



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJIRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 10, October 2021

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 7.569



# Face Mask Detection System

**Bhagwat Nitin<sup>1</sup>, Dasurkar Abid<sup>1</sup>, Prabhudesai Aniket<sup>1</sup>, Prof. Mr. Amar Palwankar<sup>2</sup>**

U.G. Student, Department of Information Technology, Finolex academy of Management and Technology, Ratnagiri,  
Maharashtra, India<sup>1</sup>

Associate Professor, Department of Information Technology, Finolex academy of Management and Technology,  
Ratnagiri, Maharashtra, India<sup>2</sup>

**ABSTRACT:** In the recent times, the Coronaviruses that are a big family of different viruses have become very common, contagious and dangerous to the whole human kind. It spreads human to human by exhaling the infection breath, which leaves droplets of the virus on different surface which is then inhaled by other person and catches the infection too. So it has become very important to protect ourselves and the people around us from this situation. We can take precautions such as social distancing, washing hands every two hours, using sanitizer, maintaining social distance and the most important wearing a mask. Public use of wearing a masks has become very common everywhere in the whole world now. From that the most affected and devastating condition is of India due to its extreme population in small area. This paper proposes a method to detect the face mask is put on or not for offices, or any other work place with a lot of people coming to work. We have used convolutional neural network for the same. The model is trained on a real world dataset and tested with live video streaming with a good accuracy. Further the accuracy of the model with different hyper parameters and multiple people at different distance and location of the frame is done.

**KEYWORDS:** Face Mask Detection, Convolutional Neural Network, MobileNetV2, Corona virus Precaution.

## I. INTRODUCTION

Public use of face masks has been common in China and other nations in the world since the beginning of the new coronavirus disease outbreak. "This means that the virus can spread between people interacting in close proximity — for example, speaking, coughing, or sneezing — even if those people are not exhibiting symptoms. So the need of Face mask detection arose. The model in this paper uses the Convolutional Neural Network. It is based on an inverted residual structure where the residual connections are between the bottleneck layers. The intermediate expansion layer uses lightweight depth wise convolutions to filter features as a source of non-linearity. It is a deep neural network model used for analyzing any visual imagery. It takes the image data as input, captures all the data, and send to the layers of neurons. It has a fully connected layer, which processes the final output that represents the prediction about the image. The Convolutional neural network model used here is the MobileNetV2 architecture.

## II. LITERATURE REVIEW

The importance of Convolutional Neural Networks is discussed in many contexts with respect to image recognition, object detection, image segmentation etc. There are significant numbers of Convolutional Neural Networks available, but it depends on the application of implementation. So far, different handcrafted and deep learning feature-based approaches have been proposed. In recent days, deep learning approaches for Face-Mask detection is gaining popularity because of better accurate results of pre-trained models. Initially, the images from the camera-feed are extracted and segmented by marking with bounded boxes depicting confidence levels around person the wearing or not wearing a mask.

### III. SYSTEM DESIGN

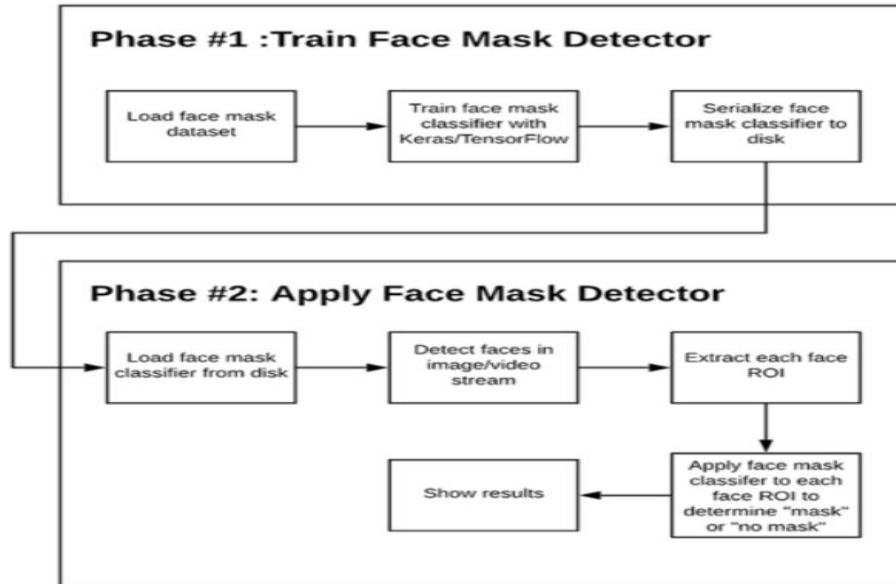


Figure.1.Block diagram for Face Mask Detection System

### IV. FLOWCHART

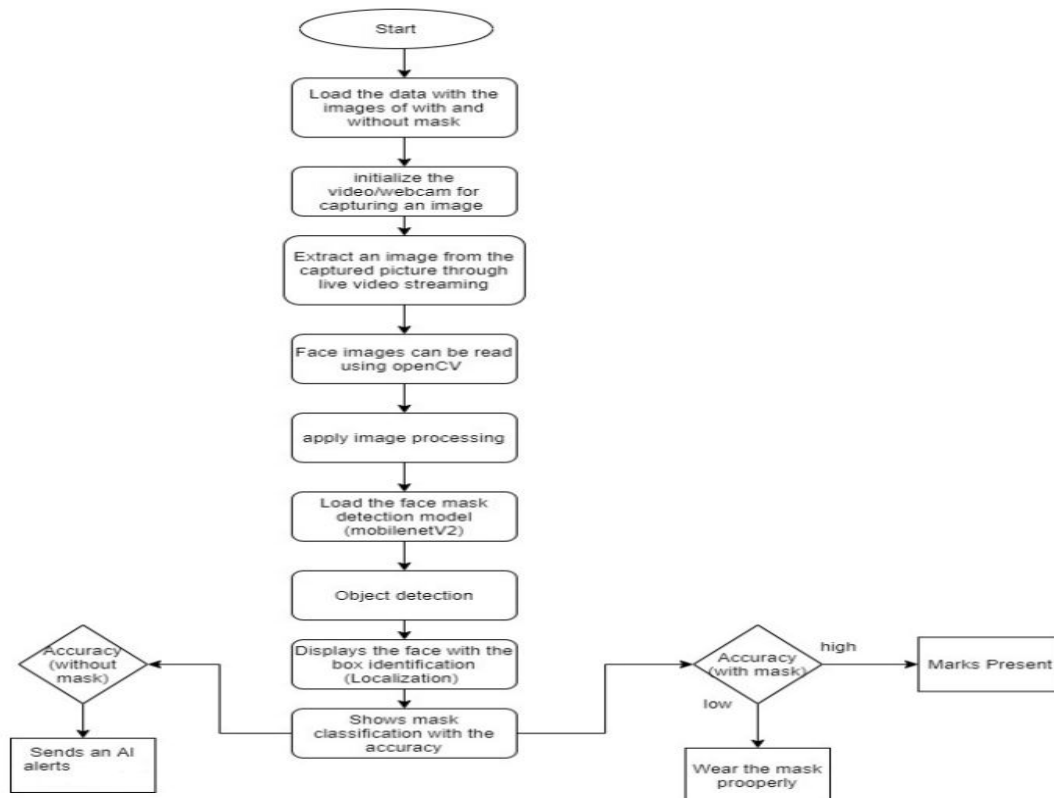
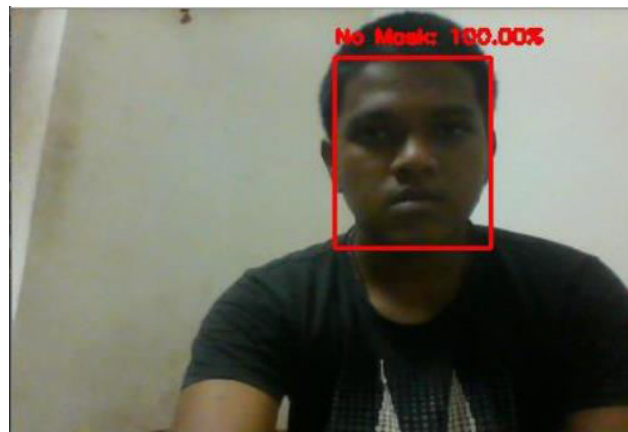


Figure.2. Flow Diagram for Face Mask Detection System

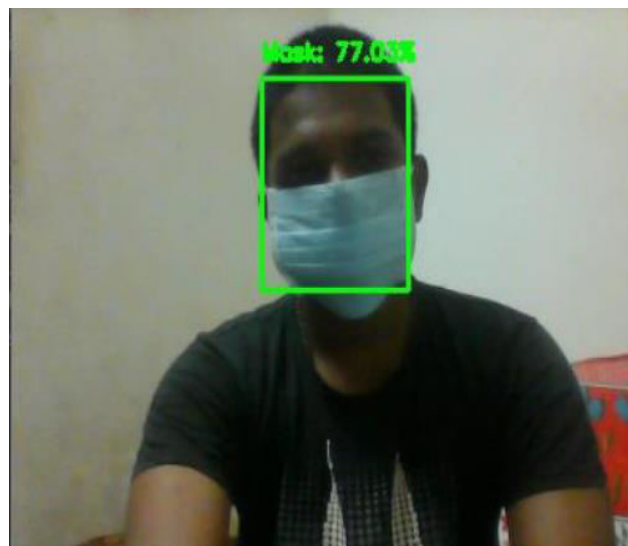
## CONCEPT OF THE SYSTEM

We want to build a system that can detect faces in real-world videos and identify if the detected faces are wearing masks or not. The system sends an alert message to 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 premises without a face mask

## V. IMPLEMENTATION



**Result 1:** represent the person is not wearing mask and showing the result as No mask with 100.00%.



**Result 2:** represent the person is wearing mask and showing the result as Mask with 77.03%.

Thus, the mask detector is capable of running in real-time and is correct in its predictions also. Because the technology is blooming with emerging trends the availability therefore the novel mask detector designed which may possibly contribute to public healthcare. The architecture consists of Mobile Net because the backbone it is often used for top and low computation scenarios. So as to extract more robust features, transfer learning is employed to adopt weights from an identical task face detection, which is trained on a really large dataset.

OpenCV, tensor flow, Keras and CNN is employed to detect whether people were wearing face masks or not. The models were tested with images and real-time video streams. The accuracy of the model is achieved and, the





optimization of the model may be a continuous process and a highly accurate solution is building by tuning the hyper parameters. This specific model might be used as a use case for edge analytics. Furthermore, the proposed method achieves state-of-the-art results on a public mask dataset.

By the event of mask detection, if the person is wearing a mask is detected and permit them entry would be of great help to the society.

## RESULTS:

Thus, the mask detector is capable of running in real-time and is correct in its predictions also. Because the technology is blooming with emerging trends the availability therefore the novel mask detector designed which may possibly contribute to public healthcare. The architecture consists of Mobile Net because the backbone it is often used for top and low computation scenarios. So as to extract more robust features, transfer learning is employed to adopt weights from an identical task face detection, which is trained on a really large dataset.

OpenCV, tensor flow, Keras and CNN is employed to detect whether people were wearing face masks or not. The models were tested with images and real-time video streams. The accuracy of the model is achieved and, the optimization of the model may be a continuous process and a highly accurate solution is building by tuning the hyper parameters. This specific model might be used as a use case for edge analytics. Furthermore, the proposed method achieves state-of-the-art results on a public mask dataset.

By the event of mask detection, if the person is wearing a mask is detected and permit them entry would be of great help to the society

## VI. CONCLUSION

This thesis presented a study on facial recognition and face mask detection through deep learning techniques by building a CNN model using transfer learning and fine-tuning techniques. This process gave accurate and quick results for facial recognition security systems despite the fact that half of the faces are covered with face masks. The test results show a high accuracy rate in identifying individuals wearing a face mask, not wearing a face mask, and wearing a face mask but in an incorrect manner. The model was able to achieve a 97.1% of performance accuracy, which is a significant achievement. Moreover, the study presented a useful tool in fighting the spread of the COVID-19 disease by allowing all individuals to wear a face mask while performing biometric authentication.

## VII. ACKNOWLEDGEMENT

Report is on the topic: “**Acknowledgement**” All the Relevant and essential details are included in the paper. At the beginning we have given the summarized details of the project which we are building and we have also proceed details about how the project is going to be implement and which technologies we are going to use to develop this project.

We are thankful to **Prof.Mr.Amar Palwankar** who guides us and helps in preparing the paper .We thank him for providing us the confidence and most importantly giving us the track regarding the project topic whenever we needed it.

## REFERENCES

1. Z. Wang, G. Wang, B. Huang, Z. Xiong, Q. Hong, H. Wu, P. Yi, K. Jiang, N. Wang, Y. Pei et al., “Masked face recognition dataset and application” arXiv preprint arXiv:2003.09093, 2020.
2. D. Cahi and K.N. Ngan, “Face segmentation using skin color map”, IEEE Trans. On Circuit and Systems for Video Technology, vol 9, no 4, pp. 551-564, Jun. 1999.
3. Abbas El Gamal, “Introduction To Statistical Signal Processing”, Lecture Notes
4. Richard Duda, Peter Hart and David Stork, “Pattern Classification”, 2 nd ed., John Wiley and Sons.
5. Sirovich, L. and Kirby, M.: 1987, Low dimensional procedure for the characterization of human faces, J. Opt. Soc. Am. A 4, 519–524.
6. Gender classification with support vector machines, [www.merl.com/reports/docs/TR2000-01.pdf](http://www.merl.com/reports/docs/TR2000-01.pdf)
7. Support Vector Machines (SVM), <http://www.site.uottawa.ca/~stan/csi5387/SVMtransp.pdf>



**Impact Factor:  
7.569**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details