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Review on Face Mask Detection and Contactless Temperature Scanning Using Raspberry Pi with Sanitization

Rudrani Bhausaheb Mate[1]

1Department of Electronics & Telecommunication Engineering, DIEMS, BATU University, Lonere (M. S) India

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Abstract – In India the first step to detect COVID virus is by scanning for fever in early time. Also we need to monitor every people for a mask and temperature check. Also we have temperature measuring systems for every entrance for scanning and measuring but manual temperature scanning has a lot of disadvantages. There is some kind of human error in reading values. So Many times people are aloud from entry even after higher temperature readings and also no masks at the public spot. The temperature reading is avoided by the checking person if supervisors are not watching at that time. So manually scanning system is not suitable for large crowds. To solve and avoid t this problem we here propose a fully automated temperature, mask scanner and entry provider system are introduce. This is a multipurpose system that has a wide range of applications. The system makes use of a contactless temperature measuring and a face mask monitor with the barrier system. The scanner is connected directly with a human barrier to bar entry if high temperature or no mask is detected at the public spots.

The effect of COVID-19 has been fallen on practically all areas of advancement. The medical services are going through an emergency. Various types of automation systems are develop to avoid sickness where wearing a mask is one of them. In this system we have used ML, Open CV and Tensor Flow to recognize face masks. This Model can be utilized for security purposes since it is very resource efficient to deploy process.

Key Words: COVID-19, Face mask detection, Machine learning, Raspberry Pi, Sensors, Temperature detection, Tensor Flow, open CV, python, camera and LCD

1. INTRODUCTION

Everyone has been affected by the COVID-19 corona virus epidemic on a global scale. It crippled the profitable growth of the entire nation around the world. Corona virus complaint 2019 (COVID-19) is an arising respiratory complaint caused by severe acute respiratory pattern corona virus 2 or SARS-CoV2. As of June 10, 2020, the contagion reached nearly eight million infected cases and half a million failed from the contagion. To combat the transmission of the contagion (4), there are executed protocols set by the World Health Organization (WHO) like mandatory wearing of face masks, observing strict social distancing in public places, and washing of hands or sanitizing hands with detergents constantly. There are studies conducted that wearing a facemask is important to help the spread of the contagion. Research studies show the effectiveness of N95 and surgical masks in precluding contagion transmission are 91 and 68 independently. Wearing these masks will effectively disrupt airborne contagions so that similar infections can't reach a mortal being's respiratory system and it's an affordable way to alleviate losses and respiratory infection diseases. Nonetheless, the efficacy of facemasks in precluding complaint transmission in the public has generally been lessened due to shy facemask use. It's essential to develop an automatic discovery for wearing facemask which will give individual protection and help the original epidemic.

Fig1: Real time face mask detection

Raspberry Pi is designed as a Chip System (SoC) where the critical circuits such as the Central Processing Unit (CPU), the Graphics Processing Unit (GPU), input, and output are carried by a single circuit board. The GPIO pins provide an essential element to help enable the RPi to be accessible to hardware programming for controlling electronic circuits and data processing on input/output devices. Add a power adapter, keyboard, mouse, and monitor that works on the Raspberry Pi in compliance with the HDMI connector. New models are available to interact via Wi-

Fi to the internet. The RPi can be run using the Raspbian operating system. It has a pre-installed Python programming language.

Fig2: Temperature & Flap barrier system

The photos are categorized as "mask" or "no mask also the MLX90614 sensor will be used to measure the temperature

2. Literature Review

In the literature, we found several face detection, hand sanitizer and thermal scanning system but with different approach and proposed solution. A. Kumar, A. Kaur, and M. Kumar [5] introduced the artificial face mask detection technique in simple form and low cost device proposed in the paper. Deep learning introduced in this paper. Hurriyatul Fitriyah [7] proposed automatic hand wash dispenser. So, everyone can wash their hands without touching machine and maintaining hygiene. N. H. Leung [10] proposed a layered face mask that how virus cannot enter in mouth and also solving breathing problem after wearing face mask. Need of wearing face mask proposed in the paper. Gade, R.; Moeslund [13] introduced thermal cameras for thermal screening and measuring temperature of body.

Due to the worldwide COVID-19 corona virus outbreak, the wearing of face masks in public is becoming more common. Before Covid-19, people wore masks to protect their wellbeing from air pollution. Some people conceal their feelings from the public by covering their faces [1], while others are self-conscious about their appearance. The most recent influenza virus to strike human health in the last century is COVID-19 (also known as corona virus)[2]. Face masks have been shown to help inhibit COVID-19 transmission by scientists. COVID-19 has been declared a global epidemic by the World Health Organization (WHO) in 2020 due to its rapid spread. In this paper, we present a mask face detection model that is focused on computer vision and deep learning [3]. Artificial Intelligence (AI) based on Machine Learning and Deep Learning will help to combat Covid19 in several ways. The proposed model can be used in conjunction with observation cameras to prevent COVID19 transmission by detecting people who aren't wearing face masks. Our project's goal is to create an infrared thermometer, which is a device that measures the emitted energy from an object's surface. For a broad range of uses, infrared thermometers are used in medical, manufacturing, and home environments. We discovered that infrared thermometers have three essential stages [4]. A sensing stage that converts IR radiation to an electrical signal, a signal conditioning stage that filters, amplifies, and laniaries the analogue signal, and a digital output stage that converts the analogue signal to a digital signal[5]. Hand sanitizers are generally regarded as an appropriate hand hygiene regime for hospitals, health-care settings, and other settings [6]. The COVID-19 epidemic, as we all know, wreaked havoc on the planet and altered our way of life[7]. In this case, alcohol and hand sanitizers are essential fluids, but they must be used correctly. When infected hands touch alcohol containers or hand sanitizers, the virus will spread to the next person. We will develop and implement a smart hand sanitizer dispenser in this research paper that uses an ultrasonic sensor to detect the presence of a hand, activates the first servo motor to pour the liquid on the hand, de-energizes the electromagnetic lock, and sends a signal to the second servo motor to open the entrance door immediately[8].

3. Body of Paper

This project presented a study on real-time facemask recognition with an alarm system through deep learning techniques by way of Convolution Neural Networks. This process gives a precise and speedily results for facemask detection. The test results show a distinguished accuracy rate in detecting persons wearing a facemask and not wearing a facemask. The trained model was able to perform its undertaking using the VGG-16 CNN model achieving a 96% result for

performance accuracy. Moreover, the study presents a useful tool in fighting the spread of the COVID-19 virus by detecting a person who wears a facemask or not and setting an alarm if the person is not wearing a facemask.

The integration of several models of CNNs and compare each model with the highest performance accuracy during training to increase the performance in detecting and recognizing people wearing facemasks is suggested. Also, the researchers recommend a different optimizer, enhanced parameter settings, fine-tuning and using adaptive transfer learning models.

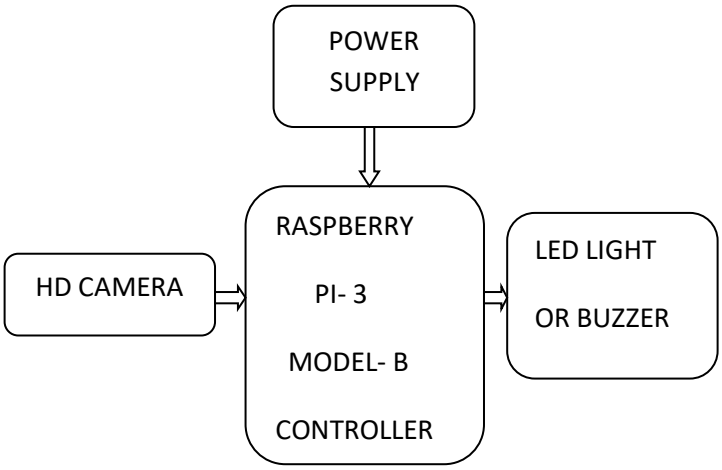

Fig3: Block diagram of Face mask detection system

This system can be used in offices, hospitals, airports, banks, sports facilities, the entertainment industry, restaurants and densely populated areas. This system aims to support society by reducing the spread of COVID19 and saving time. The system will work effectively in the current situation where the blockade has been relaxed and public meetings, malls, church meetings and school reopening is now possible. This automated control minimizes the number of personnel required for assembly inspections and is ready to use in all situations. In the fig. 1 below, each phase of the planned task is demonstrated graphically, also in fig. 2 and fig. 3 shows block diagram of the overall system.

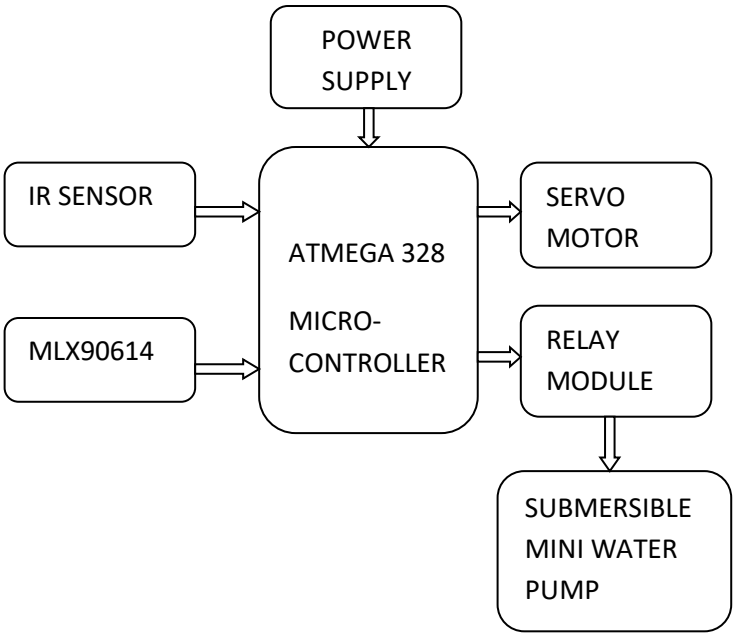

Fig4: Block diagram of Temperature, Sanitizer & Barrier System

4. CONCLUSIONS

The main goal of this project is to automate the Covid-19 protocol's manual work, check the temperature, and verify if anyone is wearing masks. This system can control the spread of the Covid19 virus and the temperature check will be more accurate than if done manually. Employee and student health and care needs do not have to be related to a particular management agency. Lack of attention from staff checks can also be addressed by this system. In the future, we will be able to further improve the accuracy of mask detection, and there is plenty of room for further development in our project for security systems and any other outbreak prevention. Using this project implementation, it will prevent people from getting effected by life-threatening situations which will help them to be safer. In summary, face mask, body temperature, sanitization and pulse sensing awareness helps to reduce the large collection of people in places without a mask and reduce the risk of infectious diseases.

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