

# Smart Security Solution Based on IoT

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**Abstract-** *Internet of Things (IoT) technology has opened up doors of opportunities for development of smart systems and applications. With IoT it has now become possible to design simple systems to control the devices, machines and processes. Smart systems are the future of all technological advancements in the coming days. IoT has become a popular technology because of the supporting open access softwares and hardware. Authors have developed the smart security system for households using IoT. The implementation of the same system is presented in this paper. Integration of different sensors with the internet is useful to design the different systems to control the operations.*

**Keywords-** IoT, Security system, Home automation via blynk, Biometric Lock.

## I. INTRODUCTION

Smart systems are the basis for industrial evolution 4.0. Industrial and home automation systems are basically working to control the operations and processes from remote places. This project presents the implementation of the smart system for granting access to the person to enter in house with verification of identity by means of biometric recognition. The system is developed to control the operation from remote places also.

Every individual has got unique body features such as figure prints, face, etc. The human body has the privilege of having features that are unique and exclusive to each individual. Authors have proposed the system based on identification and recognition of these unique features of the human body.

### 1.1 Internet of Things

The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, sensors, and software, network connectivity which enables these objects to collect and exchange data. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer-based systems, and resulting in improved efficiency,

accuracy and economic benefit. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing internet infrastructure. Experts estimate that the IoT will consist of almost 50 billion objects by 2020. The application of the IoT is not only restricted to these areas; other specialized use cases of the IoT may also exist. An overview of some of the most prominent application areas is provided here. Based on the application domain, IoT products can be classified broadly into five different categories: smart wearable, smart home, smart city, smart environment, and smart enterprise. The IoT products and solutions in each of these markets have different characteristics.

### 1.2 system architecture

Biometrics have been proven to be effective in terms of reliability, security and maintaining privacy. The biometric system is being popularly used in many places nowadays for attendance monitoring. Authors have developed a system for recognition of a person and to grant access to home with biometric recognition or IoT based live streaming and door access.

The main objectives of the implemented system are:

- Real time authentication system using fingerprint module
- Door accessing using relay switch & solenoid lock
- Wrong authentication will raise alarm
- Live streaming to owner
- Provide access to guests using mobile application on need basis

## II. WORKING PRINCIPLE

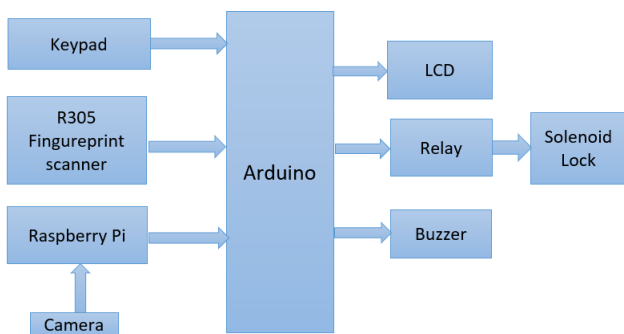
In this prototype we make use of 'R305 fingerprint sensor', Raspberry Pi processor, Arduino module, LCD, Relay and Solenoid lock. User puts his finger on the Fingerprint scanner - the result of scanning will be passed to the Arduino processor.

If the scan result indicates Authorized user, then the trigger will be set to relay which will ensure opening of solenoid lock for some time & then closes it automatically.

If the scan result indicates Unauthorized user, then the trigger will be sent to the buzzer to raise the alarm door lock will not open in this case.

This prototype also has provision to live stream via web camera - which can be used to keep track of ongoing activities. If the owner sees that guests are approaching the door, then the Mobile based application can be used to send trigger to open the door.

**III. BLOCK DIAGRAM**



- **Execution steps:**
- Person reaches door Puts his finger print on the fingerprint scanner.
- If user is authorized [has fingerprint stored], then door opens
- If user is unauthorized, then the door won't open

**Alternate execution steps:**

New person reaches home, but unable to open door due to missing biometric data

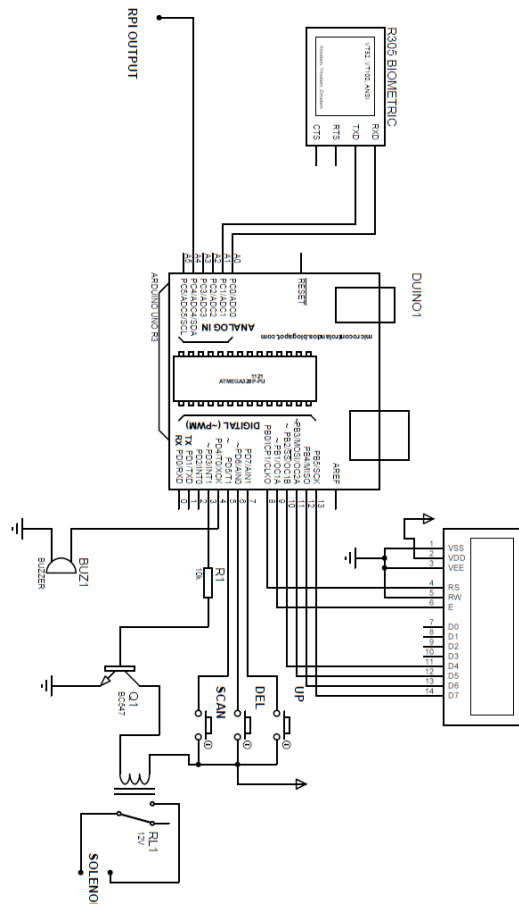
- Admin user will see the live streaming using Blynk application on mobile
- After confirming the identity of a person using live streaming, the admin can trigger a signal to open the door using IoT logic used in the application.

**IV. MOBILE APPS USED**

**VNC Viewer:** With this mobile application, we can connect to Raspberry Pi. Remote desktop screen of Raspberry pi can be accessed via VNC viewer. Command to run Blynk app is executed via remote desktop.

**Blynk App:** Our own interface is developed in the Blynk app to see live streaming from a web camera. Button provided to momentarily open the door, for guests - as one of the function on mobile application

Pin Diagram:

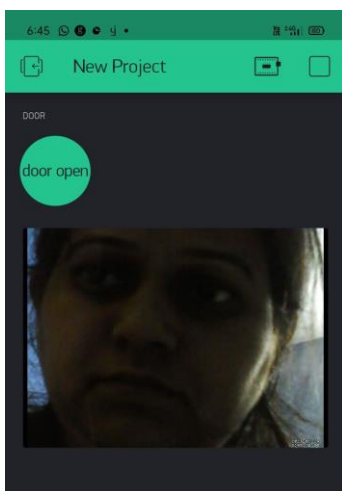


Photos of actual Hardware





### Mobile Application:



## V. CONCLUSION

Internet of Things is changing human life with better experiences of controlling the operations, processes and applications. In the coming years the IoT will become an integral part of human life. With the new technological advancements in relaying and controlling devices it has become easy to design the new systems for different applications. Authors have presented the implemented system of smart security designed for the purpose of household applications in this paper. The prototype was Not only providing access to the authorized people, but was raising alarms for unsuccessful attempts - thereby alerting neighbours. Live streaming feature of the prototype can help owner to keep track of outside activities.

Efficient system developed with ready to market components & open source softwares is found working properly for biometric access control as well as IoT based controlling of the door operations.

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