Smart Door Security System

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Abstract: *Recently home security system has been very poor. These research projects consist of a smartdoor locking system which provides a great solution to improve the home safety management of doors. Arduino IDE software and a Bluetooth module hc-05 were used to connect between the smartphone, the microcontroller and the door lock to give an easy access to authorized persons. The person with the authority to open the door can have access within their fingertips by installing the required application which has open/close button. The hc-05 serves as a receiver and transmitter but also communicates with the microcontroller which serves as a processing unit in this project and decides whether the password entered by the user is right or wrong and then send the servo motor to either open or close the door. If the password is right the user can have access to the door and when the password is wrong the user will have no access whatsoever. Enhancing the safety and security of main entrance doors.*

Keywords: Arduino, Bluetooth Module, IOT, Servo Motor

I. INTRODUCTION

Security has become a major concern in the twenty first century; everybody wants to feel safe at his or her own home, workplace and a safe environment as a whole. Smartdoor security system using Arduino and Bluetooth application is a project aimed at increasing and advancing the safety and security of lives and property of the people. The project deals primarily with the protection of doors and making it more secured within our houses, office or public related buildings. With the help of smartdoor, when indoors or while you are away from your home and workplace, the doors are protected primarily to grant access to only authorized persons using their smartphone and Bluetooth application. With the advancement of technology smartphone has become a household requirement. As of 2007 smartphones were not more than two percent of phone industries, but in 2009 the smartphone world has taken more than fifty percent of phone market (www.Wikipedia.com/androiddevelopers) With this it is quite logical to say that there is at least a smartphone owner in every house. With this smartphone we can simply interface it with a arduino (microcontroller) to keep our houses and offices safer and more secure with a single click to lock or unlock the resulting door. The microcontroller will be mounted on the door which will then communicate with the device through a Bluetooth module which will be connected to the microcontroller. This project is aimed at making security better and securing the lives and properties of people at home or their work places
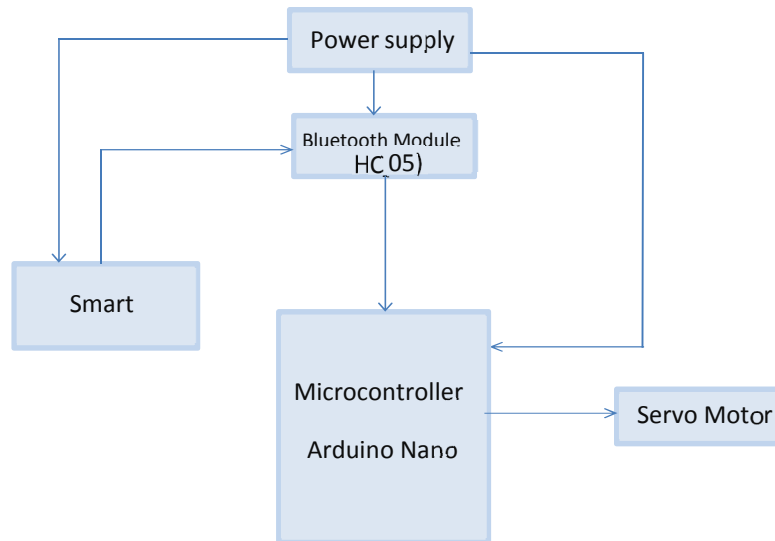
II. SCHEMATIC DIAGRAM

Figure 1: Block Diagram

III. ALGORITHM

1. Connect the mobile Bluetooth to the module.
2. Touch the mobile fingerprint sensor.
3. Arduino turns motor on with delay of 3 sec.
4. Rotates the servo motor.
5. Then open the door.

IV. METHODOLOGY

Input Unit

This is the unit in which command is given to start the execution of a program and in this project the smartphone is the devices that serves the purpose of sending command as input.

The mobile smartphone sends signal when connection is established between the device's Bluetooth and the Bluetooth module (HC-05). The smartphone sends the input command through a developed application which has lock and unlock slider in the application which is to say a person operating the smartphone can either send lock (which is close) or unlock (which is to open) the respective door. The input command can only be executed when and only when a Bluetooth connection is established between the device and the module and be operated within Bluetooth range limit.

Receiver Unit

This unit deals primarily with the receiving of command signals sent from the input. The command sent by the mobile smartphone is received in this unit with the help of a Bluetooth module (HC-05). The module also serves as a link to establish connection between the mobile device and the Arduino microcontroller.

Processing Unit

This unit is the brains and work of any project. This unit determines the output of the project, it determines what command to execute, how to execute, when to execute and where to execute it. The Arduino microcontroller serves the purpose of processing the command of this project. The Arduino receives the command from the mobile smartphone on what command to execute via the Bluetooth module and then the microcontroller determines what function to perform

and how to perform the particular task and give the required output of the given task. The Arduino that serves as the main processing unit has two units the hardware (which is the Arduino board) and the IDE (integrated development environment) which comprises of software program that runs the whole operation and how the circuit basically works.

Smartphone Application

In this research I have an Android application to control all the home appliances. From Android phone we select any home appliance from the options that appear in the App then we select open or close. The user cannot run the App from outside the house unless within the Bluetooth range related with the Bluetooth module. It allows establishing point-to-point connection with Bluetooth support devices. This technology is known by Android support for the Bluetooth network stack which permits to exchange data wirelessly.

Android Application (API). This application is a Java based program. The Android uses .apk file to install the application. The code is written in Android Studio IDE. The code is written according to the appearance of the options in the phone.

Output Unit

This is the final stage of the methodology on receiving the command from the microcontroller. The task to be performed could either be to open or close the door. Servo motor is the device used in this unit to perform the task. When the servo motor receives the command from the microcontroller to open it moves its position to ninety degrees which moves up and opens the slider while when the command is to close the servo motor moves to one hundred and eighty degrees which moves the slider to lock position which closed the door in turn. All this action is performing and written in form of a computer code in the

V. RESULT

The program for the Arduino Uno microcontroller was written in C language and was then compiled into an executable file using the Arduino IDE. The executable file was then imported into the Proteus Design Suite, where the hardware circuit shown was designed and simulated. Figure shows the installed android app, the Proteus simulation of the door security system results for each process of entering the correct and wrong passwords respectively. Upon successful completion of the software simulation, the system"s hardware was constructed on a bread board and programming of the arduino microcontroller was carried out using Arduino IDE. The hardware construction with connections and various operations of the system are shown in the figure below. The response of the hardware of the security door when communicating with the Arduino board.

Distance	Connection	Result
2m	Connected	Open/close
3.4m	Connected	Open/close
5.8m	Connected	Open/close
10.5m	Not connected	no signal

VI. CONCLUSION

The main aim of this paper is to design a smartdoor security system using Arduino and Bluetooth application, so that people can feel safe about their home whether they are away from home or are in the house. This project is based on Arduino, and the coding is done on Arduino ide platform using the arduino application. At the end of this research the aim and objectives of the project was achieved. People can now feel more secure about their doors all the time. Doors can be controlled conveniently to those with access. Physically challenged people can open or lock doors from their

fingertips without asking help of anybody. It is safe to say that the main objectives and the aim of the project were achieved at the end of the project.

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