SMART ENTRY FOR CORONA PROTECTION
A report on CSE316 Term Project

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1 Introduction

COVID 19 has made a huge impact on the society, one has to sanitize himself first to enter into a room in offices, shops, etc. along with regular temperature check at entrances of malls and offices is mandatory.

In this project, we demonstrate an entrance where two necessary precautions are taken.

- When the project tools detect motion it will check the temperature of the person. If the temperature is less than the set temperature(100^oC) the person is allowed to enter otherwise the entry access is denied.
- When a person enters into the room he has to sanitize his hands using the automated hand sanitizer.

2 Modules

2.1 Temperature Check[1]

2.1.1 Equipments

- **IR Temperature Sensor GY-906 MLX90614ES:** The MLX90614 is an infrared thermometer for non-contact temperature measurements. Both the IR sensitive thermopile detector chip and the signal conditioning ASIC are integrated in the same TO-39 can. Integrated into the MLX90614 are a low noise amplifier, 17-bit ADC and powerful DSP unit thus achieving high accuracy and resolution of the thermometer.
- **PIR Module HC-SR501:** The PIR Motion Sensor Detector Module HC SR501 allows you to sense motion. It is almost always used to detect the motion of a human body within the sensor's range. It is often referred to using "PIR", "Pyroelectric", "Passive Infrared" and "IR Motion" sensor. The module has an onboard pyroelectric sensor, conditioning circuitry, and a dome-shaped Fresnel lens. It has a delay time adjustment Potentiometer and sensitivity adjustment Potentiometer.
- **Micro Servo MG90S:** MG90S is a micro servo motor with metal gear. This small and lightweight servo comes with high output power, thus ideal for RC Airplane, Quadcopter or Robotic Arms.
- 16*2 LCD Display
- I2C Module
- LED Diode
- Wire
- Arduino Uno
- ATmega32a
- Breadboard
- Breadboard variable power supply

2.1.2 Circuit Diagram

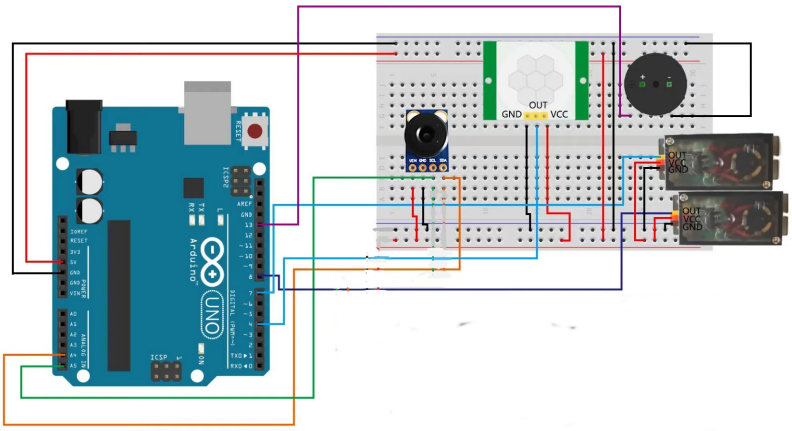

Figure 1: Motion Sensor and Temperature Sensor

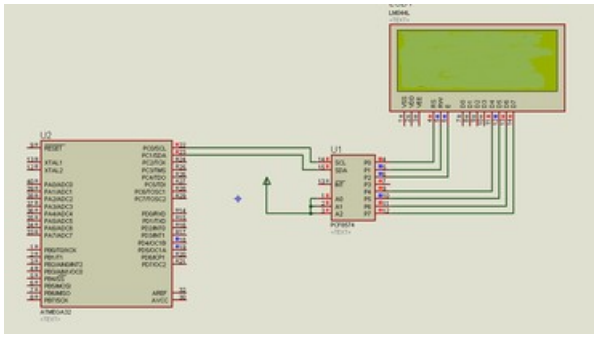

Figure 2: LCD Display interfacing with ATmega32a through I2C module[3]

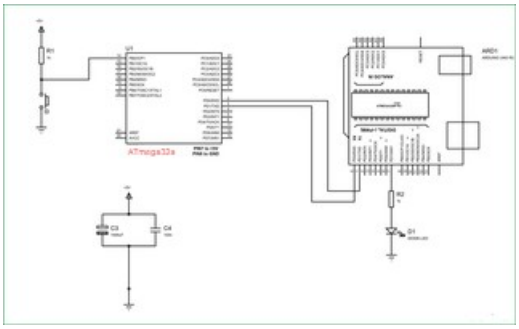

Figure 3: Arduino Uno interfacing with ATmega32a

2.1.3 Difficulties and Solutions

- We were unable to print anything in 16*2 LCD display though we tried every possible ways. We tried it with 3 different LCDs but in vain. At last, we interfaced our ATmega32a with Arduino Uno(ATmega328p) along with an I2C module to solve this issue.
- Our temperature sensor was not measuring accurate value of body temperature. So, we had to add an offset value to minimize the error.
- PIR module sensor is way too sensitive then we expected. It can even detect a fly in front of it and thus it activates the temperature sensor which is not supposed to happen. So, we set a lower limit of temperature for the door to open.

2.2 Automated Hand Sanitizer[2]

2.2.1 Equipments

- **Ultrasonic Distance Sensor HC-SR04:** This sensor provides 2cm to 400cm of non-contact measurement functionality with a ranging accuracy that can reach up to 3mm. Each HC-SR04 module includes an ultrasonic transmitter, a receiver and a control circuit. There are only four pins on the HC-SR04: VCC (Power), Trig (Trigger), Echo (Receive), and GND (Ground).
- Submersible water pump
- PNP transistor

- 5V Relay Switch
- Resistor(220,4.7k,1k)
- ATmega32a
- Hand Sanitizer
- Breadboard
- Wire
- LED
- Breadboard variable power supply

2.2.2 Circuit Diagram

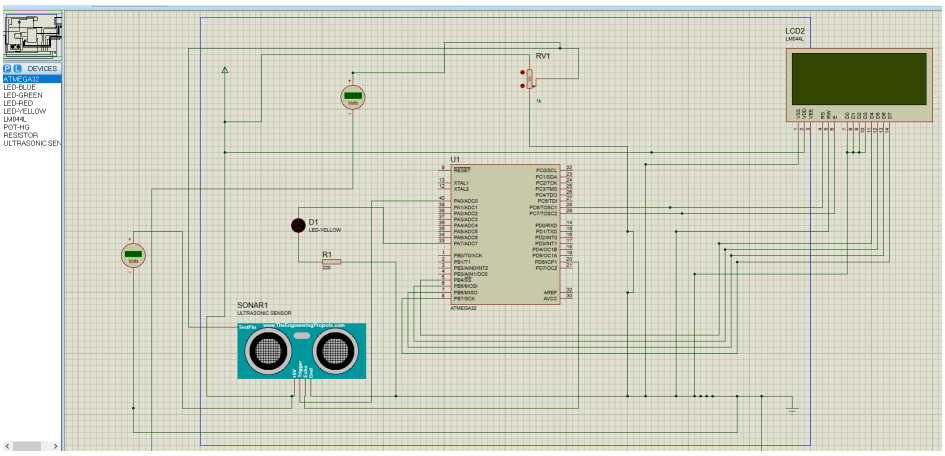

Figure 4: Automated Hand Sanitizer

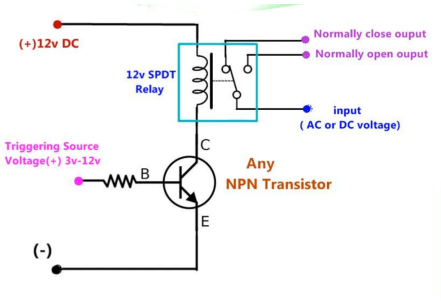

Figure 5: Relay swtich circuit diagram

2.2.3 Difficulties And Solutions

- Ultrasonic sensor is very voltage sensitive which means voltage above 5v may result in damaging the sensor.
- One needs to be very careful with variable power supply. Though it says it can take voltage upto 23v but we bursted one of our power supplies by giving it only 20v.
- The pump requires minimum 8v to work. But from ATmega32 we get maximum 5v output voltage which was insufficient to run the pump. To solve this issue we used 5v relay switch.[4]
- The switching voltage of relay switch was 5v. But from our ATmega32 we were not getting even 4v. To solve this issue, we used a PNP transistor.

References

[1] "How to make non-touch automatic door open-close body temp. detect system to avoid spreading covid-19." [Online]. Available: https://www.youtube.com/watch?v=XQoRMEcXAm0list=LLindex=5

[2] "Automatic hand sanitizer dispenser using arduino — covid-19 safety project." [Online]. Available: https://www.youtube.com/watch?v=6hASapzMa-olist=LLindex=7t=7s

[3] "Non-contact-temperature-monitoring-using-mlx90614." [Online]. Available: https://github.com/msuresh168/Non-contact-temperature-monitoring-using-MLX90614

[4] "Npn transistor based dc relay drive make — triggering source (+) voltage — method-1— power gen." [Online]. Available: https://www.youtube.com/watch?v=L530rN5W9owt=18s