### SYNOPSIS OF IOT LABORATORY PROJECT WORK

ON

**AN IOT SECURITY LOCK AND ALERT-SYSTEM**

**USING RFID**

Submitted By:

**SARVESH (4PS18IS040)**

**AATIFULLA BAIG M M (4PS19IS001)**

**D. SHRIYANS DHRUV (4PS19IS017)**

**MOHAMMED FARHAN M (4PS19IS034)**

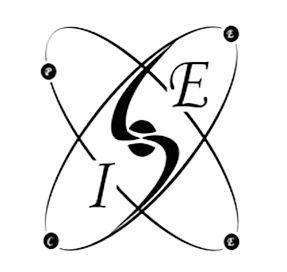
Under the guidance of:

**Dr. ANITHA M L**

**PROFESSOR AND HEAD,**

**DEPT. OF ISE,**

**PESCE MANDYA**

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**Department of Information Science and Engineering**

**P.E.S. College of Engineering, Mandya - 571 401**

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**INTRODUCTION**

The need for safety has been one of the primary factors behind people’s attempts to build homes of their own. Every house comes with one or more main entrances. The main doors are one of the vital points of security. Having mechanisms or security measures in place to control the access to the house has been proved to provide the aspired safety and security. As every house comes with doors, doors come with locks. In an attempt to ensure security, various kinds of door locks such as mechanical or electronic, have been implemented. Even after using those kinds of locks, the crimes do happen due to the fact that such locks have well-known weak points of their own. Some locks can be picked and others can be disabled in some way. So there is a need to invent other kinds of locks which cannot be easily broken and even if they can be broken, the task won’t be so easy as it is for other kinds of locks. Various control systems have been designed over the years.

The main aim in designing those systems includes –

* Ease of Control: The system should be easy to control for the household owners.
* Durability: The system should be durable enough.
* Security: The system itself should be secure to provide security.

The purpose of this project is to present a secure smart door lock which is intended to offer high security, easy access, and control. Therefore, the proposed system makes use of RFID tags and GSM modules to implement a secure but easy-to-use system. It has the possibility to replace the traditional door lock system. By using the proposed method, the security of the household can be enhanced at a very low cost.

RFID, Radio Frequency Identification is a fundamental and inexpensive technology that enables wireless data transmission. This technology has not been very often used in industry due to lack of standardization among the manufacturing companies earlier. RFID technologies are efficient and secure compare to other network. With RFID, wireless automatic identification takes a very specific form: the object, location, or individual is marked with a unique identifier code contained with an RFID tag, which is in some way attached to or embedded in the target. RFID is not a single product but a comprehensive system, a typical RFID system include three basic elements: RFID tag (transponder), reader (transceiver) and back-end application system (or database), which demands the support of the computer network. The software is used for management, controlling, transaction, operation and maintaining record of the various users. A digital door locking system is also implemented and governed by RFID reader which authenticate and validate the user and open the door automatically. It also keeps the record of check-in and check-out of the user. It’s very important to authenticate the user before entering into a secure space and RFID provide this solution. The system enables user to check-in and check-out under fast, secure and convenient conditions. The system include door locking system which open when the user put their tag in contact with reader and the user information matched with the information already stored in database. The RFID controls the opening and closing of the door. In this study we utilize RFID technology to provide solution for secure access of a space while keeping record of the user. We used passive type of RFID here. The passive types of RFID are battery-less and they obtain power to operate from reader. The major advantages of passive RFID are its cost effective and small in size. Due to above advantages, it is widely use by inventory tracking technology. Current antenna technology makes it possible to smaller in size.

**LITERATURE SURVEY**

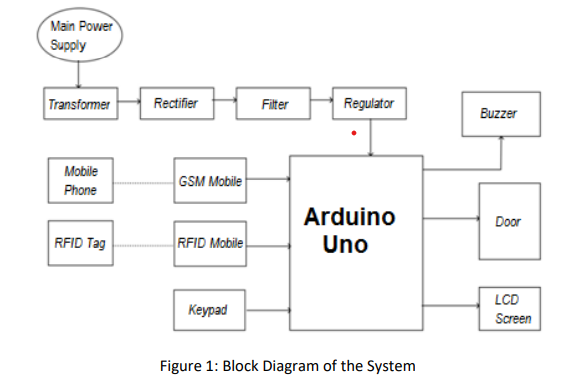
As per Prof. A. Y. Prabhakar’s work [1], by using Arduino automatic RFID-based access control system, this system was designed to represent a combination of RFID system in order to achieve a particular task. RF reader detects an RFID tag then the system captures the UID that is a unique identifier.

If card UID matches with capture image then access is granted or access is denied and the system gives an alert alarm for security purposes this system plays a significant task of entrance monitoring controller and exit monitoring controller it can be installed at the entrance and exit gate. This system can be used in hostels for security purposes. In this technology, response time can be enhanced by using controller processes and real-time images. Umar et al [4] suggested and developed an RFID-based security control system and also installed it in hostels at the Punjab University campus this system combines RFID technology with biometrics.

RFID is Radio Frequency Identification which is a fundamental and cheapest technology to enables wireless data transmission. Radio frequency Identification i.e., RFID is a non-contact technique applied in industries for personal tracking, supply chain management, management of books in libraries and at tollgate. RFID technology has a lack of standardization and hence it has not been very often among the manufacturing companies earlier. RFID technologies are more proficient and more secure as compare to other networks. RFID technology is used in many areas such as public transport, industrial automation, animal identification, ticketing, inventory detection, electronic immobilization, access control, asset and people tracking, and many more. Gyanendra and Pawan [3] proposed a security system using a passive type of RFID contains a door locking system using an actuator.

**METHODOLOGY**

Like all other RFID systems, the one presented in this work contains three basic components, the RFID tag, the RFID reader and the backend. The code had to be modified to include the RFID tag’s UUID. The passive RFID tag powers up passively and exchanges commands/responses. If the RFID tag is read successfully, the user has to proceed with entering the keycode on the matrix keypad. Matrix keypads or thin membrane keypads are built on a film membrane and are rectangular in shape. Library available for Arduino will be used for keypad. Though, it is important to note that, one can program the keypad to enable the user to input symbols as a code, which will provide even better than simple alphanumeric code, specifically if the code is noticeably short in length. SIM900 is a quad band GPS solution and it can be even embedded in client applications. It gives voice notice, sms and text. The user can send a message to the board in order to control the behavior of the door lock. If the user sends “close” to the board, the lock will suspend its regular application and it will wait for the confirmation message with “open” as its content. During this period, the scanning for RFID tags will halt too and only messages to the board will be looked for. On scanning the wrong tag or on entering the wrong password, it will send the owner an alert. On scanning the right tag and on entering the right password, it will send the household owner a confirmation message that the door has opened. The owner can halt the system by sending a ‘close’ message to Arduino and it will only go back to normal mode when the ‘open’ message is sent to Arduino. During halt time, it won’t scan for any tags and it will only look for messages. It is possible to open the door by sending a message to Arduino

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**FACILITIES REQUIRED**

### **Hardware components required**

* I2C LCD
* Arduino UNO
* MFRC522 RFID Reader
* Tags
* SIM900 GSM module
* 5V, 2A power adapter
* SG90 Micro-servo motor
* 4X4 Keypad
* Resistor 221 ohm
* Buzzer
* 6V to 12V Power source
* 5 mm LED: Red
* 5 mm LED: Green
* 5 mm LED Blue

### **Software Required**

### Arduino IDE

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