

Smart Door Lock-Unlock with Internet of Things & Access Control

Rachana Buch*, Tosal Bhalodia, Jaydeep Tadhani
Atmiya University, Rajkot

ABSTRACT

In the current scenario, the internet of things is one of the best and new technology which can easily connect and communicate with control of the device and give a better and easy life with security. With the exponential growth of IoT devices, IoT security is becoming more and more important. Specifically, the first step of security comes from the door. In every field, we need a smart door for safety. In this paper, we are proposing smart door lock and unlock system using keyless method i.e. Bluetooth technology by double verification, fingerprint sensor, and face recognition techniques which cannot be hacked and also non-vulnerable techniques to provide security to various places like home, banks, industries, etc. It will take snaps of the entering person and send it as a floating message to the owner; he/she will have the option to save or ignore the snap. If anyone tries to unlock the door forcefully then an alarm will start and the owner will also receive the message that someone is trying to unlock the door forcefully. So, that owner can inform the neighbor also. At last, we achieve security through access control.

KEYWORDS: IoT, Smart Door Lock-Unlock Framework, Access control, Security: Bluetooth-Face Recognition-Fingerprint.

1. INTRODUCTION

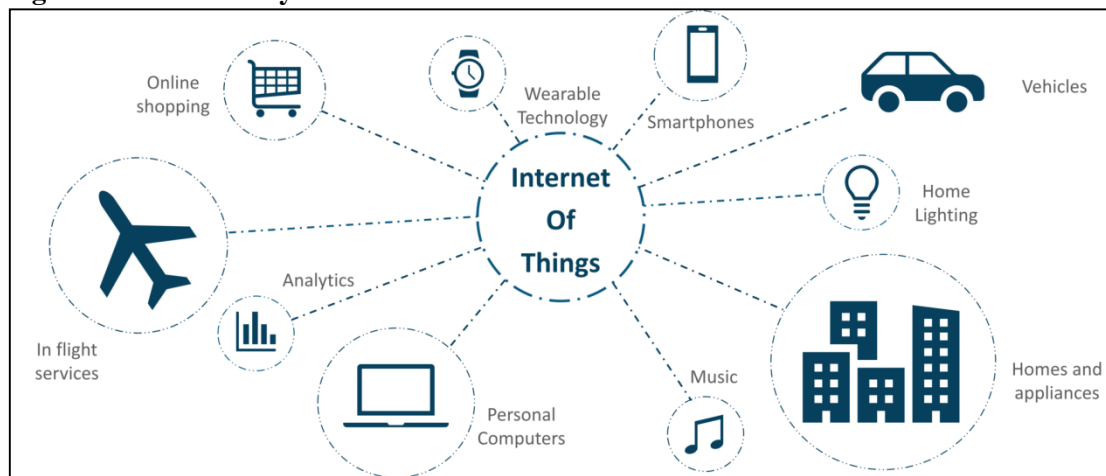
1.1 Internet of things (IoT)

IoT is a new and emerging technology nowadays. It will become more and more popular in today's world. IoT is that technology which reduces the burden of human being and also helps to reduce the work and stress in daily life. It will help people to stay tension free and make their life easier.

The Internet of things (IoT) is known as associating articles like mobile phones, PC, home machines to the internet or web, which presents another period in the region of correspondence, where items speak with one another without human intervention. (Satoskar and Mishra, 2018) The foundation of IoT has prompted expanded research in the territory of IoT and the improvement of home computerization is ending up extremely well known these days. The greater part of the gear and contraptions are controlled and checked to help and help people by cell phones.

In addition, different remote advances help with speaking with remote spots which assume an incredible job in the knowledge of house environment. IoT is a refined system of hubs with the one of a kind capacity to trade information and learning remotely which empowers correspondence between two articles in this manner making them keen and expelling the need of people for the machine to machine correspondence. IoT provides security to all the fields and also it helps to save energy by automatic or remotely access the home appliances. It will use in gardening, farming, vehicular network, and many more field.

In the below figure we can see that in all the devices like wearable devices, home appliances, smartphones, home lighting, music personal computers, in-flight service, online shopping, vehicles IoT are used and make services best and easier, no need to give more attention to the all the devices. It will help to make communication smoother and make life more comfortable. IoT can connect with the devices and its devices will be operated, control and monitor through smartphones. It will also provide security to the devices for leakage of data and make your devices more secure. In this privacy will also be maintained.

Fig.1 Fields covered by IoT

In the below figure, we can differentiate the devices relays in which category either in home IoT devices or personal IoT devices.

Fig.2 Differentiate IoT applications

1.2 Access control

Security means a lot to the user and for that access control is used. Access control is the main part of security. In other words, we can say that access control is the heart of information security. It will make devices or places more secure. It is used to give restriction to the places or devices.

There are two kinds of access control: Physical and Logical. Physical access control cutoff points get to the executives to grounds, structures, rooms, and physical IT resources. Consistent access control limits associations with PC systems, framework documents, and data.

Access control frameworks perform recognizable proof confirmation and approval of clients and elements by assessing required login certifications that may grasp passwords, individual distinguishing proof numbers (PINs), biometric checks, security tokens or diverse verification factors. Multifaceted confirmation, which needs two or extra validation factors, is generally a urgent piece of the superimposed barrier to protect access control frameworks.

2. CHALLENGES AND ISSUES OF IoT

Fig.3 Challenges and Issues of IoT



Internet of things have main 5 challenges and issues are as follows:

- 1) Security: Security is the main challenge of the internet of things. When the number of connected devices is increased security will be compromised more and more. With a lack of security, IoT can be hacked.
- 2) Privacy: Privacy is the main issue of the internet of things. With less privacy, private data and personal information can be stolen. This way privacy plays an important role in the internet of things.
- 3) Botnets: Botnet means virus infected devices. As we the ll know that internet of things based on the internet and all the devices of the network will be connected to the internet constantly. So, If any device getting virus infected then all other devices which are connected with that device is also getting infected. With the virus, infected devices performance of the devices will be reduced and data will be dropped in some cases and chances of hacking will be more due to botnets.
- 4) Vulnerability: It shows the loopholes in the system through which an attacker can attack and the system will be hacked. It will be an effect on security as well as the privacy and private information may be misplaced or hacked.
- 5) Connectivity Issue: There is a main issue of connectivity as several devices are connected to the centralized server. Therefore Connection will be lost sometime or low connectivity issue will occur.

3. LITERATURE SURVEY

Table 1: Method which was used by the author

Sr. No	Title	Author	The method which was used			
			Digital Password	Bluetooth Technology	Alarm System	Biometric System
1	Smart Door Lock and Lighting System using the Internet of Things	Rahul Satoskar, Akarsh Mishra	√	×	×	×
2	IOT Based Smart Door System	K. Sri Viraja, K. Bharath Kumar, C. Keerthi, G. Sandeep	×	×	×	×

3	Design of Smart Lock System for Doors with Special Features using Bluetooth Technology	Muhammad Sabirin Hadis, Elyas Palantei, Amil Ahmad Ilham, Akbar Hendra	×	√	×	√
4	Internet of Things Cyber Security: Smart Door Lock System	Marko Pavelić, Zvonimir Lončarić, Marin Vuković, Mario Kušek	×	×	×	×
5	Block-chain based Smart Door Lock system	Donhee Han, Hongjin Kim, Juwook Jang	×	×	×	×
6	Smart Door Lock System: Improving Home Security using Bluetooth Technology	Jayant Dabhade, Amirush Javare, Tushar Ghayal, Ankur Shelar, Ankita Gupta	×	√	√	×
7	Block-chain based Smart Door Lock system	Naser Abbas Hussein, Inas Al Mansoori		×	×	×
8	Smart digital door lock system using Bluetooth technology	Siddhi Kavde, Riddhi Kavde, Sonali Bodare, Gauri Bhagat	×	√	×	×
9	Design and implementation of door Access control and security system Based on IoT	G.Sowjanya, S.Nagaraju	×	×	×	√

In 2018 author proposed a new Smart Door Lock and Lighting System using the IoT a novel home computerization framework utilizing IOT which incorporates the home security alongside the LED. The shrewd entryway lock and lighting framework give a helpful method to remotely control the entryway lock and lighting of a house in this way upgrading security and empowering the client to spare power (Satoskar and Mishra, 2018). They used LED light to notify the user that the door is open or closed. The green light is for door open and red light for door close.

In the year of 2018 author enhanced Internet of Things Based Smart Door System, in which it sends image to the owner in the mail, after giving permission of owner, LED light is helpful to notify the user or guest to understand that the owner has allowed user or deny a user for entering the home (Viraja *et al.*, 2018).

In 2018 author proposed Design of Smart Lock System for Doors with Special Features using Bluetooth Technology in which they used Bluetooth technology by pairing. After pairing via Bluetooth with the door, the door will open, if the user cannot make pairing with the door user will unable to open the door (Habis *et al.*, 2018).

In 2018 author explained the Internet of Things Cyber Security: Smart Door Lock System with giving learning about various security issues in IoT frameworks. Those issues will be unmanageable with the expanding assortment of associated gadgets in the event that they're not self-tended to ahead of schedule. all through the arranging of the IoT framework, security concerns must be encased from the earliest starting point (Pavelic *et al.*, 2018).

Security is compromised with the help of some attacks which are described in this paper:

- 1) DDOS
- 2) False impersonation
- 3) Man in middle attack

In 2017 author has given an idea about Block-chain based Smart Door Lock system and they used blockchain for security of database which will use any previous hash value for add new database and also door lock system by using motion section, if motion sensor detects motion then it will judge someone is there and broadcast the message in blockchain for permission and any of user connected in blockchain gave permission to the user for open the door only after that user can enter in the home (Han *et al.*, 2017).

In the year 2017 author gave a novel idea about Smart Door Lock System: Improving Home Security using Bluetooth Technology. They used Bluetooth technology and b-id fetching system. It verifies b-id to permit the user to unlock the door. It also uses the alarm system for an alert if anything goes wrong and alarm activated when the vibration sensor feels something abnormal. This system also gives the notification by taking a snap of the user and send it to the user by the mail or message (Dabhade *et al.*, 2017).

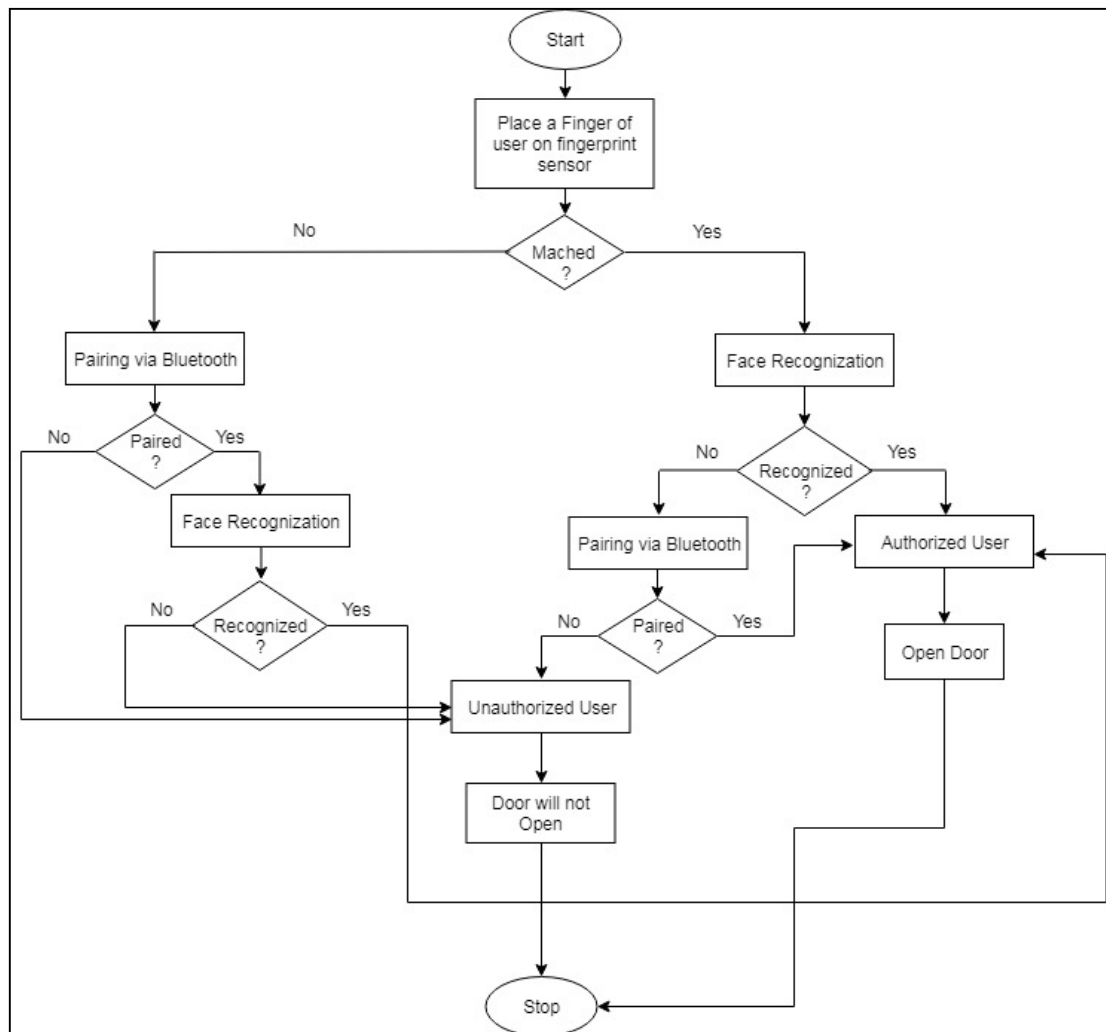
In 2017 author proposed Block-chain based Smart Door Lock system in which it uses the technology of password for security purpose and it also took a snap and sends it through email. If the user entered the password is correct and the image will be matched by the database image then and then the door will open otherwise door will not open and in that case, the image will be sent to the owner and owner can give permission to access the door or not (Hussein and Mansoori, 2017).

In 2017 author enhanced Smart digital door lock system using Bluetooth technology in which author proposed Bluetooth technology and see the live feed of home just as they also use the database for storing visitors information (Kavde *et al.*, 2017).

In 2016 author enhanced Design and implementation of door Access control and security system Based on IoT in which the author proposed biometric technology for security of home (Sowjanya and Nagaraju, 2016).

4. PROPOSED ARCHITECTURE

Fig. 4 Proposed flowchart



Above flowchart shows the overview of the proposed system in which the following steps will be followed.

In this system, the fingerprint sensor, face recognition, and Bluetooth technology will be used. Mentioned three technologies any of two must be successfully done to unlocking the system. User has to place the finger on the fingerprint sensor and if the fingerprint will be matched then it will redirect to recognize is the face of user if it recognized means the user is authorized and the door will open else user has to pair via Bluetooth if paired then the door will open else system detects unauthorized user and door will not open.

5. CONCLUSION

The target objective of this project is to provide an enhanced idea of brilliant entryway lock-open framework with the web of things and access control for providing security to the various places. Security will be provided with upgraded technology like fingerprint sensor, face recognition, and Bluetooth technology. This novel idea is not depended on smartphones only without smartphone door can open for an authorized user. This research also provides a facility to take and to save a snap of the user for proof.

6. REFERENCES

- Dabhade, J., Javare, A., Ghayal, T., Shelar, A., & Gupta, A. 2017. Smart Door Lock System: Improving Home Security using Bluetooth Technology. *International Journal of Computer Applications*, 160(8).
- Hadis, M. S., Palantei, E., Ilham, A. A., & Hendra, A. (2018, March). Design of smart lock system for doors with special features using bluetooth technology. In *2018 International Conference on Information and Communications Technology (ICOIACT)* (pp. 396-400). IEEE.
- Han, D., Kim, H., & Jang, J. 2017. Blockchain based smart door lock system. In *2017 International Conference on Information and Communication Technology Convergence (ICTC)* (pp. 1165-1167). IEEE.

- Hussein, N. A., & Al Mansoori, I. 2017. Smart Door System for Home Security Using Raspberry pi3. In *2017 International Conference on Computer and Applications (ICCA)* (pp. 395-399). IEEE.
- Kavde, S., Kavde, R., Bodare, S., & Bhagat, G. 2017. Smart digital door lock system using Bluetooth technology. In *2017 International Conference on Information Communication and Embedded Systems (ICICES)* (pp. 1-4). IEEE.
- Pavelić, M., Lončarić, Z., Vuković, M., & Kušek, M. 2018. Internet of Things Cyber Security: Smart Door Lock System. In *2018 International Conference on Smart Systems and Technologies (SST)* (pp. 227-232). IEEE.
- Satoskar, R., Mishra, A., 2018. Smart Door Lock and Lighting System using Internet of Things. In *2018 International Journal of Computer Science and Information Technologies (IJCSIT)* (Vol. 9, pp. 132-135).
- Sowjanya, G., & Nagaraju, S. 2016. Design and implementation of door access control and security system based on IOT. In *2016 International Conference on Inventive Computation Technologies (ICICT)* (Vol. 2, pp. 1-4). IEEE.
- Viraja, K. , Bharath Kumar, K. , Keerthi, C., Sandeep G. 2018. IOT Based Smart Door System. In *2018 International Journal for Research in Applied Science & Engineering Technology (IJRASET)* (Vol. 6, pp. 1-6).

