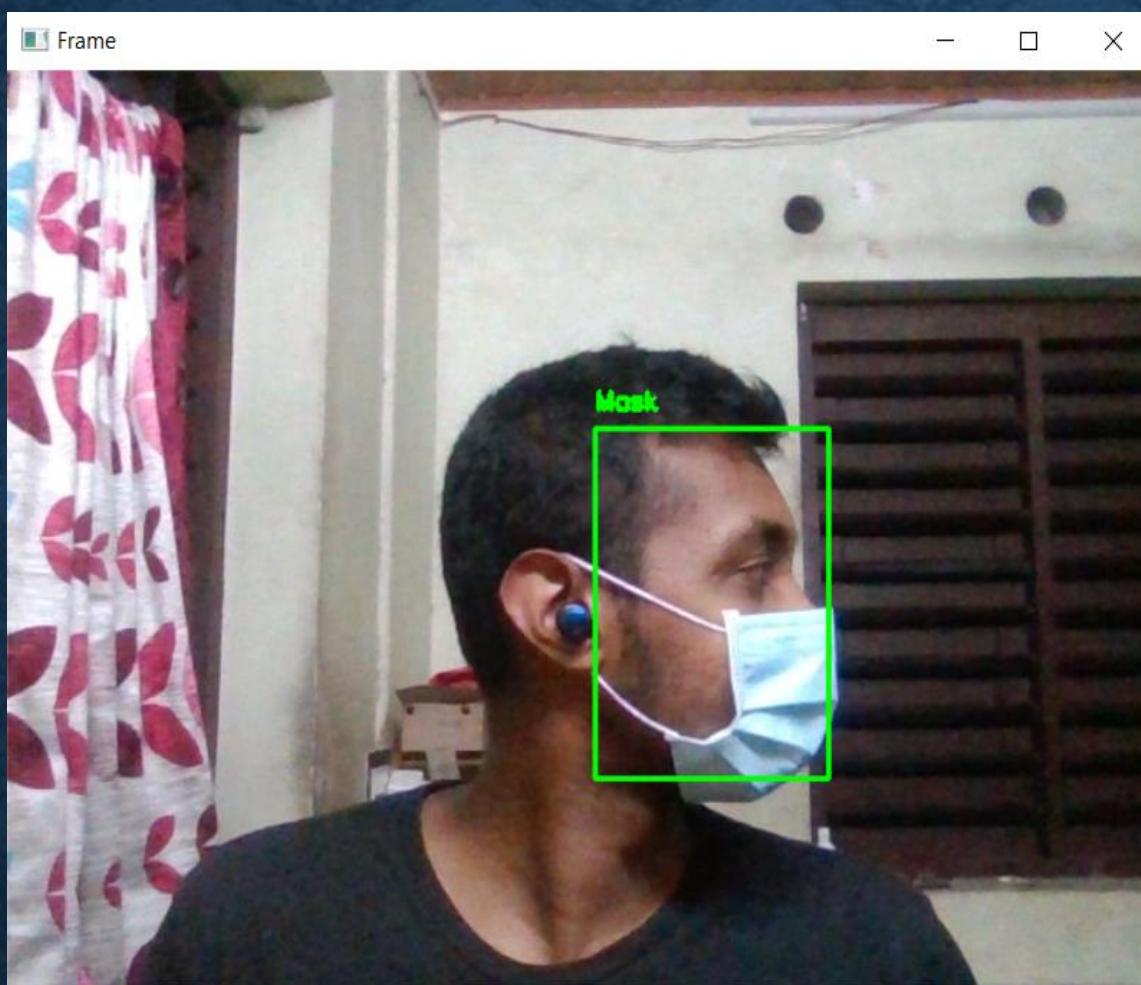
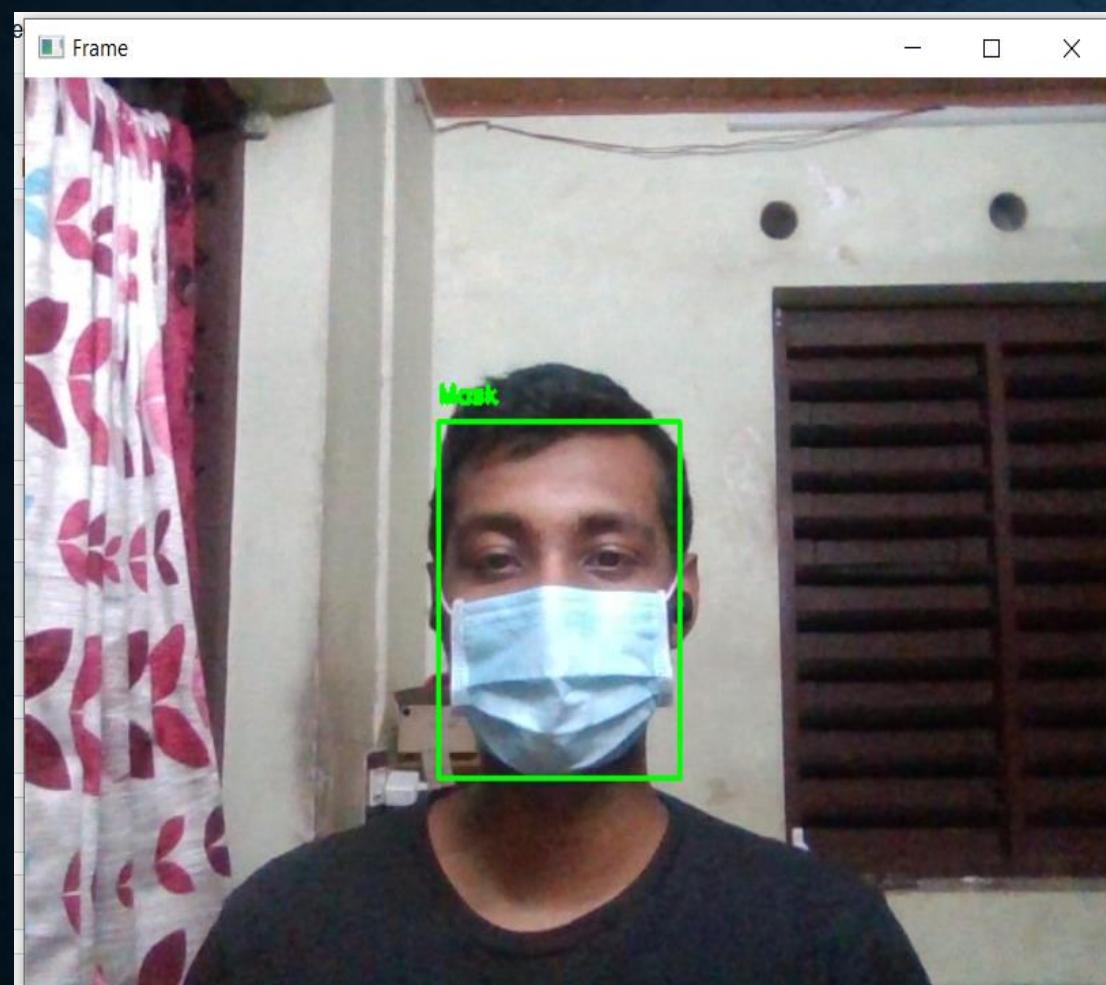
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- 3) By using 'Open CV' we created a program to do real time face detection
- 4) We used this trained model to predict whether the face have mask or not.

GITHUB LINK:-

[GITHUB](#)

OUTPUT



OBSERVATIONS

- In this pandemic situation, where whole world is dreaming to return to normal routine, this system will play effective role in monitoring the use of face masks at workplaces.
- By the development of this system, we can detect the mask on one's face and allow his entry in the workplace.
- This system also contributes to public healthcare, as it helps in keeping environment healthy.
- This system can be aptly used in public areas with embedded systems for application in airports, railway stations, offices, schools, and public places to ensure that public safety guidelines are followed.

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- This model can be used in any high-definition camcorders, this will make sure that this model is not limited to only face mask detection system.
- Also, this can be used for biometric scans with a mask on the face.
- Finally, this work can be used for future researchers and enthusiasts.

REFERENCES

GitHub

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