IOT INSTANT CONTACTLESS COVID TESTING BOOTH AUTOMATION

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ABSTRACT:

In view of current pandemic covid testing plays a key role in fighting the pandemic. The main aim of this project is to design a completely automated instant contactless covid testing booth system by which person details is monitored using RFID technology. This project makes use of micro controller. It acts as heart of the project. This onboard computer can efficiently communicate with the output and input modules which are being used. We use controller memory to dump some set of assembly instructions into the controller. And the controller function is dependent on these assembly instructions. When the Micro controller gets the data from the RFID Reader, Automatically the tag details related to the person along with the sample collection details will be sent as an SMS along with the test results to the stored mobile number. The system also provide both audible and visual alerts using LCD and Buzzer.

Keywords:
AVR microcontroller, Power supply, RFID tag, RFID reader, Wi-Fi ESP8266 module, GSM modem.
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1. INTRODUCTION:

Internet of Things (IoT) is rapidly increasing technology. IoT is the network of physical objects or things embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. In this paper, we are developing a system which will automatically test the person with covid instantly with contactless testing booth. This project makes use of an onboard computer, which is commonly termed as micro controller. It acts as heart of the project. This onboard computer can efficiently communicate with the output and input modules which are being used. The controller is provided with some internal memory to hold the code. This memory is used to dump some set of assembly instructions into the controller. And the functioning of the controller is dependent on these assembly instructions.

The design of this system is very much sensitive and should be handled with utmost care because interfacing RFID reader and GSM to the micro controller is sensitive. So every small parameter should be given high importance while designing the interfacing circuit because if we use single sided board then lot of parts are being used in a small space then it may be difficult to make a single sided board without jumping over traces with a cable. The main idea is to design a completely automated instant contactless COVID testing booth system by which person details is monitored using RFID technology. It is used for ensuring the person details like name, aadhar scan specific information by which the system totally isolates the test person from the user and also makes the process fast and error free by automating registration process too. When the Micro controller gets the data from the RFID Reader, Automatically the tag details related to the person along with the sample collection details will be sent as an SMS along with the test results to the stored mobile number. Thus we fully automate the Covid booth testing process, making it faster, safer and error free to help fight the pandemic in a better manner.

2. LITERATURE SURVEY:

IoT-based System for COVID-19 Indoor Safety Monitoring In this paper, we introduce an affordable IoT-based solution aiming to increase COVID-19 indoor safety, covering several relevant aspects: like contactless temperature sensing, mask detection, social distancing check. Contactless temperature sensing subsystem relies on Arduino Uno using infrared sensor or thermal

camera, while mask detection and social distancing check are performed by leveraging computer vision techniques on camera-equipped Raspberry Pi.

Jingyi Xiao Non-pharmaceutical Measures for Pandemic Influenza in Non-healthcare Settings—Personal Protective and Environmental Measures review the evidence base on the effectiveness of non-pharmaceutical personal protective measures and environmental hygiene measures in non-healthcare settings and discuss their potential inclusion in pandemic plans although mechanistic studies support the potential effect of hand hygiene or face masks, evidence from 14 randomized controlled trials of these measures did not support a substantial effect on transmission of laboratory-confirmed influenza.

Sujithraa Sampath, Respiratory viruses like coronavirus disease (COVID-19) spread when mucus or droplets containing the virus get into your body through your eyes, nose or throat. The virus can spread from one person to the next, if a healthy person touches a surface which was previously touched by an infected person. With this system in place, you can turn on or turn off your room lights just by entering or leaving the room.

Eftychios G. Christoforou, Medical telerobotic systems: current status and future trends This study presents a systematic review of the relevant literature between the years 2004 and 2015, focusing on medical tele operated robotic systems which have witnessed tremendous growth over the examined period. A thorough insight of tele robotics systems discussing design concepts, enabling technologies (namely robotic manipulation, telecommunications, and vision systems), and potential applications in clinical practice is provided, while existing limitations and future trends are also highlighted.

3. IMPLEMENTATION:

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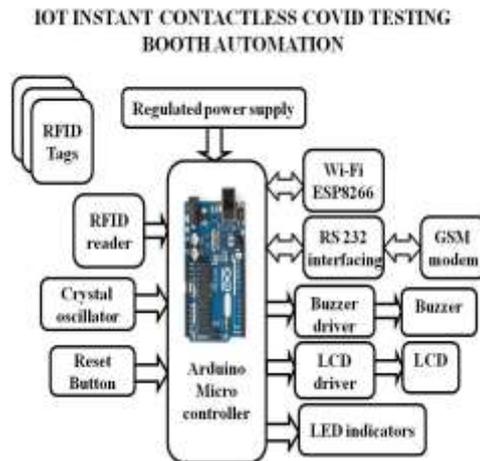
3.1 Block diagram

The design can be implemented with following as we No need for separate registration, the system uses RFID technology for instant aadhar card scan registration details monitoring. The Test person provides the sample number of the person from inside the booth using provided RFID tag. The system uses buzzer to inform patient that his test is done and next person to come forward. The data collected by the time is transferred over to Lab using IOT ESP8266 Wi-Fi module automatically before next person comes ahead. The lab in-charge can view the no of samples tested in real time and can update sample test results too on IOT server through Wi-Fi module. When lab in-charge updates test result of a sample, an SMS using GSM modem is instantly sent to the respective person by the system itself. Thus we fully automate the Covid booth testing process, making it faster, safer and error free to help fight the pandemic in a better manner. This project makes use of an onboard computer, which is commonly termed as micro controller. It acts as heart of the project. This onboard computer can efficiently communicate with the output and input modules which are being used. The controller is provided with some internal memory to hold the code. This memory is used to dump some set of assembly instructions into the controller. And the functioning of the controller is dependent on these assembly instructions.

4. RELATED WORK:

The brief introduction of different modules used in this project is discussed below:

4.1. GSM Modem:

Fig: **GM modem**

SIM 300 is a GSM modem with a simple serial interface. SIM 300 modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. With this module one can send/receive sms, connect to internet via GPRS and receive calls. The modem can either be connected to PC serial port directly or to any microcontroller. When purchasing purchase the entire board. As it comes with RS232 to TTL converter and ethernet port Also do check the module by calling a few times when in the shop.SIM300 GSM modem works for supply voltages from 3.4V to 4.5V. This voltage is difficult to generate as we dont get a standard regulator at this voltage. Do not give 5V directly to the modem as it is above its absolute maximum ratings.

Specifications: The SIM300 is a complete Tri-band GSM solution in a compact plug-in module. Featuring an industry-standard interface, the SIM300 delivers GSM/GPRS900/1800/1900Mhz performance for voice, SMS, data and Fax in a small form factor and with low power consumption. The leading features of SIM300 make it deal fir virtually unlimited application, such as WLL applications (Fixed Cellular Terminal), M2M application, handheld devices and much more.

1. Tri-band GSM/GPRS module with a size of 40x33x2.85
2. Customized MMI and keypad/LCD support
3. An embedded powerful TCP/IP protocol stack
4. Based upon mature and field proven platform, backed up by our support service, from definition to design and production.
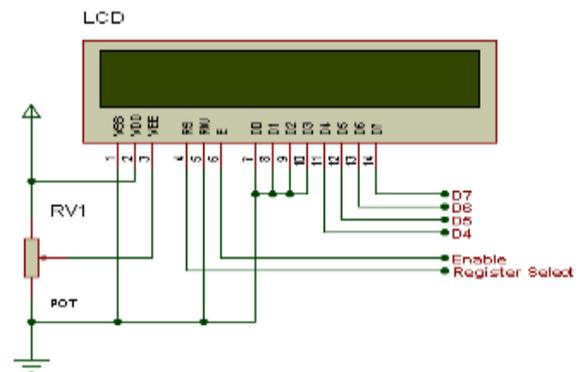
4.2. LCD Module:

Fig: **LCD**

One of the most common devices attached to a micro controller is an LCD display. Some of the most common LCD's connected to the many microcontrollers are 16x2 and 20x2 displays. This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively. As previously mentioned, it takes a certain amount of time for each instruction to be executed by the LCD. The delay varies depending on the frequency of the crystal attached to the oscillator input of the LCD as well as the instruction which is being executed. The "Get LCD Status" command will return to us two tidbits of information; the information that is useful to us right now is found in DB7. In summary, when we issue the "Get LCD Status" command the LCD will immediately raise DB7 if it's still busy executing a command or lower DB7 to indicate that the LCD is no longer occupied. Thus our program can query the LCD until DB7 goes low, indicating the LCD is no longer busy. At that point we are free to continue and send the next command.

4.3. Buzzer:

Fig: Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke. A piezoelectric element may be driven by an oscillating

electronic circuit or other audio signal source, driven with a piezoelectric audio amplifier. Sounds commonly used to indicate that a button has been pressed are a click, a ring or a beep. Piezo buzzer is an electronic device commonly used to produce sound. Light weight, simple construction and low price make it usable in various applications like car/truck reversing indicator, computers, call bells etc

4.4 Arduino Uno:

Fig : **Arduino Uno**

Arduino Uno The Arduino Uno is a microcontroller board based on the ATmega328. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs), a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (ICSP) header, and a reset button. The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits

4.5 Radio Frequency Identification

Fig: RFID module

Radio Frequency Identification (RFID) is the application of radio waves to read and capture information stored on tags affixed to objects. RFID readers are installed at tracking points and can read information from tags when they come into range, which can be of several feet radius. A tag need not be within direct line-of-sight of the reader to be tracked. RFID is used to check identities and track inventory, assets and people. RFID tags can be attached to a variety of objects like cash, clothing, baggage, parcels, and even implanted in animals and people.

4.6 Wi-Fi Module

Fig: ESP8266 module

The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi-ability as a Wi-Fi Shield offers. The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

Features:

- 802.11 b/g/n, Wi-Fi Direct (P2P), soft-AP
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLLs, regulators, DCXO and power management units
- +19.5dBm output power in 802.11b mode
- Power down leakage current of <10uA
- 1MB Flash Memory
- Integrated low power 32-bit CPU could be used as application processor
- SDIO 1.1 / 2.0, SPI, UART
- STBC, 1×1 MIMO, 2×1 MIMO
- A-MPDU & A-MSDU aggregation & 0.4ms guard interval
- Wake up and transmit packets in < 2ms
- Standby power consumption of < 1.0mW (DTIM3)

5. CONCLUSION:

The existing model presents an Integrating feature of all the hardware components which has been used and developed in it with Arduino.

The Presence of each and every module has been reasoned out and placed very carefully. Hence the contributing to the best working unit for "**IOT INSTANT CONTACTLESS COVID TESTING BOOTH AUTOMATION**" Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

6. ACKNOWLEDGEMENT

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7. RESULTS:

The project "**IOT INSTANT CONTACTLESS COVID TESTING BOOTH AUTOMATION**" was designed a completely automated instant contactless COVID testing booth system by which person details are monitored using RFID technology. The data collected by the time is transferred over to Lab using IOT ESP8266 Wi-Fi module automatically before next person comes ahead. The lab in-charge can view the no of samples tested in real time and can update sample test results too on IOT server through Wi-Fi module along with test result of a sample, an SMS using GSM modem is instantly sent to the respective person by the system itself.

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