SMART DOOR SECURITY USING ARDUINO AND BLUETOOTH APPLICATION

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ABSTRACT

Security is becoming an important issue everywhere nowadays. Every person wants his house, factory; bank etc to be secured. house security is becoming necessary as the possibilities of intrusion are increasing day by day. In this paper, door security system has been designed that has a unique feature . Arduino was used, which is considered one of the modern programmable device and we also used HC-05 wireless Bluetooth transreceiver so as to control door Here, our application uses Arduino as it's controller and HC-05 as a communication link between mobile application which we developed using MIT app inventor 2. This paper aims to develop a door security system using LDR sensor & Ultrasonic sensor,servo motor ,laser module, data from all these sensors is continuously received and processed by Arduino UNO board which act as microcontroller unit., a LDR sensor measures intensity of a particular place, while ultrasonic sensor works to measure distance by sending small pulse .The Bluetooth module HC-05 is used to control the door through the application DOOR developed by us ,thus the system ensures home safety as well as security.

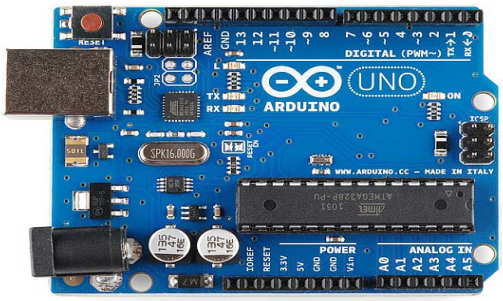
KEYWORDS : Arduino UNO , HC-05 , Transreceiver, LDR , Ultrasonic sensor , DOOR., Servo motor.

I. INTRODUCTION

In day to day life home security is very important factor. It is trending issue in 21st century. Security is primary concern everywhere and for everyone. every person wants his home, industry, banks etc to be secured. This project describes a security system that can control home door. This is a useful and simple security system. here, our application uses arduino as it's controller and detects whether the door is unlocked or locked using ultrasonic sensor & LDR values.the Ultrasonic sensor measures the distance of door and LDR detects the intensity of laser light falling on it and based on it decides if its locked or unlocked. This paper is based on embedded system where microcontroller is use for home security. This system can operate using cellular phone with the help of Application that we developed. This system is to implement microcontroller based controlled module that receives it's instruction and command for cellular phone over bluetooth. This microcontroller then will carry out the issued Commands and then communicate the status given applicants or device back to the smart phones.

II. LITERATURE REVIEW

As per survey there exists many such systems that could control door. Each system has its own unique feature. Following model describes the work performed in project. Arduino UNO itself act as a microcontroller. Design and implementation of low, smart and real-time monitoring and controlling of door security using Arduino.Arduino along with HC-05 and mobile Applications allows us to control door from any where in the home and constantly keep watch on it. Some system provide security alarm using low processor chip. R-Pi would exchange data or would communicate with the help of Bluetooth, Wi-Fi and Ethernet. These systems have their own disadvantages. For example, system-implementing must requires Wifi/Ethernet for the data communication. These system also proficient for home automation.



Bluetooth Specifications : Bluetooth is a global specification for a small form-factor, lowcost radio solution providing links between mobile computers, mobile phones, and other portable handheld devices, as well as connectivity to the Internet. The Institute of Electrical and Electronics Engineers (IEEE) has given the IEEE 802.15 standard. Its main strength is its ability to simultaneously handle both data and voice transmissions. A Bluetooth is capable of supporting asynchronous data link with each client and Also synchronous voice links with up to three client devices. It provides range of up to 10m at transmit power of 1 mwatt. The range can be extended to 100m if the transmit power is increased to 100 m watt. Bluetooth has a data rate of 1 Mbps. Bluetooth is a standard for a small (9mm x 9mm) , cheap radio chip to be plugged into computers, printers, mobile phones, etc. A Bluetooth takes the information normally carried using the cable, and transmits it at a different frequency to a receiver. Bluetooth, which then will give the information received to the computer, phone or whatever. Bluetooth offers most economical solution for low to medium-speed device connectivity. It aims at low power consumption and also provides security for mobile devices. The basic function is to provide standard wireless technology so as to replace the multitude of propriety cables currently linking computing devices. [2]

Working of Bluetooth : A Bluetooth module is a short range device of around 10 meters which provides both sound and data transmission. The Bluetooth device uses an IEEE 802 standards wherein the connections can be point-topoint or point-to-multipoint. The data transfer rate is 3mbps and the maximum range of a Bluetooth device can be 10-100 meters. The default baud rate is 38400 and also other supported baud rates are 9600, 19200,57600,115200,230400 and 460800. Bluetooth can connect up to 8 devices simultaneously. It uses the spread spectrum technology in which each device uses different frequency band and hence the devices do not transmit at same time. When the two devices come in range with each other, the transmission takes place between them.

III. PROPOSED SYSYTEM

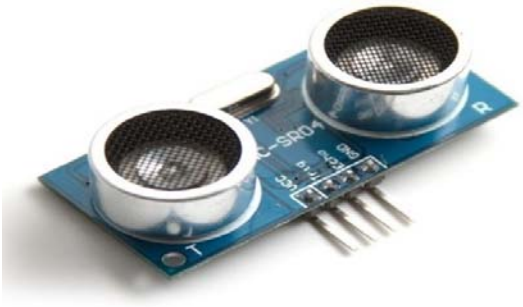
In this paper, we are going to interact with component with the help of HC-05 (Bluetooth module). The main advantage of this system is that it can be controlled anywhere within a range application. It's easy and allows communication with set up without wired connection. This system can be further extended for a proper Surveillance of home system.

IV. HARDWARE

1. ARDUINO UNO : It is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to As microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

2. LDR : It is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits

3. ULTRASONIC SENSOR : An Ultrasonic sensor is a device that measures the distance of an object by using sound waves. It measures distance by sending out a sound wave at a very specific frequency and listening for that same sound wave to bounce back. By recording the elapsed time between the sound wave being sent and the sound wave received back, it is possible to calculate the distance between the ultrasonic sensor and the object.



4. SERVO MOTOR : A servomotor is a rotary actuator that allows for precise control of angular position, velocity and acceleration. It also consists of a suitable motor coupled to a sensor so as to get position feedback. It requires a relatively special controller, often an dedicated module designed specifically for use with servomotors.

5. BLUETOOTH MODULE HC-05 : HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module,designed for transparent wireless serial connection setup.The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication.

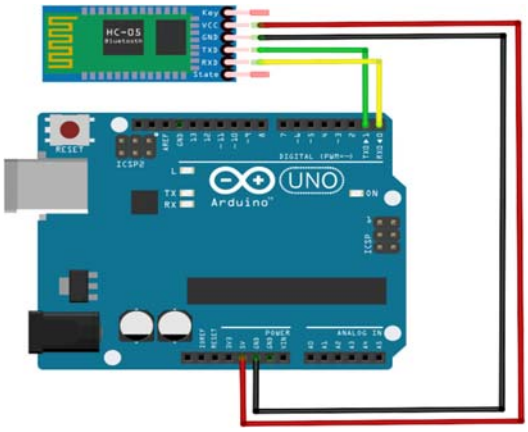


Fig : Connection of HC-05 to Arduino UNO

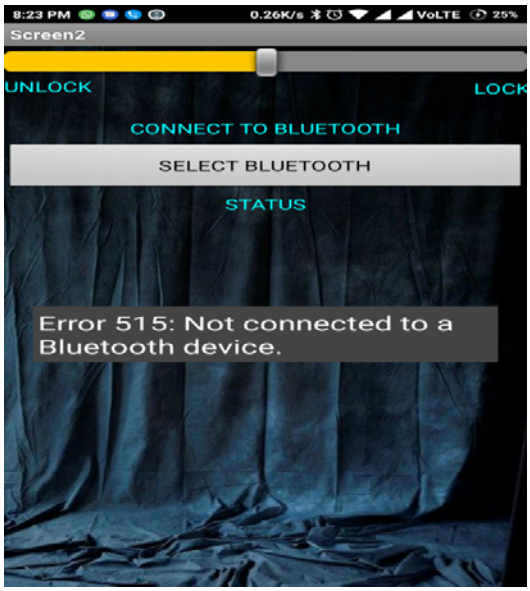
V. SOFTWARE

1. ARDUINO IDE : Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

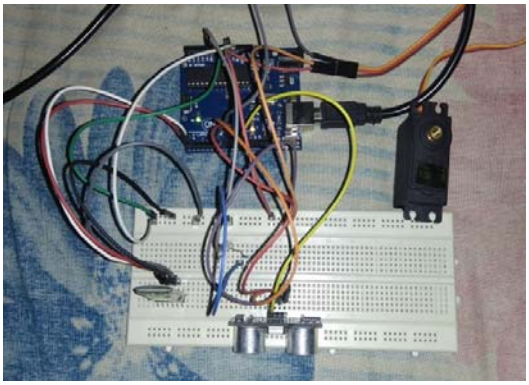
2. MIT APP INVENTOR : **App Inventor for Android** is an open-source web application originally provided by Google, and now maintained by the Massachusetts Institute of Technology (MIT).

It allows newcomers to computer programming to create software applications for the Android operating system (OS). It uses a graphical interface, very similar to Scratch and the StarLogo TNG user interface, which allows users to drag-and-drop visual objects to create an application that can run on Android devices. In creating App Inventor, Google drew upon significant prior research in educational computing, as well as work done within Google on online development environments.

Fig : Login page of application(screen 1)



VI. CONNECTION DAIGRAM



VII. WORKING

Initially, we need to connect smartphone to system using the application which we created on MIT APP inventor . once connected we will be able to lock or unlock door using the scroll button in the application.. if we move slider to unlock position then the application will send particular value to Bluetooth module and then servo motor will rotate with certain degree so that the door will be opened. The ultrasonic sensor will be placed in the door frame and so will be Light Dependent Resisitor on which the laser light will cotinuosly fall.if some one opens the door then the distance between door and ultrasonic sensor will increase and also the laser light which was falling on LDR will also be cutted due to which ldr will give large value, if this both condition occurs(i.e with ultrasonic sensor and ldr) then can say that the door is opened and we can see the status of door on monitor. if we try to close the lock using application when door is open then we will receive the notification saying that we first need to close door in order to lock it. We can give this app to our family members and share the login credentials with them so that they can also be able to lock and unlock the door.

VIII. RESULT

When we scroll the slider button to unlock position the value of slider is fetched and send to Arduino via Bluetooth module HC-05 , and then the servo motor is rotated with that particular value and the lock gets opened. if we scroll the slider button to lock position the value of slider is fetched and send to Arduino via Bluetooth module HC-05 , and then the servo motor is rotated with that particular value and the door gets locked. The status of door at any particular instance was displayed on serial monitor and if we try to lock the door when it was open then we got notification saying that we need to close the door to lock it. The distance for which Bluetooth responded was 12 meters.

IX. CONCLUSION

The ultimate aim of the paper was to design a home security system using Arduino uno and Bluetooth module. So, it helps people feel safe about their home whether they are away from are in the house. This project is based on Arduino , and the coding is done on Arduino ide platform . The overall cost is low and can be easily operated. Even our home will undergo its own transformation towards the smart homes that will be in constant interaction with the grid in an effort for better energy management and full home automation to ensure comfort, security and privacy.

X. FUTURE SCOPE

Inorder to increase the range and to monitor and control the security from any where in the world we will try to implement it using a wifi module (i.e esp8266) . so that it will be more dependable and helpful also.we can also try to join a camera with it so that we can continuously keep track of our house.

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