Wearable Face Mask Recognition System

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Abstract: COVID-19 outbreak has put the whole world in an unprecedented difficult situation bringing life around the world to a frightening halt and claiming thousands of lives. because of COVID-19's spread in 212 countries and territories and increasing numbers of infected cases and death tolls mounting to five,212,172, and 334,915 (as of May 22, 2020), it remains a true threat to the general public health system. This paper renders a response to combat the virus through AI (ai). Some deep learning (dl) methods are illustrated to realize this goal, including generative adversarial networks (gans), extreme learning machine (elm), and long /short term memory (L/STM). It delineates an integrated bioinformatics approach during which different aspects of data from a continuum of structured and unstructured data sources are put together to make user-friendly platforms for physicians and researchers. the foremost advantage of those ai-based platforms is to accelerate the tactic of diagnosis and treatment of the COVID-19 disease. the foremost recent related publications and medical reports were investigated to settle on inputs and targets of the network which may facilitate reaching a reliable artificial neural network-based tool for challenges associated with COVID-19. Furthermore, there are some specific inputs for every platform, including various sorts of data, like clinical data and medical imaging which may improve the performance of the introduced approaches toward the sole responses in practical applications.

Keywords— COVID-19, AI-Based Platforms, Disease, ANN-Based Tool, User-Friendly

I . INTRODUCTION

Since the last days of the previous year, the occurrence of novel infectious flu-like respiratory disease COVID-19 caused by the SARS-Cov-2 virus (also mentioned as coronavirus) has affected almost every aspect of people's lives globally. First, it had been discovered in China but spread quickly to other continents in only a couple of weeks[1].

According to [1], until July 11th, 2020, the entire number of identified cases was 12,653,451, while taking 563,517 lives worldwide. Common symptoms of coronavirus disease include fever, tiredness, pharyngitis, nasal congestion [2], loss of taste and smell [3].

In most cases, it's transmitted directly (person to person) through respiratory droplets, but also indirectly via surfaces [4],[5].

Despite the actual undeniable fact that the pandemic seemed weaker at some points, most safety regulations are still applied thanks to unstable situations. From workplace behaviour to social relations, sport, and entertainment, coronavirus disease poses many changes to our everyday routine, habits, and activities. during this paper, an economical IoT-based system going to help organizations respect the COVID-19 safety rules and guidelines to reduce the disease spread is presented. We specialize in the foremost common indoor measures - people with high blood heat should occupy home, wearing the mask is obligatory and j-distance between persons should be a minimum of 1.5-2 meters. For the first scenario, the Arduino Uno microcontroller1 board with contactless temperature sensor is used, while we believe Raspberry Pi2 single-board computer equipped with the camera making use of computer vision techniques for the opposite two scenarios. We decided to use these devices because of their small size and affordability.

II. LITERATURE SURVEY

1.IoT-based System for COVID-19 Indoor Safety Monitoring

T. Galbadage, B. Peterson, R. Gunasekera et. al., have proposed a way of literature survey. Several existing works contain a variety of the weather relevant to the work presented during this paper. However, to the simplest of our knowledge, there's no such solution covering these aspects together to realize this goal while allowing execution on low-cost IoT devices at an equivalent time.

A dataset for masked face recognition is introduced and its application by different algorithms within the context of campus and enterprise coronavirus prevention is discussed [1].

2. Masked Face Recognition Dataset and Application.

Z. Wang et al. have proposed a way of literature survey. during a high-accuracy method for facial mask detection using semantic segmentation supported fully convolutional networks, gradient descent, and binomial cross-entropy was presented. However, performance-wise, it's too heavy for low-power IoT devices, like Raspberry Pi [2].

3. Facial Mask Detection using Semantic Segmentation

T. Meenpal, A. Balakrishnan, A. Verma, have proposed a way of literature survey. super pixel segmentation is usually parameter-dependent and doesn't provide much insight about the segment except providing a perceptually consistent area. Semantic segmentation algorithms provide much detailed information about segments/pixels, however, they're generally supervised and need a considerable amount of coaching data [3].

4. Masked Face Recognition Using Convolutional Neural Network

Md. Sabbir Ejaz; Md. Rabiul Islam et. al, have proposed a way of literature survey. during this paper, Artificial neural networks require processors with multiprocessing power, by their structure. For this reason, the assumption of the equipment depends. Also, there's no specific rule for determining the structure of artificial neural networks. the acceptable network structure is achieved through experience and trial and error [4].

5. Design of a Deep Face Detector by Mask R-CNN

Ozan Cakiroglu; Caner Ozer; Bilge Gunsel et. al., have proposed a way of literature survey. during this paper, the most drawback of R-CNN is that's slow. it's mainly due to the Convent aerial of each object proposal. There are about 2000 object proposals generated from each image. SPP-Net solves this issue because it computes the feature map of the whole image then embedding ROI proposals to those feature maps through ROI projection. [5].

III. EXISTING SYSTEM

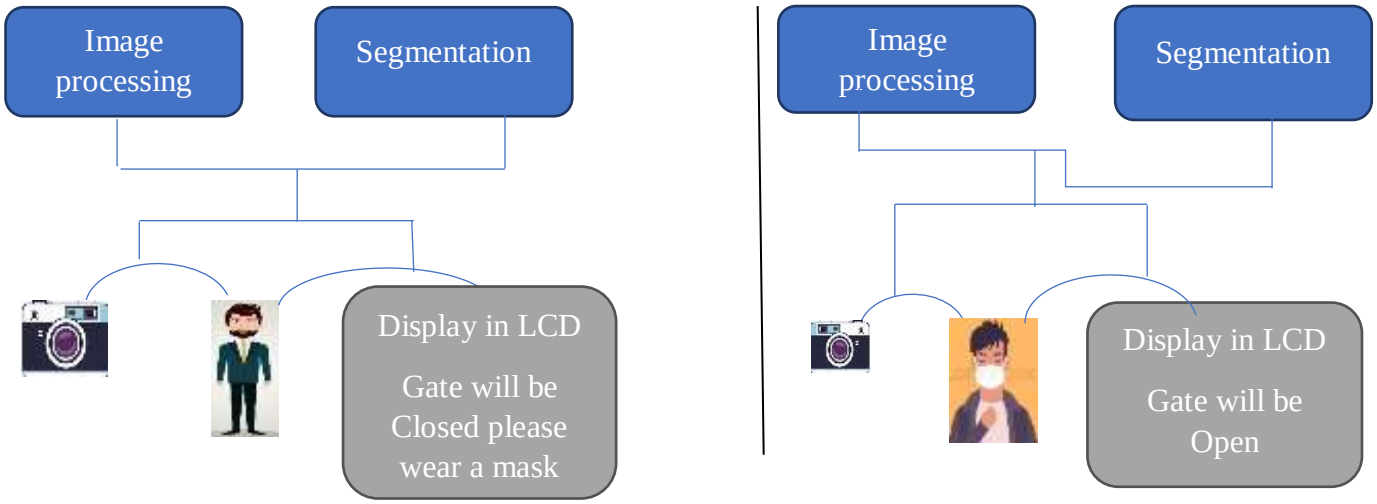
Within the previous systems, some were implemented using ML or AL neutral networks or image processing but the sole issue is that of the camera positioning.
In the existing system the implementation has done by Machine learning but there the camera position has got to be steady to capture the actual person then it had been not giving an accurate result and was giving garbage values

IV. PROBLEM STATEMENT

Nowadays, humans face the COVID-19 pandemic, due to that survival of the citizenry gets difficult. we've to think for precautionary major, it's impossible that at every place one person is present to require care or for observation of individuals that are they following all precautionary major. to beat this problem we are come up with the answer of a wearable mask recognition system to creating human life fearless and safe.

V. PROPOSED SYSTEM

This system is specially created by taking into consideration the pandemic situation which is going on in the world, but this is a necessity in every situation too by taking into consideration the current era's deteriorating health situation. Through our system humans will be able to keep it mandatory to wear a face mask, & If the person is not wearing the mask then he/she will not be able to allowed inside the company, shop, or any other place. Due to the flexible cost and easy implementation of the system, it is very easy to implement the particular project in any system easily & effectively.



Person Who Not Wearing Mask Will Not Allowed Person Who Wearing Mask Will Allowed

Figure 1: Architecture of Proposed System

VI. ALGORITHM DETAILS

Step I:- Image is Found. Now, On that image processing is applied. The algorithm which is being used is as follows.
Step II:- From the dataset, we can store the images & then start the processing. This processing changes particular images into grayscale images into binary forms that are the form of 0 & 1. Here, '0' indicates the black colour. '1' indicates the white colour.
Step III:- We consider as the space of gray levels, the set E=(-1,1).
Step IV:- Now, We convert this grayscale image into the morphological image[2].
Step V:- The structure of vector space defined for set F(D, E) allows us to translate the notion of contrast from the classical framework. We will note pi=(xi, Yi), the pairs of coordinates that outline the spatial position of a pixel in a picture [3].

VII. CONCLUSION

According to the achieved results, the proposed solution is employed for its purpose under certain performance limitations (such because the number of processed frames of measurements per second). Moreover, it relies on both open hardware and free software, being a particular and desirable advantage for such systems. within the future, it's planned to experiment with various deep learning and computer vision frameworks for object detection on Raspberry Pi to understand higher framerate. Moreover, we'd wish to increase this solution with environment sensing mechanisms for adaptive building air-con and ventilation airborne protection to reduce the spread of coronavirus indoors [4], especially during summer. Finally, the last word goal is to integrate the system presented during this paper with our framework for efficient resource planning during an epidemic crisis to enable efficient security personnel scheduling and mask allocation, alongside risk assessment supported statistics about respecting the security guidelines and air quality.

VIII. REFERENCES

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