AUTOMATING CONTACTLESS COVID TESTING: IOT-ENABLED INSTANT TESTING BOOTH

#1 DOOSA KAVITHA Assistant Professor
#2 VORUGANTI SATHWIKA
#3 GOTTUMUKKULA PAVANI
Department of Electronics & Communication Engineering,
SREE CHAITANYA INSTITUTE OF TECHNOLOGICAL SCIENCES, KARIMNAGAR, TS.

ABSTRACT: Because of the current global epidemic, prioritizing COVID-19 testing is important for effectively containing the disease's spread. The fundamental goal of this initiative is to create a contactless, entirely automatic COVID testing booth system that analyzes each individual's data in real time using RFID technology. This project involves a microprocessor. This is the project's principal center. Currently in use input and output devices can effectively communicate with this onboard computer. The processor's memory is used to hold a list of assembly instructions. Furthermore, the controller's assembly instructions are critical for assuring appropriate operation. After receiving data from the RFID reader, the microcontroller sends an SMS to the registered mobile device. The SMS contains crucial information such as the test results, the individual's identification, the sample collection method, and other facts. The system also includes an LCD display and a siren to guarantee that alerts are clearly visible and audible.

KEYWORDS: AVR microcontroller, Power supply, RFID tag, RFID reader, Wi-Fi ESP8266 module.

1. INTRODUCTION

The Internet of Things (IoT) is increasing rapidly. The Internet of Things (IoT) is a collection of real-world devices linked to a network via sensors, software, electronics, and other electronics. They can communicate with each other and gather information this way. The purpose of this project is to develop a contactless testing booth equipment that can administer COVID-19 tests to people on its own at any time. This project makes use of an internal computer, sometimes known as a microcontroller. This is where the project's main hub is situated. The input and output units now in use can connect effectively with this onboard computer. The gadget has memory built in to store code. This memory is used to store a list of assembly instructions that are programmed into the controller. These instructions for assembling the controller are also vital for ensuring that it functions properly.

Because the relationship between the RFID reader and GSM is so delicate, this system must be carefully designed. Because many components are employed in a limited space, it is critical to carefully consider each characteristic while designing an interface circuit. The difficult element is designing a single-sided circuit board that does not require a wire to connect the conductive channels. The primary goal is to develop a COVID testing booth system that is entirely automatic, immediate, and touchless, with RFID technology keeping track of each individual's information. This ensures that personal information such as a person's identity and Aadhar scan results are correct while keeping the test subject distinct from the user. By automating the registration process, it speeds up and eliminates errors. As soon as the microcontroller receives data from the RFID reader, it sends an SMS to the registered cell phone. This SMS message includes the test results, information about the person's tag, instructions for collecting a sample, and other vital information. In order to effectively respond to the pandemic, we completely automated the Covid

booth testing procedure. This increases speed, safety, and accuracy.

2. LITERATURE SURVEY

Indoor Safety Monitoring System for COVID-19 Based on IoT. This study describes a low-cost Internet of Things (IoT) solution to improve building safety during the COVID-19 pandemic. The technology helps with a range of important functions, such as establishing social distance, recognizing masks, and measuring temperatures without touching them. The contactless temperature measuring unit is driven by either a thermal camera or an infrared sensor linked to an Arduino Uno. To find masks and estimate people's social distance, computer vision technologies are used on a Raspberry Pi with a camera.

"Xiao Jingyi" is the username. This study looks into how effective non-drug personal preventive measures and environmental cleanliness are during pandemic flu outbreaks in places other than hospitals. It also discusses how these indicators may be used to construct pandemic preparedness strategies. Mechanistic research suggests that wearing a face mask and washing your hands may have some benefits. However, 14 randomized controlled trials on these medicines found no substantial effect on influenza spread, as confirmed by lab tests.

Sapthai Hello, Sujithraa. Respiratory viruses, such as COVID-19, enter the body via the eyes, nose, or mouth as virus-laden mucus or droplets. The virus can transfer from one person to another if they come into contact with something handled by an infected individual. Setting up this method allows you to easily change the lighting in a room as you enter or exit it.

What medical telerobotic systems are like today and what they might be like in the future. Eftychios G. Christoforou This study focuses on medical teleoperated robotic systems, which have advanced dramatically in recent years. It provides a thorough evaluation of every relevant research

published between 2004 and 2015. This course teaches you everything you need to know about telerobotic systems. It covers design concepts, key technologies (such as robotic manipulation, telecommunications, and visual systems), and prospective clinical applications. Furthermore, future boundaries and trends receive specific consideration.

3. IMPLEMENTATION
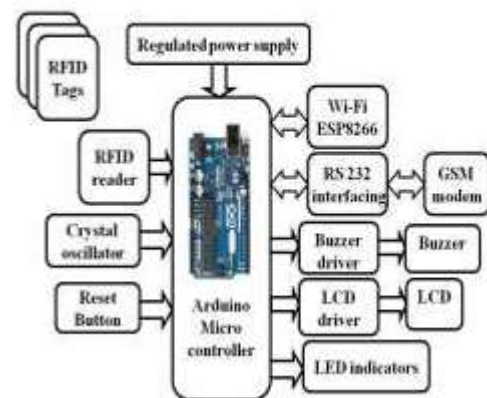
Block diagram

The following could be used to carry out the strategy that we now have. RFID technology is utilized in this way to swiftly track the registration details of Aadhar cards, eliminating the need to register them again. The test subject uses the RFID tag given to them to provide the sample number of the individual inside the box. When the patient's test is complete, the device sounds a bell to release the next person. The ESP8266 Wi-Fi module of the Internet of Things (IoT) collects data and sends it directly to the lab before the next person takes over. The lab supervisor can use a Wi-Fi module to monitor the live count of samples being analyzed and immediately update the IOT server with the results. When the lab boss alters the test results for a sample, the system immediately sends an SMS to the appropriate individual using a GSM modem. In order to effectively respond to the pandemic, we completely automated the Covid booth testing procedure. This has made it more efficient, safe, and error-free. This project makes use of an internal computer, sometimes known as a microcontroller. This is where the project's main

hub is situated. The input and output components that are currently in use can successfully connect with the onboard computer. The gadget has memory built in to store code. This memory is used to store a list of assembly instructions that are programmed into the controller. These instructions for assembling the controller are also vital for ensuring that it functions properly.

4. RELATED WORK

This project made extensive use of many modules. Here's a brief list of them:

GSM Modem:

Fig: GM modem

The SIM 300 is equipped with a straightforward serial port and operates as a GSM modem. The SIM 300 modem operates in a manner similar to a cell phone, except it possesses its own distinct phone number and can accommodate any SIM card provided by a GSM network operator. This module enables users to initiate and receive telephone conversations, exchange text messages, and establish internet connectivity using GPRS technology. The modem has the capability to establish a direct connection with both a microcontroller and a PC serial port. When conducting a transaction, purchase all of the assets or properties available. Provided that it has both an Ethernet port and an RS232 to TTL converter. While you are in the store, make numerous phone calls to verify the authenticity of the module. The SIM300 GSM modem is compatible with voltage levels ranging from 3.4V to 4.5V. Attaining this voltage is challenging due to the absence of a standardized control mechanism. It is recommended to avoid supplying voltages higher than 5V to the modem, as this exceeds its absolute maximum rating.

Specifications: A entire tri-band GSM system is incorporated inside the SIM300, a tiny module. The SIM300 includes an interface that is commonly used in business. It is tiny and consumes little electricity, which are both positive attributes. It supports GSM/GPRS900/1800/1900MHz frequencies, allowing it to make calls, send SMS texts, send data, and receive faxes. The SIM300 can be utilized in many different ways. It has numerous applications, including M2M, mobile devices, and WLL (stationary cellular terminals).

1. This 40x33x2.85-inch piece supports tri-band GSM/GPRS technology.
2. Assist with the keypad/LCD and customize the man-machine interface (MMI).
3. An efficient TCP/IP protocol stack constructed in
4. Built on a platform that has been tried and tested numerous times, with continued assistance from our professionals throughout the entire process, from concept generation to design and production.
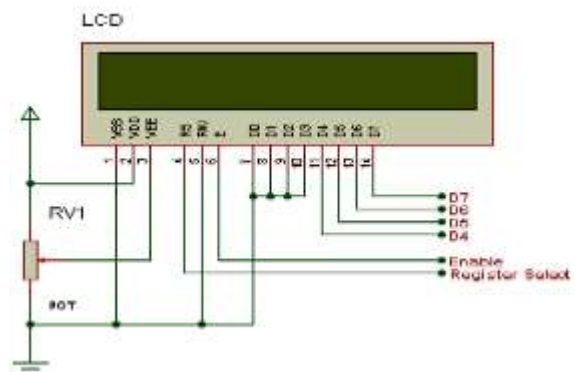
LCD Module:

Fig: LCD

LCD monitors are commonly used components that are connected to microcontrollers. 16x2 and 20x2 LCD panels are widely used and connected to a variety of microcontrollers. More specifically, this translates to a line length of 20 characters for the second line and 16 characters for the first. As previously stated, the LCD requires a specific time duration to execute each command. The duration of the delay is influenced by both the current instruction execution and the frequency of the crystal linked to the LCD's oscillator input. The

command "Get LCD Status" provides us with two unique pieces of information. Currently, the crucial data we want is housed in DB7. To summarize, when the "Get LCD Status" instruction is issued, the LCD will immediately raise the value of DB7 to indicate that it is now performing a command, or decrease the value of DB7 to indicate that it is no longer active. As a result, our program cannot access the LCD until DB7 hits a low state, indicating that it is no longer in use. We are then free to carry out the following directive.

Buzzer:

Fig: Buzzer

A sound warning device, such as a buzzer or beeper, may contain piezoelectric, electromechanical, or mechanical components. Buzzers and beepers are commonly used in alarm systems, clocks, and to confirm the user's actions, such as hitting keys or clicking the mouse. A circuit that oscillates or another audio data source can be utilized to drive a piezoelectric element via a piezoelectric audio amplifier. Three frequent sounds indicate that a button has been pressed: a click, a ring, and a beep. The piezo buzzer is a common electronic device for producing noise. It is utilized in a variety of applications due to its low cost, ease of manufacture, and light weight. Examples include call bells, computers, and vehicle/truck turning indicators.

Arduino Uno:

Fig : Arduino Uno

The required component is an Arduino Uno. The Arduino Uno microprocessor board uses the ATmega328. The device has a reset button, a USB connector, a power port, an in-circuit system programming (ICSP) header, and a 16 MHz resonator. Six of the ports are labeled as analog inputs, while the remaining six serve as PWM outputs. Arduino.cc built the Arduino Uno utilizing an open-source microcontroller board based on the Microchip ATmega328P microcontroller. The board has analog and digital input/output (I/O) connectors, allowing it to communicate with expansion boards and other circuits (shields).

Radio Frequency Identification

Fig: RFID module

Radio frequency identification (RFID) technology uses radio waves to retrieve and store data from objects marked with markers. RFID readers are carefully placed in surveillance locations to collect data from tags even when they are close together, usually within a few feet. Tag tracking is possible even if the tag is not immediately visible to the reader. RFID is used to verify the identities of people, products, and assets while also tracking them. RFID tags can be used to identify a wide range of objects, including currencies, garments,

tote bags, deliveries, and even human and animal implants.

Wi-Fi Module

Fig: ESP8266 module

The ESP8266 Wi-Fi Module's TCP/IP protocol core makes it easier to connect any microcontroller to a Wi-Fi network. The ESP8266 can either host a program or delegate all Wi-Fi networking tasks to a separate application processor. Every ESP8266 device comes with preset software that includes an AT command set. Connecting the module to an Arduino device allows for a comparable degree of Wi-Fi connectivity as a Wi-Fi shield. The ESP8266 module is a low-cost board with a large, growing community.

5. CONCLUSION

This version now adds a functionality that assembles all of the hardware components used in the Arduino's manufacture. Every component's place has been carefully examined and ordered. As a result, we are helping to design the most effective unit for "IoT Instant Contactless COVID Testing Boot Automation." Furthermore, the project was completed effortlessly thanks to the use of cutting-edge technology and extremely advanced integrated circuits. Thus, the project's design and testing were rated adequate.

REFERENCES:

1. Jingyi Xiao Non-pharmaceutical Measures for Pandemic Influenza in Non-healthcare Settings— Personal Protective and Environmental Measures.

2. World Health Organization. Comparative analysis of national pandemic influenza preparedness plans,2011[cited 2019 Jun 25]

3. Aerosol transmission of influenza A virus: a review of new studies Raymond Tellier, Published:22 September 2009.

4. Guyatt G, Oxman AD, Akl EA, Kunz R, Vist G, Brozek J, et al. GRADE guidelines: 1. Introduction-GRADE evidence profiles and summary of findings tables. J Clin Epidemiol. 2011;64:383–94. Published:January 03, 2011

5. Wong VW, Cowling BJ, Aiello AE. Hand hygiene and risk of influenza virus infections in the community: a systematic review and meta-analysis. Epidemiol Infect. 2014;142:922–32.

6. Hand hygiene and risk of influenza virus infections in the community: a systematic review and meta-analysis Published online by Cambridge University Press: 23 January 20

7. Aiello AE, Murray GF, Perez V, Coulborn RM, Davis BM, Uddin M, et al. Mask use, hand hygiene, and seasonal influenza-like illness among young adults: a randomized intervention trial. J Infect Dis. 2010;201:491–8, 15 February 2010.

8. Suess T, Remschmidt C, Schink SB, Schweiger B, Nitsche A, Schroeder K, et al. The role of facemasks and hand hygiene in the prevention of influenza transmission in households: results from a cluster randomised trial; Berlin, Germany, 2009 2011. BMC Infect Dis. 2012;12:26 Article number: 26 (2012)

9. Macias AE, de la Torre A, Moreno-Espinosa S, Leal PE, Bourlon MT, Ruiz-Palacios GM. Controlling the novel A (H1N1) influenza virus: don't touch your face! J Hosp Infect. 2009;73:280, 1 May 17, 2010.

10. Telemedicine and telerobotics: from science fiction to reality. Evans CR, Medina MG, Dwyer AM. Updates Surg. 2018 Sep;70(3):357-362. doi: 10.1007/s13304-018-0574-9. Epub 2018 Jul 28.