The Face Mask & Oxygen Level Detection With Sanitization Entry System For Preventing Spread of Covid-19 Virus

Munmun Kakkar[1], Bhavana Shinde[2], Samyaka Telang[3], OmkarMantake[4]

[1]Assistance professor, Dept of Electronics and telecommunication and Engineering

[2, 3, 4]Dept of Electronics and telecommunication and Engineering

[1, 2, 3, 4]Dr. D.Y. Patil Institute of Engineering Management & Research, Akurdi, Pune – 44

Abstract- *In view of the current pandemic and the rapid spread of the COVID-19 virus along with its variants like Delta & Omicron viruses resulted in serious health issues among people. Thus, there needs to be a proper system in place to detect COVID-19 symptoms & stop the spread of the disease. In this paper, we propose a system that is basically an entry system that grants access only if the user satisfies all the requirements. The condition consists of three steps which include the detection of a face mask, determining the oxygen content of the blood and sanitizing the hands. If these conditions are met, the individual will be allowed access to the premises. In any case, the user will be notified if the requirements are not met. This is an entirely contactless & automatic method for monitoring a user. As the entire setup is automated, it reduces both time & labour. The ultrasonic sensor detects the presence of the user; the python code utilizing Tensorflow, OpenCv and Imutils packages will detect the presence of mask on user's face. The MAX30100 is a pulse oximeter sensor used to measure the blood oxygen level in the human body. Additionally, to avoid manual contact, the proposed system involves a sanitiser dispenser in such a way that there is no contact required between the nozzle and the user hand.*

Keywords- COVID-19, Pandemic, Alert system, Face Mask Detection, Hand sanitizer, Pulse-Oximete Sensor, Raspberry Pi, TensorFlow, Imutils, OpenCV.

I. INTRODUCTION

The COVID-19 pandemic which is also known as the Novel Corona Virus. It is an infectious disease caused by the SARS-CoV-2(Severe Acute Respiratory Syndrome Corona virus -II& has led to a huge loss of human life worldwide. People who are affected by this disease will experience a mild to moderate respiratory illness, also this virus can spread from an infected person's mouth or nose in the form of a small liquid droplets when they cough, sneeze, speak, sing or breathe. The World Health Organization (WHO) provided instruction in order to prevent the virus such as obligatory face

mask wear, rigorous social distancing in public place and regular hand washing or sanitizing by using disinfectants. According to research it is found that using face mask at public places is necessary to inhibit viral propagation. The use of face masks prevents this disease from reaching the respiratory system of humans. Also one of the symptoms of the corona virus is low blood-oxygen level in a person. Therefore we have designed an entry system which detects whether a person is wearing a face mask or not, also whether the face mask is in proper position or not. Our proposed system also detects the blood oxygen level of the person. If this two conditions are not satisfied the person is not only alerted but also not allowed entry in the premises.Furthermore to avoid manual contact, our proposed system also involves an automatic hand sanitizer dispenser in such a way that there is not contact between the nozzle and human hand. It is fully automated, contactless, hand sanitizer dispenser with alert system. Our goal is to build a fully automatic & contactless entry system for user evaluation which is used to prevent the spread of virus.
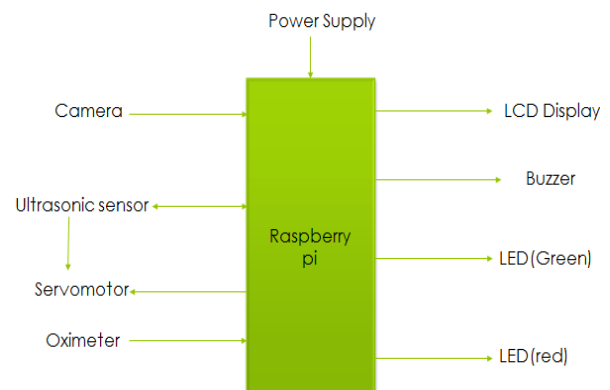

BLOCK DIAGRAM OF PROPOSED SYSTEM

II. METHODOLOGY

The proposed method consists of three models such as mask detection, hand sanitization & the oxygen detection.

The present proposed prototype is basically is an entry system that allows the person only if the person passes the above three steps. The three steps includes: mask detection, blood-oxygen level detection and the hand-sanitizer. An ultrasonic sensor is used to detect the presence of person. Immediately after detecting the presence of the user, the python code utilizing Tensorflow, OpenCV, and imutils packages will detect the mask. The raspberry pi microcontroller is programmed using the python programming language. They read input from sensors and convert it into output based on the program.

The Python code uses Tensor Flow, OpenCV and imutils packages to detect whether or not a user is wearing a face mask when they approach your webcam. The setup begins with a detection of face mask. Open CV is an open source software library for processing real-time image and video with machine learning capabilities. Imutils is a set of convenience functions designed to speed up OpenCV computing on the Raspberry Pi.Tensor flow is an open source machine learning platform. If a face mask is not worn, a message will display "Face Mask Detection Failed!!" and it shows the steps to move forward in the process. If a face mask is worn, the user will see a message such as "Face Mask Detection Success!!". On other hand, users wearing a face mask will be informed with the text, *"Thank you. Mask Face Mask Detection Successful.".* Once the mask detection completed the next step in the process is the hand sanitization, the user has to go through the hand sanitization in order to enter into the final stepof the procedure. As soon as the user completes the above two steps i.e mask detection and hand sanitization the next and the last step is pulse oximeter detection. A pulse oximeter is a non-invasive device to measure a person's oxygen saturation. The oxygen saturation is measured at the periphery, like at the fingertips or earlobes. The device consists of a red LED, an infrared emitter, and a photodiode to detect the light absorbed by oxygenated and deoxygenated haemoglobin. The ratio of oxygenated haemoglobin to the total number of haemoglobin gives us oxygen saturation. Any value between 95% to 100% is a reading that is expected in a normal person. If the blood – oxygen level of a user is detected below the normal level i.e below 95% then the entry of the user will be prohibited with a note or a text "Your SPO2 level is below 95%. Kindly take consultation from your doctor." On other side, if the condition of the blood – oxygen level is satisfied then he/she will be able to enter into premises.
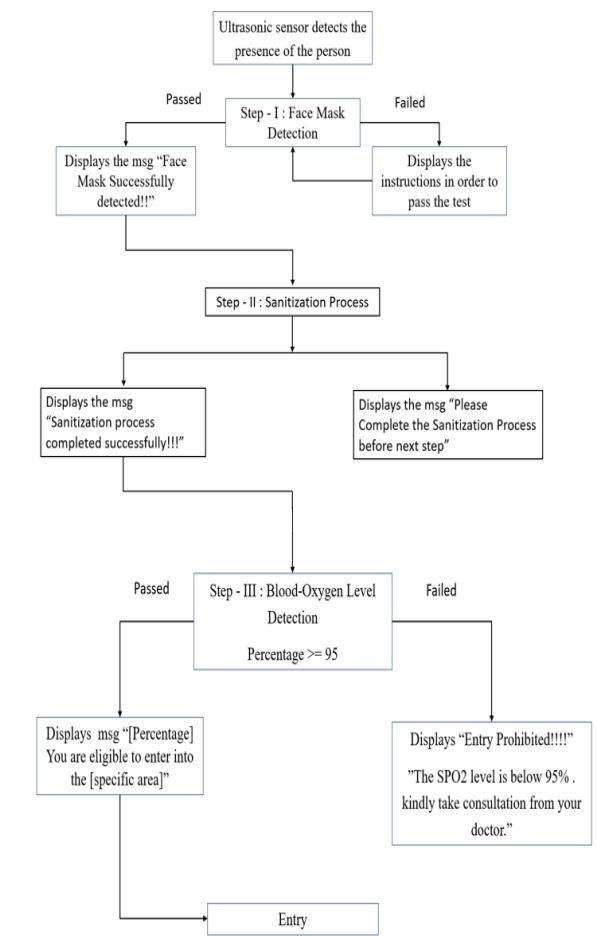
FLOWCHART OF PROPOSED SYSTEM

III. CONCLUSION AND FUTURE DEVELOPMENT

The system is a three step evaluation process which helps us to detect the presence of mask on the users face also it help us to measure one of the basic yet important symptom of Covid -19 which is Blood- oxygen saturation level of an individual which not only alerts the associated authority of the potential carriers with the required information but also doesn't allow to enter the user into the premises. Automatic Hand-sanitization with alert system is also included in the system which not only helps to sanitize the user but also alerts the nearby officials if the liquid inside the sanitization bottle is below the threshold level. The Hand sanitization process is fully automatic & contactless. It can be used for future reference. The above system helps us thoroughly to ensure safety with little to no involvement of people and also, it grants entry to the user only if he/she passes the 3 steps of evaluation. The acquiring of information is automated which ultimately saves time & labour. Prevention from virus begins right here with this three step evaluation process.

IV. ACKNOWLEDGEMENT

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