

**IOT BASED CONTACTLESS TEMPERATURE MONITORING SYSTEM AND
TOUCHLESS HAND SANITIZER**

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Abstract

The design and development of a contactless temperature reading and touchless sanitizer dispensing is designed to prevent the spreading of infection. From COVID-19, The new restriction has been introduced like maintaining the social distance and allowed a number of users in public places, along with the temperatures checkup and sanitize the hands at entrances are mandatory. IR thermometer will sense the person's body temperature without any contact. Normally, Sanitizers are used by pressing the cap with hands, which probably increases the infection. RFID Tag is used to automatically store the details of the person and their temperature value who are entering the entrance. If the persons informations is normal then the persons are permitted to enter. If the temperature is higher than the expected then the buzzer will intimate and also sensed temperature value is displayed in the LCD displays. The sanitizer bottle is automatically filled by using the water level sensor. When the sanitizer level are too high or too low, MOSFET is used as a switch to automatically turn on the pump to refill the sanitizer again.

Keywords:- Automatic hand sanitizer, Water level sensor, covid-19, Buzzer, Sanitizer.

Introduction

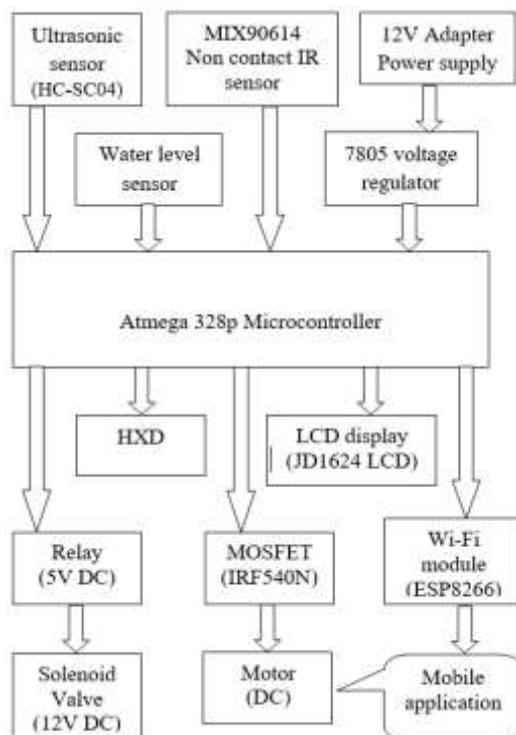
COVID-19 is an infection caused by SARS-CoV virus. Since 2019 the world is under tremendous tension. The COVID-19 situation need a frequent cleaning of hands with an alcohol-based hand sanitizer or with soap and water and temperature checkup for preventing COVID-19 infections.

Washing hand frequently with soap and water at all places were uncomfortable. Automatic sanitizer dispensers and touchless temperature checking are more user-friendly since they operate in a touch less manner and are 100 percent safe to use.

The non-contact automatic hand sanitizer dispenser and temperature checkup using controller, it has microcontroller atmega328p which is used to control the sanitizer flow with the help of the ultrasonic sensor, relay and solenoid valve, temperature is measured by the temperature sensor. This helped to power up the system by the external power supply or USB cable. RFID Tag is designed and it is used before the person enter into the gate. The Tag contains the person's information. The information and the temperature details are stored for references by using WiFi-Module. Sanitizer is automatically filled by using Motor with the help of water level sensor and MOSFET. If the sanitizer is low level the motor automatically fill the sanitizer bottle.

Methodology

In the case of corona pandemic situation ,the preventing measures for good hygiene and health are to wash our hands and sanitize the hands with the alcohol sanitizer. Nowadays in shopping Centre, factories and other places these systems are implemented. The system is comprised of two modules. The first module is automatic sanitizer dispenser by sensing the hand of the person. The second module is for checking the temperature using Touchless thermal sensor. The communication between thermal sensor and ATMEGA-328 is through the 12C communication.



Components

- ATmega328P
- Temperature sensor [MLX90614]
- Wi-Fi module -ESP8266
- Water Level Sensor
- LCD
- Ultrasonic sensor-HC-SR04
- Piezo Buzzer
- Solenoid valve
- Relay
- MOSFET(IRF540N)
- Motor(DC)
- Submersible Spray pump

LCD

LCD is a type of flat panel display which uses liquid crystals of light modulating properties. LCD displays the temperature and LED glows green, if the temperature is normal. LED glows red, if the temperature is high.

Temperature sensor [MLX90614]

The MLX90614 is a contactless infrared (IR) digital temperature sensor and it is used to measure the temperature of an object ranging from -70°C to 382.2°C . This uses infrared rays to measure the temperature without any contact of the object. The distance between the object and the sensor is 2cm-5cm (approx.)

ESP8266 Wi-Fi Module

An ESP8266 Wi-Fi module is a SOC microchip mainly used for the development of end-point IoT applications. It is referred to as a wireless transceiver and available at a very low cost. It is used to enable internet connection to the various applications of an embedded system.

Ultrasonic sensor [HC-SR04]

An ultrasonic sensor is an electronic device and it is used to measure the distance of the object by emitting ultrasonic sound waves and converting reflected sound into an electrical signal. Ultrasonic sensors have two main components, they are Transmitter (emits the sound using piezoelectric crystals) and the receiver (encounters the sound after it is travelled to and from the target).

Water level sensor

Water level sensor is used to gauge and manage sanitizer levels in a sanitizer container. The control panel is also programmed to automatically turn on a pump once the level get low and refill the sanitizer back to the adequate level.

MOSFET

MOSFET (Metal Oxide Semiconductor Field Effect Transistor) is widely used with the microcontroller for logic switching, speed control of motors. It is used for switching and amplifying electronic signals. So that MOSFET is used for switching purpose of the water level sensor. It has three terminals such as source, gate, and drain.

DC Motors

A DC motor converts direct current Water level sensor activate the motor automatically run when the sanitizer level become low or high. This de-energizes the MOSFET to deactivate the pump motor to stop the flow if the level become high. This energizes to activate the motor to start to filling the container if the level is low.

Buzzer

The buzzer is an audiodevice, it may be electromechanical or piezoelectric or mechanical type. Here, we use piezoelectric buzzer. It is used to identify when the person have a abnormal temperature. It produces a sound which will alert nearby Authorities if the temperature is high.

Solenoid valves

Solenoid valves are used automatically wherever the fluid flow has to be control .

Solenoid valves are control units which, when electrically energized or de-energized, either shut off or allow flow of fluid. The actuator is the form of the electromagnet. When it is energized, a magnetic field is build up which is pulls a pivoted armature against the spring action. When de-energized, the pivoted armature is returned to its original position by the action of spring.

ATmega328P

Atmega328P is a high performance and low power consumption 8-bit RISC based AVR microcontroller with 28 pins.

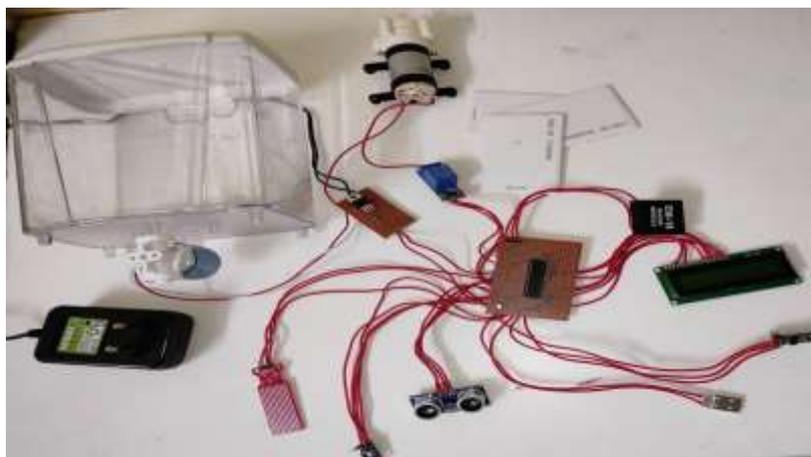
Atmega328 is used in many projects and autonomous systems where a simple, low-powered, low-cost micro-controller is needed. It has 23 IO pins, 32 general purpose working registers, 32KP ISP flash memory, 1KB EEPROM, 2KB SRAM, operating voltage is 1.8 – 5.5V.

IOT

The internet of things helps the people to live and work smarter, as well as gain complete control in their lives. IoT provides the smart devices that is used to automate homes, it is also essential to business. IoT provides a real-time look into how the systems work, delivering insights into everything from the machine performance to supply chain and the logistics operations.

IoT improves the service delivery and making less expensive for manufacture and deliver the goods, and also offering transparency into customer transactions.

Results and Conclusion



In this proposed project we have designed an automatic sanitizer dispenser and it accomplish the all safety measures with simple design. The sanitizer will dispense when the person's hand close to the device. The ultrasonic sensor senses the hand and will dispense the sanitizer. ATmega328P is used as a microcontroller and it process the data coming from tr ultrasonic sensor and then switch on the solenoid valve using relay for the particular time. Contactless temperature sensor is also connected to the microcontroller in 12C port. ESP8266 Wi-Fi module is connected to the microcontroller in serial communication pins. By connecting all sensors and actuators in microcontroller we got the result of perfect sanitizer dispensing and measuring the temperature in effective manner.

Conclusion

The circuit was made in a software and simulated accordingly. While prototyping the hardware some power distribution to each module can be hinderence, to overcome the problem, relays must be installed to drive the spray pumps or submersible pumps, so that the sensors, LCD, and other minute modules get enough power supply from the inbuild 5V and 3.3 V ports of the microcontroller. It can be manufactured in any household at very low cost and can be installed anywhere be it in offices, educational institutions, public transport, regular shops etc. To draw a concluding line to the project it can be said that in a war with an invisible enemy the device is a weapon for survival in the pandemic situation.

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