IOT TECHNOLOGY BASED TEMPERATURE & MASK SCAN ENTRY SYSTEM

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ABSTRACT

Now many shops, offices and institutions are re-opening again after the Corona lockdown, many businesses are faced with the need to provide the best possible protection for their staff and customers. Face masks and body temperature checks play an important part in the protection effort. While this is already done routinely and at a large scale at airports or railway stations, many businesses and institutions are struggling to meet the challenge. Face mask monitoring often requires additional staff resources. At the same time, body temperature checks by staff come with certain risks in terms of hygiene and data privacy. In this system we proposed a fully automated temperature scanner and entry provider system. It is a multi-purpose system that has a wide range of applications. The system makes use of a contactless temperature scanner and a mask monitor. The scanner is connected directly with a human barrier to bar entry if high temperature or no mask is detected.

Any person will not be provided entry without temperature and mask scan. Only person having both conditions is instantly allowed inside. The system uses temperature sensor and camera connected with a raspberry pi system to control the entire operation. The camera is used to scan for mask and temperature sensor for forehead temperature. The raspberry processes the sensor inputs and decides whether the person is to be allowed. In this case the system operates a motor to open the barrier allowing the person to enter the premises. If a person is flagged by system for high temperature or no Mask the system glows the red light and bars the person from entry. This total operation controlled by raspberry Pi.

I. INTRODUCTION

Since the last days of the previous year, the occurrence of novel infectious flu-alike respiratory disease COVID-19 caused by SARS-Cov-2 virus (also known as coronavirus) has affected almost every aspect of people's lives globally. First, it was discovered in China, but spread quickly to other continents in just few weeks. According to , until July 11th, 2020, the total number of identified cases was 12,653,451, while taking 563,517 lives worldwide.

Common symptoms of coronavirus disease include fever, tiredness, sore throat, nasal congestion , loss of taste and smell . In most cases, it is transmitted directly (person to person) through respiratory droplets, but also indirectly via surfaces . Incubation period could be quite long and varies (between 14 and 27 days in extreme cases) . Furthermore, even asymptomatic persons (almost 45% of cases) can spread the disease making the situation even worse. Therefore, the usage of face masks and sanitizers has shown positive results when it comes to disease spread reduction . However, the crucial problem is the lack of approved vaccine and medication .

Due to these facts, many protection and safety measures were taken by governments in order to reduce the disease spread, such as obligatory indoor mask wearing, social distancing, quarantine, self-isolation, limiting citizens' movement within country boarders and abroad, often together with prohibition and cancellation of huge public events and gatherings. Despite the fact that the pandemic seemed weaker at some points, most of safety regulations are still applied due to unstable situation. From workplace behavior to social relations, sport and entertainment, coronavirus disease poses many changes to our everyday routine, habits and activities.

In this paper, cost-effective IoT-based system aiming to help organizations respect the COVID-19 safety rules and guidelines in order to reduce the disease spread is presented. We focus on most common indoor measures - people with high body temperature should stay at home, wearing mask is obligatory and distance between persons should be at least 1.5-2 meters. For the first scenario, Arduino Uno microcontroller1 board with contactless temperature sensor is used, while we rely on Raspberry Pi2 single-board computer equipped with camera making use of computer vision techniques for other two scenarios. We decided to use these devices due to their small size and affordability.
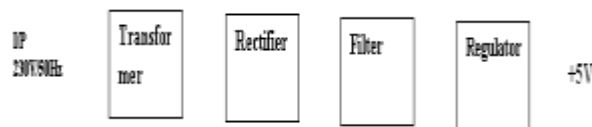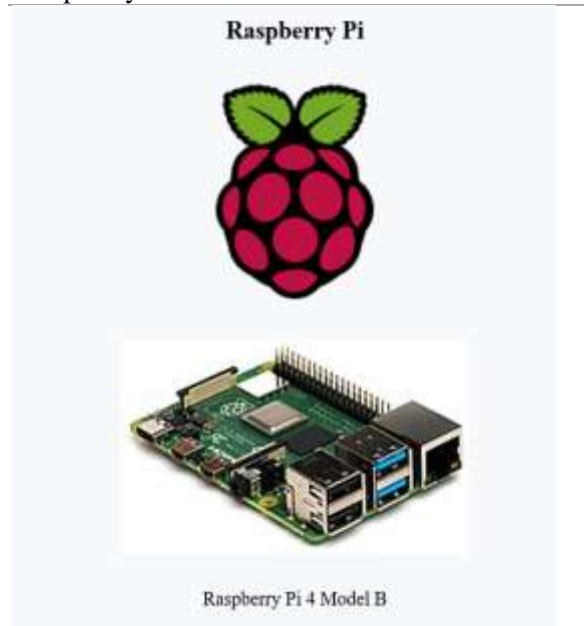
II. POWER SUPPLY:

Figure: Power Supply
III. HARDWARE
Raspberry Pi

Raspberry Pi 4 Model B

LCD (Liquid Cristal Display)
A liquid crystal display (LCD) is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. Each pixel consists of a column of liquid crystal molecules suspended between two transparent electrodes, and two polarizing filters, the axes of polarity of which are perpendicular to each other. Without the liquid crystals between them, light passing through one would be blocked by the other. The liquid crystal twists the polarization of light entering one filter to allow it to pass through the other.

A program must interact with the outside world using input and output devices that communicate directly with a human being. One of the most common devices attached to an controller is an LCD display. Some of the most common LCDs connected to the contollers are 16X1, 16x2 and 20x2 displays. This means 16 characters per line by 1 line 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.

L293D

L293D is basically a high current dual motor driver/controller Integrated Circuit (IC). It is able to drive load having current up to 1A at the voltage ranging from 4.5V to 36V. Motor driver usually act as current amplifier because they receive a low current signal as an input and provides high current signal at the output.

Motors usually operates on this higher current. L-293D has to builtin H-Bridge driver circuits and is able to control two DC motors at a time in both clockwise and counter clockwise direction. It has two enable pins and they should be kept high in order to control the motor. By changing the polarity of applied signal motor can be rotated in either clockwise or counter clockwise direction. If L 293D enable pin is high, its corresponding driver will provide the desired out. If the enable pin is low, there will be no output. L-293D has different features including internal ESD protection, large voltage supply range, large output current per channel, high noise immunity input etc. L 293D plays a vital role in electronics era and has several different applications e.g relay drivers, DC motor drivers, stepping motor drivers etc. The further detail about L 293D motor driver/controller will be given later in this tutorial.

Introduction to L293D

L293D is basically a motor driver or controller. It has two builtin H-bridge circuits which are able to control two DC motors simultaneously in both clockwise and counter clockwise direction. It acts as an current high amplifier because it take low current signal at its input and provides higher current signal at the output in order to drives different load e.g stepper motor & DC motors. Its features include large inpu voltage supply range, large output current high noise immunity input signals etc. Its common real life applications include stepping motor drivers, relay drivers, DC motor drivers etc. L-293D motor driver/controller is shown in the figure given below.
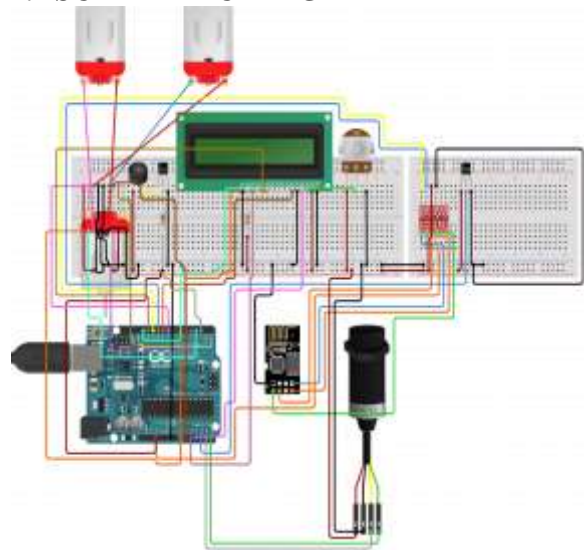

IV. Result:

4.1 BLOCK DIAGRAM
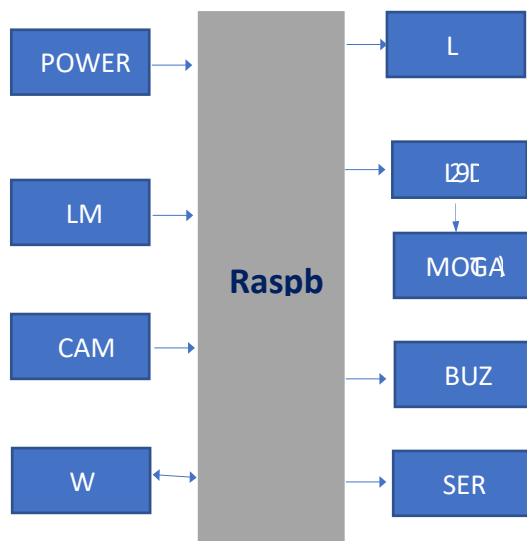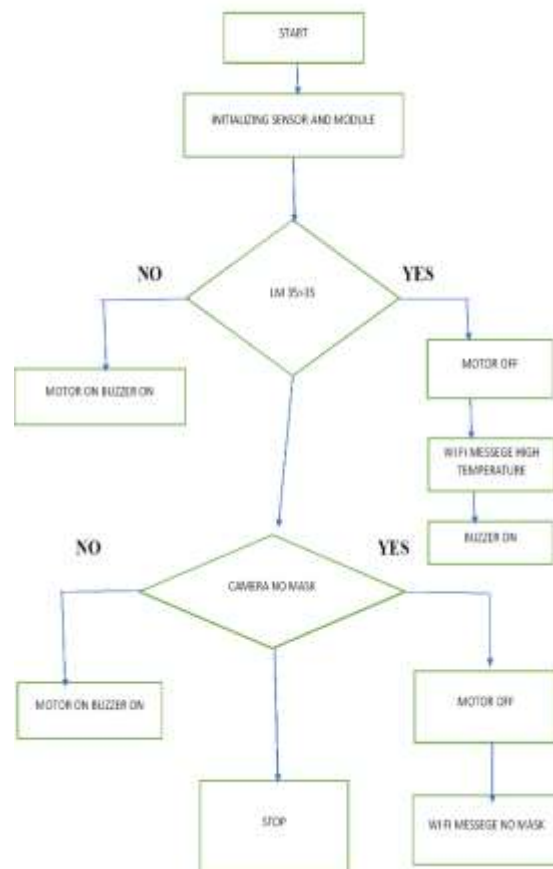

4.2 SCHEMATIC DIAGRAM

4.3 FLOWCHART

Working

If LM3 is greater than 35 then motor off message sends to wifi is temperature is high

buzzer on .when camera on mask then motor off message send to wifi module is no mask

V. CONCLUSION

According to the achieved results, the proposed solution is usable for its purpose under certain performance limitations (such as number of processed frames or measurements per second). Moreover, it relies on both open hardware and free software, being definite and desirable advantage for such systems.

In future, it is planned to experiment with various deep learning and computer vision frameworks for object detection on Raspberry Pi in order to achieve higher framerate. Moreover, we would like to extend this solution with environment sensing mechanisms for adaptive building air conditioning and ventilation airborne protection in order to reduce the spread of coronavirus indoors, especially during summer. Finally, the ultimate goal is to integrate the system presented in this paper with our framework for efficient resource planning during pandemic crisis in order to enable efficient security personnel scheduling and mask allocation, together with risk assessment based on statistics about respecting the safety guidelines and air quality.

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