Face Mask Detection and Contactless Body Temperature Sensing

Rahul Kale[1], Darshan Bhilare[2], Aditya Parmar[3], Ankit Patil[4], Prof. Darshana Patil[5]

[1,2,3,4]Student, Department of Computer Engineering, JSPM's Jayawantrao Sawant College of Engineering, Pune
[5]Guide, Department of Computer Engineering, JSPM's Jayawantrao Sawant College of Engineering, Pune

---

Abstract - *Covid-19 has spread worldwide now, and it has affected all sectors. The healthcare system of nearly every country is going through a crisis. Wearing a mask is one among the many measures attempted to combat the spread of covid-19. In this paper, we are proposing a system which will help to reduce the spread of covid-19 at Grocery Shop which further can be implemented at Malls, Universities, Smart Cities, etc. through CCTV Cameras by detecting if a person's face mask is not worn, or Temperature is above the threshold then an email with a photo of the person with their body temperature sent to the concerned person. We hope this system will help reduce the spread of Covid-19 in some content by informing the Grocery shop owner about the suspected person.*

***Key Words*: Face Mask Recognition, OpenCV .Tensorflow , Covid 19**

1.INTRODUCTION

We have been dealing with COVID-19 for the last two years, which can get transmitted through the air. So, to avoid direct contact at public premises, we are working on IoT Based system which can detect masks, detect temperatures, and if any fault seems, automatically, it will send information of that person to the owner or respective authorities. The main focus is to detect faces, not to identify or verify it also detect whether or not the individual is wearing a mask, and also Detecting the temperature of the respective person Because these scenarios have become very important to follow since the Covid-19 and still we need to follow these rules because Covid-19 is not totally under control. We also need to be ready for these kinds of pandemics in the future. Also, we need to follow the rules to protect us from viruses. We need to check whether the person is wearing

a mass or not. So, we can control the transmission of viruses or any viral diseases transmitted through the air. Today CCTVs are used in many public and private areas for surveillance activities; we can use them to enforce the rules like wearing a mask. Also, we need to check the temperature of the entering person. Whether the person is having average temperature or high temperature. So, if the person has high-temperature means, we get notified that this person is at high risk and can transfer the virus.

2. LITERATURE SURVEY

SR NO	TITLE	METHODLOGY	CONCLUSION
1	An automated evaluation of COVID-19 risk variables is combined with real-time, indoor, personal location data for potential illness identification, prevention, and intelligent quarantining.	The VL53LoX TOF sensor detects the presence of a person within a 4-meter radius. A hybrid solution utilizing both feature vector description based on a histogram of oriented gradients (HOG) approach and neural networks (NN) make the mask detection algorithm. The mask detection algorithm is a. Temperature is measured with MLX90614 infrared thermometer.	The proposed system described in this paper helps in two ways – a. automatic detection of body temperature at several checkpoints and applying suitable hygiene standards correlated with facing masks.
2	CNN based Smart System: A Smart IoT Application Post Covid-19 Era.	The Image captured by CCTVs or Cameras will be used to detect face and mask. This system will detect faces and face masks.	According to the analyzed literature system uses the CNN algorithm as multiple faces can be recognized at a time by CNN.
3	Attention-based convolutional neural network for deep face recognition.	A convolution neural network is used to perform the layer-by-layer operation on an input picture of aligned faces. When the convolutional process is active, the feature map is	The goal of an attention-based convolutional neural network is to reduce information duplication between

		created by typical CNN structures that contain numerous networks, resulting in information redundancy across channels and increasing the danger of overfitting.	channels while focusing efforts on the most valuable components of three-dimensional feature maps.
4	An Automated System to Limit COVID-19 Using Facial Mask Detection in Smart City Network.	For feature extraction from the images, the learning algorithm CNN has used, which then multiple hidden layers learn these features.	This is a system for a smart city to break the spread of the coronavirus as if the person who is not wearing a face mask, is concerned the authority informed about that person.
5	Facial Mask Detection using Semantic Segmentation.	The goal of this approach is to create a Binary face classifier that can recognise faces in any orientation. The RGB image is given as input to a model of any arbitrary size to the model. Detail Distance Computing Procedure has been used.	The proposed system can detect Non-frontal faces and detect multiple face masks in one frame.
6	Face Recognition Using Eigenface Algorithm on Laptop Camera.	Faces in columns of matric that are input are created by the face recognition algorithm and stored in a file.	Faces having different expressions can be recognized by the eigenface algorithm.
7	LAMSTAR: For IoT-based face recognition system to manage the safety factor in smart cities.	Face region recognized and cropped after getting input image from IoT sensor camera. An effective diffusion process is applied to eliminate noise in images.	The system proposes the LAMSTAR-based facial recognition process.
8	Face Mask Detection using Keras, OpenCV, and TensorFlow for the Covid-19.	A cascade classifier and a pre-trained convolution neural network with two 2-Dimensional convolution layers connected to dense neuron layers are used in this technique.	High accuracy is achieved by using ML tools and simplified techniques.
9	Real-time Mask Identification for COVID-19: An Edge Computing-based Deep Learning Framework.	In this paper, performance of low-power camera devices on buses in real time can be done by an edge computing-based m an s k identification framework (EC-Mask) to ensure public health precautions.	Real-time monitoring of the condition of wearing the mask in videos from buses by EC-Mask identification framework.
10	Cross-resolution Face recognition with pose variations via multilayer locality-constrained structural orthogonal Procrustes regression.	Learning resolution-robust representation features reduces the resolution gap among diverse image spaces.	The proposed MLCSOPR trains pose robust discriminatory representation features to close the resolution gap between the LR and HR image spaces, improving the consistency between them.

CONCLUSIONS

We can use the proposed solution with some limitations according to the achieved results. For example, the number of processed frames of measurements per second.

In order to attain a higher framerate, it is intended to experiment with various deep learning and

computer vision frameworks for object recognition in the future.

Finally, the ultimate aim is to combine the technology described in this presentation with our paradigm for effective resource planning during a pandemic.

To provide effective security and mask distribution to avoid the transmissions of viral diseases in the future.

REFERENCES

[1] J. Barabas, R. Zalman and M. Kochlan," Automated evaluation of COVID19 risk factors coupled with real-time, indoor, personal localization data for potential disease identification, prevention and smart quarantining," 2020 43rd International Conference on Telecommunications and Signal Processing (TSP), Milan, Italy, 2020, pp. 645-648, doi: 10.1109/TSP49548.2020.9163461.

[2] R. Moorthy H., V. Upadhya, V. V. Holla, S. S. Shetty and V. Tantry," CNN based Smart Surveillance System: A Smart IoT Application Post Covid-19 Era," 2020 Fourth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC), Palladam, India, 2020, pp. 72-77, doi: 10.1109/ISMAC49090.2020.9243576.

[3] K. Zhu, Z. Du, W. Li, D. Huang, Y. Wang and L. Chen," Discriminative Attention-based Convolutional Neural Network for 3D Facial Expression Recognition," 2019 14th IEEE International Conference on Automatic Face Gesture Recognition (FG 2019), Lille, France, 2019, pp. 1-8, doi: 10.1109/FG.2019.8756524.

[4] M. M. Rahman, M. M. H. Manik, M. M. Islam, S. Mahmud and J. -H. Kim," An Automated System to Limit COVID-19 Using Facial Mask Detection in Smart City Network," 2020 IEEE International IOT, Electronics and Mechatronics Conference (IEMTRONICS), Vancouver, BC, Canada, 2020, pp. 1-5, doi: 10.1109/IEMTRONICS51293.2020.9216386

[5] T. Meenpal, A. Balakrishnan and A. Verma," Facial Mask Detection using Semantic Segmentation," 2019 4th International Conference on Computing, Communications and Security (ICCCS), Rome, Italy, 2019, pp. 1-5, doi: 10.1109/CCCS.2019.8888092. 16 IOT-based System for COVID-19 Monitoring at Grocery Shop

[6] R. Rosnelly, M. S. Simanjuntak, A. Clinton Sitepu, M. Azhari, S. Kosasi and Husen," Face Recognition Using Eigenface Algorithm on Laptop Camera," 2020 8th International Conference on Cyber and IT Service Management (CITSM), Pangkal, Indonesia, 2020, pp. 1-4, doi: 10.1109/CITSM50537.2020.9268907.

[7] Medapati, P. K., Tejo Murthy, P. H. S., Sridhar, K. P. (2019). LAMSTAR: For IoT-based face recognition system to manage the safety factor in smart cities. Transactions on Emerging Telecommunications Technologies. doi:10.1002/ett.3843

[8]] A. Das, M. Wasif Ansari and R. Basak," Covid-19 Face Mask Detection Using TensorFlow, Keras and OpenCV," 2020 IEEE 17th India Council International Conference (INDICON), New Delhi, India, 2020, pp. 1-5, doi: 10.1109/INDICON49873.2020.9342585.

[9] X. Kong et al.," Real-time Mask Identification for COVID-19: An Edge Computing-based Deep Learning Framework," in IEEE Internet of Things Journal, doi: 10.1109/JIOT.2021.3051844.

[10] Gao, G., Yu, Y., Yang, M., Chang, H., Huang, P., Yue, D. (2020). Cross resolution face recognition with pose variations via multilayer locality constrained structural orthogonal Procrustes regression. Information Sciences, 506, 19–36. doi: 10.1016/j.ins.2019.08.004