Face Mask Detection on Realtime Environment using Deep Learning

1st Sravya, 2nd Dr.E. Padmalatha,[3] 3rd Dr.G. Vanitha

[1]M. Tech of 1st Sravya,[2]Doctor of Philosophy (CSE) of 2nd Author,[3]Doctor of Philosophy (CSE) of 3rd Dr.G.Vanitha

[1]Computer Science and Engineering of 1st Sravya,

[1]CBIT of 1st Sravya, Hyderabad, Indian

Abstract - Face masks are the most important form of defiance against the corona virus, and as time has gone on, doctors and scientists have advised everyone to wear them. Therefore, a variety of identification approaches are available to distinguish between people wearing face masks.

Index Terms - Deep Learning, Facemask, Machine Learning. Classification, Convolution Neural Network, Data Argumentation, MobileNet, Autoencoder.

I. INTRODUCTION

Deep learning, which is included in machine learning, does away with some of the data pre-treatment procedures used in machine learning. This deep learning overview will teach you more. Despite having a futuristic sound, it is a crucial component. In order to protect themselves from air pollution prior to COVID-19, community members wore masks, albeit others did so out of self-consciousness about their looks. At this time, COVID-19 transmission is reduced when using a face mask during the pandemic, according to scientists and subject experts. Around the end of the year 2019, individuals were affected People were infected by the coronavirus, sometimes referred to as COVID-19 or the virus in charge of the most current outbreak, and the infection rate is now considerably higher. The COVID-19 virus spreads by intimate contact in crowded places, sharing several gadgets in a public place, and interior settings like cafes, hotels, etc. The COVID 19 pandemic has sparked extraordinary levels of international scientific collaboration. COVID-19 is fought with the use of machine learning and deep learning techniques. provide a number of benefits These methods also enable the research community and doctors to evaluate a sizable amount of data for projecting COVID-19 distribution. Infection rates, COVID-19 presence utilizing chest X-ray pictures, social distance, face mask use, and other indicators are all investigated using artificial intelligence-based algorithms.

The COVID-19 virus must not be allowed to propagate in order to manage its impacts, policymakers must navigate a number of dangers and difficulties. All nations have implemented a number of preventing and including stay-at-home laws, social seclusion, city lockdowns, travel restrictions, and the requirement to cover one's face in public. These laws are implemented by the government as measures to stop the epidemic from spreading. However, manual monitoring techniques make it exceedingly difficult to keep track of a huge crowd or packed place. Face mask detection technologies must be made efficient and effective in order to solve these issues. The researchers' primary attention is on COVID-19's current problems, including social isolation. Assert that when a face is recognized while wearing a mask, face identification algorithms' accuracy falls below 70%. Their suggested model is built using a CNN architecture, which consists of three modules: proposal, embedding, and verification. Were able to categories face masks. After ensemble classifiers, Using the face mask and face unmask images, CNN models are used to extract important attributes, a support vector machine, and a decision tree have been applied. It is computationally costly due to the integration of numerous models, which calls for the use of strong GPUs and TPUs for execution.

II. Objectives

- The trained facemask classifier produced by transfer learning is utilised in the propose architecture to detect faces with and without masks.
- The ultimate goal of enforcing the wearing of face masks in public places won't be reached until after identifying the people whose faces were seen wearing masks in violation.

III. LITERATURE SURVEY

Liang Zhu [14] he assessment of cough frequency may increase the precision of diagnosis for treating a number of disorders, addressing the current COVID-19 global pandemic catastrophe and chronic obstructive pulmonary disease (COPD).Goyal [17] The Following the swift global escalation and dissemination The COVID-19 outbreak has had a significant impact on people's daily lives. Zhang [22] To get more helpful characteristics for the two tasks at hand, the classification and localization branches are then split apart. Yuzhen [26] Wearing masks, he said, is a simple and effective strategy to halt the sickness at its source. Varshini [29] The Governments all across the world had to enact measures due to the COVID 19 outbreak. Hussain [30]

IV. Propose System:

In this work In this work, we used MobileNetV2 architecture, followed by autoencoders. The MobileNetV2 is an efficient and effective deep learning-based architecture among several available choices. The feature vector is flattened by the proposed model using a global pooling layer. For classification, a completely connected dense layer connected to the SoftMax layer has been used. On two datasets of face masks that are available to the public, our suggested model beats existing models in terms of crucial performance parameters.

V. WORMHOLE ATTACK TAXONOMY

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In Figure 1 is MobileNet architecture First given input as image dataset can be perform 1 to 17 blocks after convolution is performed in this step it can be convert to machine understanding language then global pooling in this step it can divided into 2 types these are max and min polling then again it can perform convolution after completion it can send to the feature encoding.

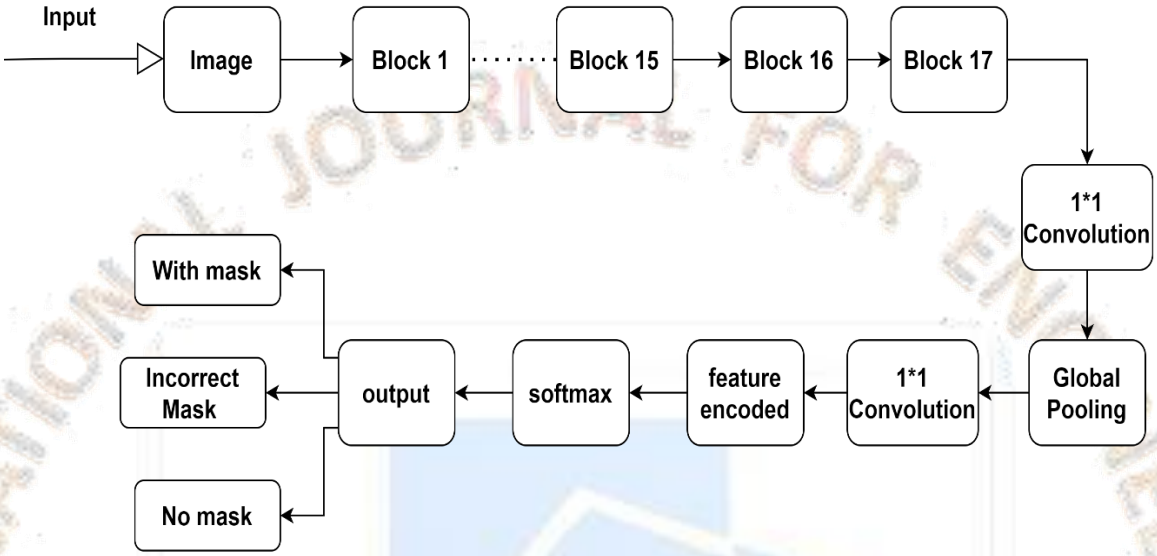

Figure 1: MobileNet Architecture

In the feature encoding the mobilenet architecture if fallowed by autoencoding. Encoder and decoder are the two major types of the autoencoder. With unlabeled data, they are frequently employed. Following encoding by the encoder, the input feature map is rebuilt using a decoder module. The features vector's 1280 dimensions are initially reduced to 640 dimensions from becoming reduced to 320 dimensions. The SoftMax in this step after applying the SoftMax Function, the Cross Entropy Function is used as the Loss Function to verify the model's reliability in order to optimize the functionality of our neural network. The classification the act or process of classifying the image after it can give the output.

VI. CONCLUSION

The MobileNet architecture processes the input data to extract valuable features, they are after that transmitted to the encoding layers for the selection of the best features. The last classification is then carried out. We will keep developing this work to take into account the placement of face masks, such as a face without a mask, a face with a mask, and a mask on a face that is not positioned correctly. In order to assure their deployment across edge devices, the performance of the proposed model is also tested on devices with limited resources. When compared to other cutting-edge methodologies, the proposed model had the best accuracy and the shortest running time. The location of face masks, such as a face without a mask, a face with a mask, and a face with incorrect mask, will be included to this work in the further.

VII. REFERENCES

[1] Habib, Shabana, Majed Alsanea, Mohammed Aloraini, Hazim Saleh Al-Rewashed, Muhammad Islam, and Sheroz Khan. "An Efficient and Effective Deep Learning-Based Model for Real-Time Face Mask Detection." Sensors 22, no. 7 (2022): 2602.

[2] L. Zhu, T. D. Hà, Y. -H. Chen, H. Huang and P. -Y. Chen, "A Passive Smart Face Mask for Wireless Cough Monitoring: A Harmonic Detection Scheme with Clutter Rejection," in IEEE Transactions on Biomedical Circuits and Systems, vol. 16, no. 1, pp. 129-137, Feb. 2022, doi: 10.1109/TBCAS.2022.3148725.

[3] S. I. Ali, S. S. Ebrahimi, M. Khurram and S. I. Qadri, "Real-Time Face Mask Detection in Deep Learning using Convolution Neural Network," *2021 10th IEEE International Conference on Communication Systems and Network Technologies (CSNT)*, 2021, pp. 639-642, doi: 10.1109/CSNT51715.2021.9509704.

[4] J. Zhang, F. Han, Y. Chun and W. Chen, "A Novel Detection Framework About Conditions of Wearing Face Mask for Helping Control the Spread of COVID-19," in *IEEE Access*, vol. 9, pp. 42975-42984, 2021, doi: 10.1109/ACCESS.2021.3066538.

[5] Y. Chen *et al*., "Face Mask Assistant: Detection of Face Mask Service Stage Based on Mobile Phone," in *IEEE Sensors Journal*, vol. 21, no. 9, pp. 11084-11093, 1 May1, 2021, doi: 10.1109/JSEN.2021.3061178.

[6] Varshini, B., H. R. Yogesh, Syed Danish Pasha, Maaz Suhail, V. Madhumitha, and Archana Sasi. "IoT-Enabled smart doors for monitoring body temperature and face mask detection." Global Transitions Proceedings 2, no. 2 (2021): 246-254.

[7] Hussain, Shabir, Yang Yu, Muhammad Ayoub, Akmal Khan, Rukhshanda Rehman, Junaid Abdul Wahid, and Weiyan Hou. "IoT and deep learning-based approach for rapid screening and face mask detection for infection spread control of COVID-19." Applied Sciences 11, no. 8 (2021): 3495.