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A Review on Face Mask Detection

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Abstract: *In this review paper, we have a study of machine learning strategies to see a face mask. The new Corona virus (COVID-19) is very dangerous it has touched the earth. At the end of November 2021, the global number is new Corona virus cases already exceeded 29.9 cr and death toll was 45,50,000 according to the World Health Organization (WHO) information. Limiting The spread of this disease, mandatory face-mask rules are now common e global community settings. In addition, many public service providers requires customers to wear a face mask in accordance with pre-defined rules (e.g., mouth and nose) when using public services. These events research-based research on automated (computer-based) face-based techniques detection that can help monitor public behavior and contribute to prevention the COVID-19 epidemic. Although research available in this area has led to ineffective face mask techniques, these often work under the idea that modern face masks provide complete visual performance (even with a covered face) and that the main purpose of the strategy is to gain presence only face masks.*
Key Word*: Covid-19; Discovery; Face mask; Face Recognition; Neural Network*

I.INTRODUCTION

In December 2019, a new and worryingly contagious primary atypical (viral) pneumo- nia broke out in Wuhan, China. The new disease, called COVID-19, was later found to be caused by a previously unknown zoonotic coronavirus, named SARSCoV-2. To help limit the spread of this new coronavirus, the World Health Organization (WHO), medical experts as well as governments across the world now recommend that people wear face-masks if they have respiratory symptoms if they are taking care of the people with symptoms or otherwise engage frequently with larger groups of people [1–4]. In response to these developments, research in face mask detection has attracted the attention of the computer vision community recently and initiated efforts towards developing automatic detection Appl. Sci. 2021, 11, 2070 2 of 24models that can help society (through monitoring, screening, and compliance-assessment applications) containing the COVID19 pandemic. Face-mask detection represents both detections as well as a classification problem because it requires first the location of the faces of people in digital images and then the decision of whether they are wearing a mask or not. The first part of this problem has been studied extensively in the computer vision literature, due to the broad applicability of face-detection technology. The second part, on the other hand (i.e., predicting whether a face is masked or not), has only gained interest recently, in the context of the COVID-19 pandemic. Although a considerable amount of work has been done over the last year on this part, it typically only tries to detect whether a mask is present in the image. No special attention is given to whether the masks are properly placed on the face and are, hence, worn in accordance with the recommendations of medical experts. This limits the application value of existing face-mask detection techniques and warrants research into computer vision models capable of not only detecting the presence of facial masks in images but also of determining if the masks are worn correctly.

II. LITERATURE REVIEW

In 2021, A proposed system to examine the Physical Distance and Mask Wearing on face of building Workers in COVID-19 Pandemic [1] was developed a computer vision software to recognize face masks that automatically wear violations and the physical distance between construction workers, to provide protection for the infrastructure projects during the pandemic. The document collected and annotated 1,000 images for facial mask recognition, including different ways of wearing a facial mask, and added them to a dataset of 1853 previously available face mask data. The Faster RCNN Inception ResNet V2 network provided 99.8 percent accuracy, and several state of the art In 2021, A proposed system to examine the Physical Distance and Mask Wearing on face of building Workers in COVID-19 Pandemic was developed a computer vision software to recognize face masks that automatically wear violations and the physical distance between construction workers, to provide protection for the infrastructure projects during the pandemic. The document collected and annotated 1,000 images for facial mask recognition, including different ways of wearing a facial mask, and added them to a dataset of 1853 previously available face mask data. The Faster R-CNN Inception ResNet V2 network provided 99.8 percent accuracy, and several state of the art In 2021, A proposed system to examine the Physical Distance and Mask Wearing on face of building Workers in COVID-19 Pandemic [1] was developed a computer vision software to recognize face masks that automatically wear violations and the physical distance between construction workers, to provide protection for the infrastructure projects during

the pandemic. The document collected and annotated 1,000 images for facial mask recognition, including different ways of wearing a facial mask, and added them to a dataset of 1853 previously available face mask data. The Faster RCNN Inception ResNet V2 network provided 99.8 percent accuracy, and several state of the art model Tensorflow object recognition models have been developed and tested in a facial dataset. For physical identification of distance people, the paper used Quicker R-CNN Inception V2. The effect of the camera angle on the distances of the points on the imagery is removed using a transformation matrix. For measuring the actual distance between entities, the Euclidian distance used the transformed image pixel. A threshold of six feet has been believed to capture the physical distance infringement. The paper also used transition education to teach the model. Four road maintenance videos in Houston, Texas, were applied to the final model, which successfully sensed the face mask and physical distance. In 2020, chavda et al. proposed a face mask detection using Multi-Stage CNN Architecture has been exposed that wearing a face mask reduces the risk of infectious infection strategy manually is not feasible. We are implementing a technology focused on Deep Learning that can classify situations where face masks are not used properly. The system made up of a convolution Neural Network (CNN) dual stage Masked and unmasked faces can be identified by the architecture and can be combined with pre-installed CCTV cameras. It will help monitor safety breaches, facilitate the use of face masks and maintain a safe working environment.

III.CONCLUSION

Over the period there have been many advancements in the deep learning towards object detection and recognition in various application domains (27,18]. In general, most of the works focus on image reconstruction and face recognition for identity verification. But the main aim of this work is to identify people who are not wearing masks in public places to control the further transmission of COVID-19. Bosheng Qin and Dongxiao Li (22) have designed a face mask identification method using the SRCNet classification network and achieved an accuracy of 98.7% in classifying the images into three categories namely "correct facemask wearing", "incorrect facemask wearing" and "no facemask wearing". Md. Sabbir Ejaz et al. [7] implemented the Principal Component Analysis (PCA) algorithm for masked and unmasked facial recognition. It was noticed that PCA is efficient in recognizing faces without a mask with an accuracy of 96.25% but its accuracy is decreased to 68.75% in identifying faces with a mask. In a similar facial recognition application, Park et al. (12) proposed a method for the removal of sunglasses from the human frontal facial image and reconstruction of the removed region using recursive error compensation. Li et al. [14] used YOLOv3 for face detection, which is based on deep learning network architecture named darknet-19, where WIDER FACE and Celebi databases were used for training, and later the evaluation was done using the FDDB database. This model achieved an accuracy of 93.9%. In a similar research, Nizam et al. [6] proposed a GAN based network architecture for the removal of the face mask and the reconstruction of the region covered by the mask. Rodriguez et al. [17] proposed a system for the automatic detection of the presence or absence of the mandatory surgical mask in operating rooms. The objective of this system is to trigger alarms when a staff is not wearing a mask. This system achieved an accuracy of 95%. Javed et al. [13] developed an interactive model named MRGAN that removes objects like microphones in the facial images and reconstructs the removed region's using a generative adversarial network. Hussain and Balushi [11] used VGG16 architecture for the recognition and classification of facial emotions. Their VGG16 model is trained on the KDEF database and achieved an accuracy of 88%. Following from the above context it is evident that specially for mask detection very limited number of research articles have been reported till date whereas further improvement is desired on existing methods. Therefore, to contribute in the further improvements of face mask recognition in combat against COVID19.

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