

IOT Based Smart Door Lock

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ABSTRACT

Nowadays folk's area unit escalating in technological advancements. We have a tendency to area unit seeking advanced technologies and computer code with each single passing day to form our life easier and a touch stress free we have a tendency to area unit creating this project - sensible Door, to assist many of us from totally different sections of the society. Sensible doors area unit an easy project that enables you to achieve the management of your house. Sensible doors project prevents the entry of these you do not need in your house. Guaranteeing the protection of your home is the most concern without delay. Nowadays homes area unit a lot of liable to several threats like United States thieves obtaining sensible numerous cases are registered for felony. For this way home security is required. Home security unquestioningly suggests that a get off the door. That's why we have a tendency to area unit proposing the concept of sensible door lock system. This uses an easy Arduino board with many lines of code drop in it, a hex input device, Associate in Nursing automaton application and a few jumper wires. The prime attribute of this project is that the Arduino board that aids the usage of this project. By fitting all this we will set it anyplace and anytime, straightforward to put in and simple to use and that guarantees your home security and secures your happiness.

- **Keywords:** Arduino Board, Android application, Hexadecimal wires, Secure, Smart door.
- **INTRODUCTION**
- Internet of Things (IoT) is a natural group of related physical articles that are accessible through the web.



Figure - 1

Iot[2] could be a assortment of detector and mechanism enabled physical devices connected to the web, that's ready to exchange the information between them while not the person's involvement. The mixture of rising technologies like Wireless detector Network (WSN), big data, Cloud computing, ubiquitous computing and therefore the net is reworking the entity into tiny objects. The sensible objects will adapt in line with the atmosphere and respond on the idea of that. Iot sanctioning technologies area unit allowed ascertaining the communication between physical devices. Iot sanctioning technologies area unit WSN, oftenest Identification (RFID).

Securing homes [1] has become one among the regarding problems. Nowadays homes area unit being a lot of vulnerable for many threats particularly being burgled. For this way home security is required. Home security implicitly suggests that a secured mechanism for the door. This is often one among the foremost standard home security systems. With this method, solely the approved people will gain the permission to access the doors. Therefore one will monitor his/her house from anyplace. Currently, the digital lock system is usually getting used in sensible home and residential automation. However, on some occasion we want to share the safety key to our relation or guest within the sensible home or building automation. The projected system introduces the technique to rectify the constraints. Nowadays, technology could be a part of our human life that allows enhancing our modus Vivendi.

Figure two shows that general design of Iot. It includes of 3 elements specifically detector, storage and application. In detector half, the detector nodes area unit deployed supported the appliance demand and it's hooked up to the wireless communication device. we have a tendency to use the sensors temperature, webcam, lightweight detector and it's connected to the wireless communication devices specifically Bluetooth, Author to whom correspondence ought to be addressed . Zigbee, etc. the sting router or Iot entrance collects the information from the detector through the wireless communication device, and it's forwarded the information to cloud storage. The user once deleting the app is ready to retrieve the previous information from the cloud [5].

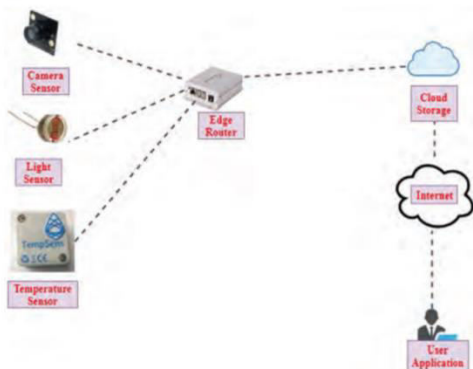


Figure - 2

II. RELATED WORK

In [7], three modules main modules are: Human Detection Module, ZigBee Module and Door lock Module. Human detection module is used to detect the visitor of the house. Visitors' ZigBee tag(ID) is checked if it is valid or not by ZigBee module. If the tag is valid, the Door lock module operates a motor to open the door. The door remains closed if the tag is invalid. As it is a wireless system so no cabling is required. But ZigBee is short-ranged compared to most other wireless technologies like Wi-Fi. In [3], a visual device for example camera or motion detectors is used to monitor the area in standby mode. If any motion is detected, pictures will be taken and it will be notified to the owner. The owner of the house then takes necessary action like alerting neighbors/seeking police help etc. in case of a suspicion. Here Global System for Mobile Communication is used for international roaming. This only supports one-way communication.

We will use Near Field Communication[4]. Whenever a person waits at the door, the owner who is present at the nearby location is notified and appropriate action is performed. NFC is a perfect source of accessibility and is primarily used for real time applications. Leading problem to NFC is computer or phone hacking. It is an extravagant Technology in comparison to other Technologies. Also it is short-ranged and is not suitable for remote access. This has three key contributions. The first taste of a new image representation called "Integral Image". The other thing which comes is learning algorithm which is based on AdaBoost.

Anuradha al [3] implemented an optimized door locking system for physically challenged people. This work is implemented using Arduino UNO microcontroller. For the physically challenged people this can be very helpful as they can lock and unlock the door very easily. In this system, the significance components are Mobile

applications, Arduino Microcontroller, Bluetooth module and Servo motor.

In Ref. [5] proposed a security-based smart home system using fingerprint. In smart home system, most of them usually follow the fingerprint and security pattern, for providing the security. Finger print device provides the identity of the person to the admin or owner in the system. It is implemented using Raspberry Pi2 and it is tested in the different environment.

Shia Kumar [6] proposed a smart home system using mobile application. This system aims to provide the flexible and low cost of the system, for the user. In this system, it is integrated with Arduino microcontroller, Ethernet, Switches, temperature sensors, gas sensors, intrusion detection sensors and humidity sensor. And then admin or owner is alerted. This system is implemented and tested in the different environment. It is provided more flexible than other smart home systems.

III. EXISTING SYSTEM

- For the most part, customary locks are substantial and that are not solid as they can harm basically by utilizing a few apparatuses.
- With these kinds of locks there is no security.
- Life is stressful enough, and when your lock brakes, you just want it fixed as quickly as possible so you can get back to your normal routine.
- Door locks have plenty of moving elements, therefore it goes while not oral communication that there area unit many totally different parts holding any given lock body along.
- You have to carry the key wherever you go plus burden to not to lose the key.

(a) DISADVANTAGES

- More prone to theft.
- Less efficient.
- Key broke in door: It is one of the most frustrating lock and key problems home and business owners face. Many a times broken keys occur when you don't have much time and trying to rush the opening or locking of the lock.
- There can be n number of reasons why you won't be able to insert the key into the lock. First and foremost, make certain it's the correct key! It looks easy when you are thinking about it but a lot tough when you do it. And if it's a newly cut key then there is high chance it not cut properly.
- Slow Door Lock problem occurs when you lock is accumulated with dirt or losses its geese.

- Lock Seizures: once you're able to get the key within the lock, however not flip the key, meaning your lock has appropriated up.

IV. PROBLEM STATEMENT

Most of the people always forget to lock the gate in the urgency situation. This is probably inflicting the issues inclusive of forgetting to lock the door in their home. Sometimes, they may lose the key of the door. Aside from that, there may be less security on the gate because of which thief can easily break the gate.

As the developed application will be available only for the admin so if anyone his relative or friend wants to come into the house that will be a problem, one thing is that user has to share its id and password or he has to be physically present.

V. PROPOSED WORK

1. An IOT based smart door can be used for many beneficial purposes.

The proposed system works on two different modes which are as follows: - User can reset the password if he feels it is not secure.

- Recovery of countersign is offered if he/she forgets victimisation the registered email address.
- Admin can access the door through a unique password.
- User will login victimisation the registered countersign.
- In basic mode the user will login through user-id and password. It has following features: -
Special guest mode will be there in which any guest wants to operate the lock, he will be provided with the one-time password.

VIPROPOSED METHODOLOGY

(a) HARDWARE REQUIRED

1. Arduino Uno Board: This microcontroller is based on the AT mega 328. In this there total of 20 pins in which 6 are analog inputs which can also be used as general purpose pins, a ceramic resonator which has 16MHz frequency, an USB connection, a reset button and power jack. It has everything which is required to support microcontroller.
2. Servo Motor: The servo used in the project is SG90 Micro Servo weighing about 9g. This is programmed using the library.
3. Bluetooth Module HC – 06.
4. Jump Wires.

(b) SOFTWARE REQUIREMENTS

We will use C programming language for Arduino to run through Arduino microcontroller. We will be using Java to make application on android studio.

(c) MECHANISM

Arduino microcontroller is the brain of the complete series. [2] The microcontroller can be linked with other circuits to perform certain functions. We use Arduino microcontroller using ATGMega328P-PU and it works with the program we have made which is ready to use. The Bluetooth module we use in this circuit is HC-05 which uses 3.3V Dc power drawn from Arduino controller circuit. Pin(TX) send data on the Bluetooth module and Pin(RX 0) as the receive path on the Bluetooth module with microcontroller. GND is path which is connecting the data between microcontroller circuit and Bluetooth module.

Table-1. The function of each System Block.

No	System Block	Function
1	Arduino Microcontroller	As data processing center
2	Android Smartphone (Andruino v0.11)	As data input
3	Bluetooth Module Hc-05	As data receiver
4	Battery and Adaptor (12V)	As the power supply
5	Driver Relay	As switch

Arduino microcontroller requires C programming language. A program will be required for the implementation of microcontroller. To run the program and incorporate the program to the microcontroller needed software i.e. Arduino. The procedure of this system is to take an input for the digital keyboard on software of the android Smartphone. The command is controlled by the user and the data is transmitted through Bluetooth network which is connected by Arduino microcontroller. Microcontroller is the central data in processing system. Microcontroller is harnessed with internal EPROM and flash memory etc. This portion of the system is used to monitor the input password, give orders to LED relay, the program is done with the principle of ISP (In system programming) so program can be done without removing its control. LED circuit is indicator for electrical phenomenon. 12V Dc solenoid will transmit the current to LED so it will turn on

in open door condition, and it will be off in locked door condition.

(d) OPERATION OF THE SYSTEM

1. Connect Arduino to Servo Motor.

The Arduino microcontroller using IC ATmega328 and works by entering the program that has been created and ready for instantly use.

2. Android app will be created on android studio.

3. Install the application on your android Smartphone.

4. Connect Bluetooth Module to Arduino.

We use Arduino microcontroller using ATGMega328P-PU and it works with the program we have made which is ready to use. The Bluetooth module we use in this circuit is HC-05 which uses 3.3V Dc power drawn from Arduino controller circuit. Pin(TX) send data on the Bluetooth module and Pin(RX 0) as the receive path on the Bluetooth module with microcontroller. GND is path which is connecting the data between microcontroller circuit and Bluetooth module.

5. Battery or adapter will be used to connect it to Arduino through switch.

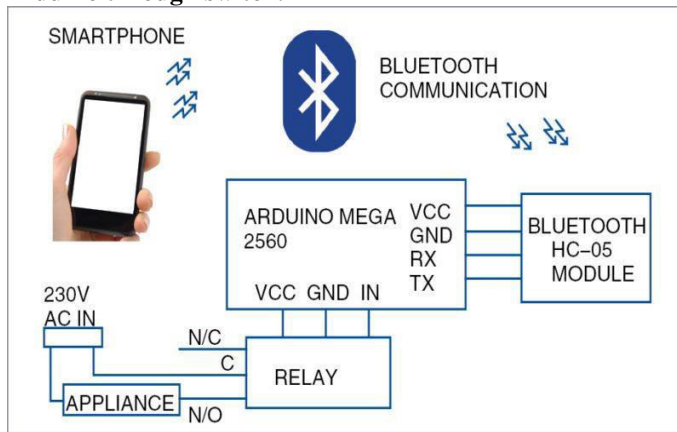


Figure - 3

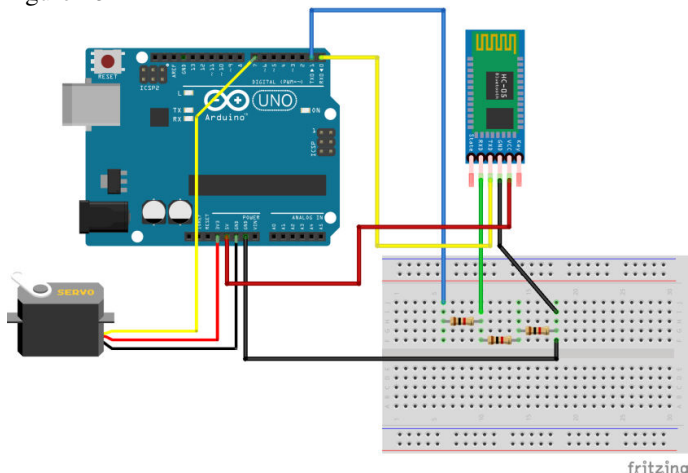


Figure - 4

VII. RESULTS AND DISCUSSION

The proposed system is implemented the Smart Door lock system and tested in the different environment. If the person who has made the application or the admin wants to open the door can open it by entering user-id and password and for guest users OTP will be generated on the phone of admin and through that it can access the door.

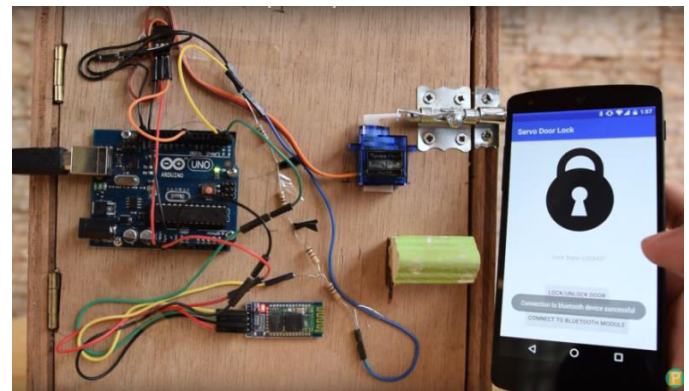


Figure - 5

VII.CONCLUSION

This is an ongoing project. In this paper we have tried to control the home security for smart home mainly for door key locks. We use Smart door lock system as a prototype for indoor and outdoor key lock system.

It enhances the protection for users who are physically challenged. This project is built on free open source platform, both android and Arduino platform are free of cost and easily available. So the build cost is cheap and can be used by a commoner. Bluetooth connection in microcontroller makes it more easy to use. The system has been swimmingly designed and prototyped to monitor the gate situations through Bluetooth enabled phone and Bluetooth module HC - 05. We have tried to make a simpler prototype but it can be further drawn-out to many other areas.

VIII FUTURE EXTENSION

1. Bluetooth module can be added to the device to open the door with the help of an application in smart phones.
2. Providing the device for low cost.
3. Camera can be added to detect the intruder while trying to authorize the door with a wrong key.

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