

A PROJECT REPORT ON

**Smart Lock -A locking system based on
Bluetooth Technology**

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(Computer Engineering)**

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Abstract

In today's world smart home control system is necessary in daily life. As the technology is emerging a lot it's time for us to be more technical related to home security. Door locks used in home automation has evolved over the years. In this approach we have derived a door lock system which provides better security and easy access to the user. This technique basically deals with keyless door lock system using smart-phone. The system includes different modules namely Bluetooth module, door lock, database server. Smart phone will be used to control the system in which SMS, E-mail, Image, anti-burglar will be used and for guest users it will generate b-id which will allow the guest user key to access the door for a given particular time only. The system also includes motion detectors that will help to determine the user and if an unauthorized person is trying to access the door then accordingly camera will be turned on and it will take snaps of user at the door for an specified amount of time so that this information is send to owner which will help him/her to take appropriate actions like start Alarm and also call 100 by using smart-phone. Thus this approach would provide more security and protection from unauthorized users in home automation. Thereby making door lock system more intelligent, efficient and better equipped to be incorporate in home networking system, banks, offices to improve privacy in the smart environment.

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CHAPTER 1

SYNOPSIS

1.1 Project Title

Smart Lock -A locking system based on Bluetooth Technology

1.2 Internal Guide

Prof. Ankita Gupta

1.3 Technical Keywords (As per ACM Key-words)

- Android ADT bundle
- Client and Scerver
- Database MySql
- Java (Swing for GUI)
- NetBeans(Servlet web server)

1.4 Problem Statement

Home automation is boon to the Residential sector. As the use of technology is increased people demand for better and quality products. Now large number of people like easy access, but with the convenience, security might be compromised. This approach introduces a simple and effective secured system which includes bluetooth technology that will help to minimize unauthorized access in home and also allow owner to take appropriate actions.

1.5 Abstract

In today's world smart home control system is necessary in daily life. As the technology is emerging a lot it's time for us to be more technical related to home security. Door locks used in home automation has evolved over the years. In this approach we have derived a door lock system which provides better security and easy access to the user. This technique basically deals with key less door lock system using smart-phone. The system includes different modules namely Bluetooth module, door lock, database server. Smart

phone will be used to control the system in which SMS, E-mail, Image, anti-burglar will be used and for guest users it will generate b-id which will allow the guest user key to access the door for a given particular time only. The system also includes motion detectors that will help to determine the user and if an unauthorized person is trying to access the door then accordingly camera will be turned on and it will take snaps of user at the door for an specified amount of time so that this information is send to owner which will help him/her to take appropriate actions like start Alarm and also call 100 by using smart-phone. Thus this approach would provide more security and protection from unauthorized users in home automation. Thereby making door lock system more intelligent, efficient and better equipped to be incorporate in home networking system, banks, offices to improve privacy in the smart environment.

1.6 Goals and Objectives

A) The objective of this system is to:

- Provide easy access to owner and guest user at the door.
- Build system that enhances security in home automation
- To determine any unauthorized access to the door so that owner can take appropriate action accordingly.
- To analyses the system and identify constraints and problems.
- To test the new/improved system
- To identify conditions for successful implementation of the system.

B) The Goals of the system is:

- To detect unauthorized users ta the door and take appropriate action.
- Build better door lock system that is good enough to replace the existing system
- Improvise home automation in terms of security

1.7 Relevant mathematics associated with the Project

Set Theory

Let G be the set of all functions.

$$G = \{Ca, Oa, Ad, S, Bt, Buz, Md, Vs, Mc, Cm\}$$

- Ca be set of all client. $Ca = \{c1, c2, c3, c4, \dots, cn\}$
- Oa be set of owner app. $Oa = \{o1, o2\}$
- Ad is set of admin. $Ad = \{ad1\}$
- S be set of server. $S = \{s\}$
- Bt is set of bluetooth fetched. $Bt = \{b1, b2, b3, b4, \dots, bn\}$
- Buz is set of burglar alarm. $Buz = \{bu1\}$
- Vs is set of vibration sensor. $Vs = \{v1\}$
- Md is set motion detector. $Md = \{m1\}$
- Mc is set of micro-controller. $Mc = \{Mc1\}$
- Cm is set of web cameras used. $Cm = \{Ca1\}$

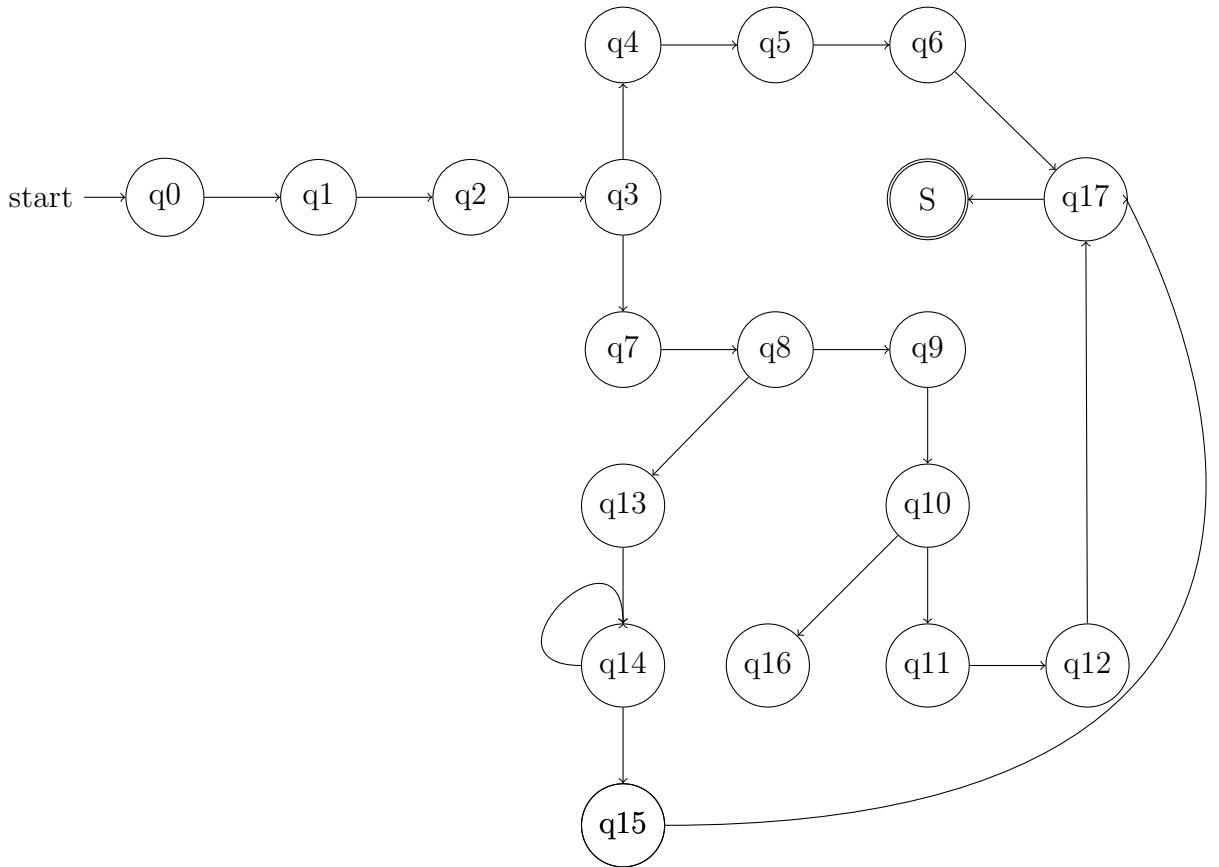
Success Condition:

- B-id register in the database so user can access the door.
- Activate burglar alarm when unauthorized user try to access the door.
- Notify owner about all user when they come in and out of the home.
- Send snaps to owner to the user at the door.
- Generate B-id for guest user when owner send request to the database.

Failure Conditions

- B-id not registered in the database.
- Alarm could not activated when authorized user try to access the door.
- couldn't receive snap of user at the door.

State Transition



Let A be the System $A = \{Q, \Sigma, Q_0, S, \delta\}$

Q_0 :Door locking system ready

Q_1 :motion sensor activated

Q_2 :trying access

Q_3 :checking into database

Q_4 :user B-id found

Q_5 :Establish connection

Q_6 :Authorize access

Q_7 :B-id not found in database

Q_8 :Asking host for access

Q_9 :Host authorizing access

Q_{10} :Checking the time window allotted by host

Q_{11} :Establishing connection if time not expired

Q_{12} :Authorize access

Q_{13} :Unknown user

Q_{14} :Send Image or snaps to the host

Q_{15} :Take appropriate actions

Q_{16} :Time expired

Q_{17} :Enter into log file

$$\Sigma = \{Db, M, C, L\}$$

Db= Database

M = Motion Sensor

C = Camera

G = Guest

L = Log file

Certainty

	Y1	Y2
$\delta(G, Db)$	1	1
$\delta(G, Db)$	0	0
$\delta(G, Db)$	1	0
$\delta(G, Db)$	0	1

Success= $\{(1,1), (0,0)\}$

Failure= $\{(1,0), (0,1)\}$

1.8 Names of Conferences / Journals where papers can be published

- Published paper in International Journal of Computer Applications (IJCA) February 2017 Edition Volume 160 with title as " Smart Door Lock System : Improving Home Security using Bluetooth Technology"
 - Ankita Gupta
 - Amirush Javare
 - Tushar Ghayal
 - Jayant Dhabade
 - Ankur Shelar

1.9 Review of Conference/Journal Papers supporting Project idea

- Kyu Hwang, et al. : Digital door lock is an electronic locking system operated by the combination of digital key, security password or number codes. It implements the system by using Zigbee protocol. Once a person at the gate is detected by the human detection module, the ZigBee module of digital door lock sends a message to the video door phone and checks whether the person has a ZigBee tag . Then the video door phone sends a command to camera module to turn it on. If a valid identification code is taken from the ZigBee tag at the gate, digital door lock operates a motor connected with the locking system to open the door. Otherwise the user can interact with the person using the speaker phone. The speaker phone includes a camera module. The digital door lock is able to control the video door phone by using the ZigBee modules.[1]
- Yong Tae Park, et al. : A door lock system proposed here consists of RFID reader for user authentication, touch LCD, motor module for opening and closing of the door, sensor modules for detecting the condition inside the house, communication module, and control module for controlling other modules. Sensor nodes for environment sensing are deployed at appropriate places at home. Status of individual ZigBee module can be monitored and controlled by the centralized controller, digital door lock. In home automation function digital door lock system enables user to conveniently control and monitor home environment and condition all at once before entering or leaving the house.[2]
- N.H, Ismail, et al. : It uses the Bluetooth technology to establish communication between user's Smart phone and controller board. The prototype support manual controlling and micro-controller controlling to lock and unlock home door. By connecting the circuit with a relay board and connection to the Arduino controller board it can be controlled by a Bluetooth available to provide remote access from tablet or smart phone.[3]
- Pavithra.D,et al. : This project aims at controlling home appliances via Smart phone using Wi-Fi as communication protocol and raspberry pi as server system. The user here will move directly with the system through a web-based interface over the web, whereas home appliances

like lights, fan and door lock are remotely controlled through easy website.[4]

- Nateq Be-Nazir Ibn Minar, et al. : This approach presents the vulnerabilities in the security protocols of this technology along with some past security threats and possible countermeasures as reported in the literature which have been surveyed and summarized. It also presents some tips that end-users can implement immediately to become more cautious about their private information.[5]
- Shruthi Suresh, et al. : The main objective of this paper is to identify the main applications of various home automation technologies and future enhancements needed in this field. The paper also reviews the different energy conservation ideas that are implemented in the field of smart homes.[6]
- Chi-Huang Hung, et al. : In this paper it proposes an integration design of both a near field communication (NFC) and a smart phone to achieve a door lock control system. This design consists of a built in NFC capabilities of a smart phone combined with a dedicated application deemed to be a key to open the door by means of the logical link control protocol (LLCP) exchange together with a time stamp to match the users own set of password information to verify who is a permissions user or not. When verified the specific door which is secured by this door lock control system immediately opens.[7]
- Chi-Huang Hung , et al. : This design integrates the near field communication (NFC) reader of a smart phone device with the door lock control system to provide a convenient single button operation. This design also offers three operation modes to the user in order to allow a one-time password with a time stamp permission to match the user's password thus enhance the doors security. The door lock control system is fixed on the door, and also provides both the sleep state and the standby state to save power consumption for a long time operation.[8]
- Mrutyunjaya Sahani, et al. : This paper describes about the implementation and deployment of wireless control system and accessibility in to a home environment for authenticated people only. A wireless network technique ZigBee based and image processing technique PCA based, dedicatedly make the security system alive as per the request.[9]
- Adnan Ibrahim, et al. : This paper discusses the design and implementation of a GSM based digital door lock security system using PIC

platform. A 5-digit password was used to lock/unlock the doors by employing a gear motor. Three consecutive unsuccessful attempts in entering the correct password results in sending a warning message, was sent to preset mobile numbers, as a means of detecting unauthorized intrusion.[10]

- Kyu Hwang, Jin-wook Baek : This paper propose a novel wireless access monitoring and control system based on the digital door lock, which is explosively used as a digital consumer device. It presents a prototype of the proposed system and shows a scheme for the implementation. To implement the system with ZigBee network protocol, four types of modules are developed, ZigBee module, digital door lock module, human detection module, and ZigBee relay module. Digital door lock module is implemented as a digital consumer device to control the access system as well as locking system. It is very convenient system for the consumers and has extensible and flexible characteristics.[11]
- Sachin Khadke : This paper introduces a remote appliances control system based on the Android smart phone which includes GUI designed on Android Smart-phone. A user logs into the smart Android phone interface, and clicks the buttons gently to send message commands from the GUI which will be transmitted to home information center through the GSM network. It focuses on the design of Android terminal, the communication between PIC and GSM module, the realization of the wireless module devices driver, the difficulty in supplying the appropriate low-voltage DC for MCU and wireless module just by a single live wire. The users can manipulate appliances anytime, anywhere, letting our houses become more and more automated and intelligent.[12]
- Kenji Yoshijoe, Melissa Abramson et al. : This paper awares the people about privacy of smart home devices in home residence settings and show how homeowners privacy could be compromised via simple network traffic analysis. Authors first measured normal traffic patterns generated on commercial off-the-shelf (COTS) smart home devices, and identify possible privacy vulnerabilities. They also designed a smart home hub-integrated solution to mitigate such risk by obscuring real network traffic with synthetic traffic. Thus it suggested that the smart home industry consider incorporating this approach into their products to improve privacy in the smart home environment.[13]

1.10 Plan of Project Execution

Number	Task	Start	End	Duration	2016						2017	
					July	August	September	October	November	December	January	February
1	Concept	26/8/2016	2/9/2016	6								
2	Synopsis Preparation	26/8/2016	6/10/2016	30								
3	SRS Preparation	26/8/2016	2/9/2016	6								
4	Overview and report submission	1/10/2016	4/10/2016	2								
5	Preparation of paper	30/12/2016	13/1/2017	11								
6	Literature survey	30/7/2016	12/8/2016	10								
7	Module Identification	20/8/2016	30/8/2016	7								
8	Design and Implementation	27/12/2016	10/2/2017	34								
9	Error Correction and Testing	13/2/2017	21/2/2017	7								

Figure 1.1: System Implementation Plan

CHAPTER 2

TECHNICAL KEYWORDS

2.1 Area of Project

- Internet of Things (IoT)
- Improvising security in home automation.

2.2 Technical Keywords

- Android ADT bundle
- Client and Server
- Database MySql
- Java (Swing for GUI)
- NetBeans(Servlet web server)

CHAPTER 3

INTRODUCTION

3.1 Background

Today technology is become important part of human life. It has great influence in many aspects in our day to day life and also have improved social problems in our environment. The creation of mobile phones and computer have caused many people to rely on technology to improve their way of working and also provide easy way to use various applications. Home automation system is a computerized and intelligent network of electronic devices designed to monitor and control the home appliances. Home automation is the emerging field that has tried to get the attraction of most of commercial and research fields. Although wired home networks were given importance in the earlier stages of home automation but now as technology is emerging a lot people have started adopting technology to a greater aspects. Wired system requires proper planning and construction works is also messy. It is the reason wireless communication has replaced the wired ones. Door lock system has been one of the most popular consumer devices replacing many of the conventional locks because of the user convenience and affordable price. It is kind of locking system that operates by fetching the Bluetooth-id from the client and is further verified in the database so as to check that client B-id is registered or not. The system also includes sending SMS to the owner, turning burglar alarm, Vibration sensor, Camera that will take the snaps of the user at the door and also notify the owner about the current status of the door. Therefore it is a good locking system for checking the access information and controlling the door on or off as everyone has access to the door to go inside or out. We proposed a system for the access monitoring and control based on door lock that uses bluetooth technology which will help the client to access the door. The system also includes various modules namely Admin module, owner application, Client, database server, Bluetooth verification module, sensors. As privacy is also important in homes System also includes burglar alarm that will be turned on whenever any unauthorized user try to access the door and accordingly camera will be turned on to take the snaps to the user which then will be send to the owner and owner can take actions accordingly. By adopting this system owner can be provided with the safe and convenient life. Furthermore it allows user to remotely monitor and control the door through Internet or any other private network. This proposed system can be easily installed anywhere without requirements of any big infrastructures and planning which is the biggest advantage over other existing system. Thus making door lock better equipment to be incorporate in home networking system, banks, offices and also disabled people who are paralyzed from legs to waist level in particularly those who use wheelchairs.

3.2 Project Idea

Smart door locks will try to improve the way of using the doors and also will allow the owner to keep their house safe from thief in the locality. Thus this design system will try to attain a better use of available technology and improve efficiency of the working system and also bring down the crime rate that is robbery in homes.

3.3 Motivation of the Project

Over the last few years incidences like burglaries have drastically increased. Due to the exponential growth in home automation installation of system and managing it are still very complex to deal with. Security plays a major role in home automation system. Traditional approach that are used in door lock system are now outdated due to advancement in technology. So we should make use of this updated technology and develop a product which fulfills the need on end user without compromising the product quality.

3.4 Literature Survey

The literature related to the research topic of key less door lock system has been reviewed for last 10 years in order to find out work carried out by various researchers. There are many system for remote monitoring and control designed as commercial products or some of research platforms. From the survey it has been observed that most of the research is carried out in the following categories

- A) Wireless monitoring using bluetooth, wi-fi, zigbee and NFC.
- B) Privacy in smart Home Environment
- C) Different reviews on smart home technology
- D) Iot based monitoring and control system for home automation
- E) Wireless access monitoring and control system based on digital door lock

Home automation that uses blue tooth technology system consists of three main components web server which is used to register the B-id and controls the flow of the data to and from the admin and also the

owner. Secondly there is admin(PC application) which is used to control the hardware interface and start the initial flow of control of the process by fetching the B-id from the client and lastly there is owner who can take actions for users at the door and also others functions like turn on alarm and check snaps of the user. The system is better from the scalability and flexibility point of view than the other commercial available home automation systems. Owner may use the technology to login to the server ,If server is connected to the internet the it can be also accessed from the web browser so as to check the details of the user who had entered and left the house. The application has been developed based on android system and installed in android phones. Application will send request to the server so as to register the B-id in the database and further allow the user to access the door.

- Kyu Hwang, et al. : Digital door lock is an electronic locking system operated by the combination of digital key, security password or number codes. It implements the system by using Zigbee protocol. Once a person at the gate is detected by the human detection module, the ZigBee module of digital door lock sends a message to the video door phone and checks whether the person has a ZigBee tag . Then the video door phone sends a command to camera module to turn it on. If a valid identification code is taken from the ZigBee tag at the gate, digital door lock operates a motor connected with the locking system to open the door. Otherwise the user can interact with the person using the speaker phone. The speaker phone includes a camera module. The digital door lock is able to control the video door phone by using the ZigBee modules.[1]
- Yong Tae Park, et al. : A door lock system proposed here consists of RFID reader for user authentication, touch LCD, motor module for opening and closing of the door, sensor modules for detecting the condition inside the house, communication module, and control module for controlling other modules. Sensor nodes for environment sensing are deployed at appropriate places at home. Status of individual ZigBee module can be monitored and controlled by the centralized controller, digital door lock. In home automation function digital door lock system enables user to conveniently control and monitor home environment and condition all at once before entering or leaving the house.[2]
- N.H, Ismail, et al. : It uses the Bluetooth technology to establish communication between user's Smart phone and controller board. The prototype support manual controlling and micro-controller controlling to lock and unlock home door. By connecting the circuit with a relay

board and connection to the Arduino controller board it can be controlled by a Bluetooth available to provide remote access from tablet or smart phone.[3]

- Pavithra.D,et al. : This project aims at controlling home appliances via Smart phone using Wi-Fi as communication protocol and raspberry pi as server system. The user here will move directly with the system through a web-based interface over the web, whereas home appliances like lights, fan and door lock are remotely controlled through easy website.[4]
- Nateq Be-Nazir Ibn Minar,et al. : This approach presents the vulnerabilities in the security protocols of this technology along with some past security threats and possible countermeasures as reported in the literature which have been surveyed and summarized. It also presents some tips that end-users can implement immediately to become more cautious about their private information.[5]
- Shruthi Suresh, et al. :The main objective of this paper is to identify the main applications of various home automation technologies and future enhancements needed in this field. The paper also reviews the different energy conservation ideas that are implemented in the field of smart homes.[6]
- Chi-Huang Hung, et al. : In this paper it proposes an integration design of both a near field communication (NFC) and a smart phone to achieve a door lock control system. This design consists of a built in NFC capabilities of a smart phone combined with a dedicated application deemed to be a key to open the door by means of the logical link control protocol (LLCP) exchange together with a time stamp to match the users own set of password information to verify who is a permissions user or not. When verified the specific door which is secured by this door lock control system immediately opens.[7]
- Chi-Huang Hung , et al. : This design integrates the near field communication (NFC) reader of a smart phone device with the door lock control system to provide a convenient single button operation. This design also offers three operation modes to the user in order to allow a one-time password with a time stamp permission to match the user's password thus enhance the doors security. The door lock control system is fixed on the door, and also provides both the sleep state and the standby state to save power consumption for a long time operation.[8]

- Mrutyunjaya Sahani, et al. : This paper describes about the implementation and deployment of wireless control system and accessibility in to a home environment for authenticated people only. A wireless network technique ZigBee based and image processing technique PCA based, dedicatedly make the security system alive as per the request.[9]
- Adnan Ibrahim, et al. : This paper discusses the design and implementation of a GSM based digital door lock security system using PIC platform. A 5-digit password was used to lock/unlock the doors by employing a gear motor. Three consecutive unsuccessful attempts in entering the correct password results in sending a warning message, was sent to preset mobile numbers, as a means of detecting unauthorized intrusion.[10]
- Kyu Hwang, Jin-wook Baek : This paper propose a novel wireless access monitoring and control system based on the digital door lock, which is explosively used as a digital consumer device. It presents a prototype of the proposed system and shows a scheme for the implementation. To implement the system with ZigBee network protocol, four types of modules are developed, ZigBee module, digital door lock module, human detection module, and ZigBee relay module. Digital door lock module is implemented as a digital consumer device to control the access system as well as locking system. It is very convenient system for the consumers and has extensible and flexible characteristics.[11]
- Sachin Khadke : This paper introduces a remote appliances control system based on the Android smart phone which includes GUI designed on Android Smart-phone. A user logs into the smart Android phone interface, and clicks the buttons gently to send message commands from the GUI which will be transmitted to home information center through the GSM network. It focuses ons the design of Android terminal, the communication between PIC and GSM module, the realization of the wireless module devices driver, the difficulty in supplying the appropriate low-voltage DC for MCU and wireless module just by a single live wire. The users can manipulate appliances anytime, anywhere, letting our houses become more and more automated and intelligent.[12]
- Kenji Yoshijoe, Melissa Abramson et al. : This paper awares the people about privacy of smart home devices in home residence settings and show how homeowners privacy could be compromised via simple network traffic analysis. Authors first measured normal traffic patterns generated on commercial off-the-shelf (COTS) smart home devices, and

identify possible privacy vulnerabilities. They also designed a smart home hub-integrated solution to mitigate such risk by obscuring real network traffic with synthetic traffic. Thus it suggested that the smart home industry consider incorporating this approach into their products to improve privacy in the smart home environment.[13]

CHAPTER 4

PROBLEM DEFINITION AND SCOPE

4.1 Problem Statement

Home automation is boon to the Residential sector. As the use of technology is increased people demand for better and quality products. To develop a system which introduces a secured system that provide ease of access and helps to improvise security using bluetooth technology

4.1.1 Goals and objectives

A) The objective of this system is to:

- Provide easy access to owner and guest user at the door.
- Build system that enhances security in home automation
- To determine any unauthorized access to the door so that owner can take appropriate action accordingly.
- To analyses the system and identify constraints and problems.
- To test the new/improved system
- To identify conditions for successful implementation of the system.

B) The Goals of the system is:

- To detect unauthorized users ta the door and take appropriate action.
- Build better door lock system that is good enough to replace the existing system
- Improvise home automation in terms of security

4.1.2 Statement of scope

Smart door locks will try to improve the way of using the doors and also will allow the owner to keep their house safe from thief in the locality. Thus this design system will try to attain a better use of available technology and improve eciency of the working system and also bring down the crime rate that is robbery in homes.

4.2 Major Constraints

Project limitations may influence how you manage your project and may even determine whether or not you (and your projects drivers and supporters) decide to proceed with your project. Project limitations typically fall

into several categories. By recognizing these categories, you can focus your investigations and thereby increase the chances that you'll discover all limitations affecting your project.

The purpose of the system is to detect the user at first case and then appropriately categorize that the user is owner or guest user or any other user which is trying to access the door without owner permission. Our system is based on bluetooth that will be fetched from user smart-phone and then accordingly check its B-id into the database so as to take appropriate actions.

4.3 Methodologies of Problem solving and efficiency issues

The only way in which systems will meet their performance targets is for them to be specified clearly and unambiguously. It is a simple fact that if performance is not a stated criterion of the system requirements then the system designers will generally not consider performance issues. While loose or incorrectly defined performance specifications can lead to disputes between clients and suppliers. In many cases performance requirements are never rigid as system that does not fully meet its defined performance requirements may still be released as other consideration such as time to market.

In order to assess the performance of a system the following must be clearly specified:

- Response Time : Response time in this project includes how fast the B-id is accessed by the user and is given access to the door. It also includes how fast the live feed is provided to the owner by the android application.
- Accuracy : The system tries to detect the user and perform actions accordingly
- Performance : The system solves the problems with a good speed so that user can access the door.
- Scalability : System is scalable in all the conditions
- Workload : System should try to manage the workload and timers efficiently at the server side.

4.4 Outcome

- Hand free access to the door
- Enhanced Security in home networking system

4.5 Applications

- It can be used by disabled people who are paralyzed from legs to waist level that is wheel chair users
- It can be used in home networking system
- Used in commercial complex and business offices
- In banks locker system

4.6 Hardware Resources Required

Sr. No.	Parameter	Minimum Requirement	Justification
1	CPU Speed	2 GHz	Remark Required
2	RAM	3 GB	Remark Required

Table 4.1: Hardware Requirements

4.7 Software Resources Required

Platform :

1. Operating System: Windows
2. IDE: NetBeans,Eclipse ADT
3. Programming Language : Java , Servlet , XML

CHAPTER 5

PROJECT PLAN

5.1 Project Estimates

5.1.0.1 Preliminary Budget

Constructive Cost model was developed by Barry W Boehm in 1981. It is an algorithmic cost model. Algorithmic cost model is developed based on relating the current project to previous projects. It is based on historical information. Cocomo is based on size of the project. The size of the project may vary depending upon the function points.

COCOMO MODELS:

- BASIC COCOMO :

- It is used for relatively small project.
- Only a few cost drivers are associated.
- Cost drivers depend upon project size mainly.
- Useful when the team size is small, i.e. small staff.

The effort (E) and schedule (S) of the project are calculated as follows:

- Effort $E = a * (KDSI)^b * EAF$, Where KDSI is number of thousands of delivered source instructions a and b are constants, may vary depending on size of the project.
- Schedule $S= c*(E)^d$, where E is the Effort and c, d are constants.
- EAF is called Effort Adjustment Factor which is 1 for basic cocomo , this value may vary from 1 to 15.

YOUR BASIC COCOMO RESULTS!!								
MODE	"A" variable	"B" variable	"C" variable	"D" variable	KLOC	EFFORT, (in person/months)	DURATION, (in months)	STAFFING, (recommended)
organic	2.4	1.05	2.5	0.38	9.459	25.400877992132912	8.546386423561076	2.972119060999464

Explanation: The coefficients are set according to the project mode selected on the previous page. (as per Boehm,81). The final estimates are determined in the following manner:

effort = $a \cdot KLOC^b$, in person/months, with KLOC = lines of code, (in the thousands), and:

duration = $c \cdot effort^d$, finally:

staffing = $effort / duration$

For further reading, see Boehm, "Software Engineering Economics".(81)

WARNING: If you see "NaN" in any field above, you have entered an **INVALID** value for KLOC!! Hit the "BACK" button on your browser, hit the "RESET" button, and enter a **DECIMAL NUMBER** in the KLOC input text box!

Thank you. and happy software engineering!



Figure 5.1: Cocomo Model

Project Modes	a	b	c	d
Organic	2.4	1.05	2.5	0.38
Semi-detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

Table 5.1: Constant values for each project mode

For our system we applied Basic COCOMO model. For Basic COCOMO Model, we set organic mode and lines of code(LOC) to 9459 that is 9.459 in KLOC. For calculating LOC we used tool named as 'CODE LINE COUNTER'. This tool is useful for counting lines of code accurately without considering blank spaces and comments. To calculate Effort and Duration we used a COCOMO calculator which is accessible by this link:

<http://groups.engin.umd.umich.edu/CIS/course.des/cis525/js/f00/kutcher/kutcher.html>.

In the above image the calculated efforts are 25.40 in person/month and duration is 8.54

5.1.1 Project Resources

- People :Amirush Javare,Tushar Ghayal,Jayant Dhabade,Ankur Shelar
- Hardware:ATmega32, MAX232, ULN2803, Motion sensor, Vibration sensor, Relay Board, Actuator
- Software:NetBeans, Eclipse ADT, Apache Tomcat

5.1.0.2 Cost Estimate

Sr.NO	Requirement	cost(approx)
1	bluetooth module HM-10 BLE	699-1400
2	webcam	800
3	REES 52 PIR motion sensor	200
4	Buzzzer	100
5	ATmega32	220
6	MAX232	28
7	ULN2803	45
8	22pf Capacitor	2
9	Reset Switch	12
10	10UF Capacitor	5
11	Pull up resistor	5
12	LED	2
13	40 pin IC base	14
14	18 pin IC base	11
15	16 pin IC base	11
16	Stepper Motor	280
17	Door latch	1000
18	PCB Printing (Negative + Positive)	750
19	PCB Making	870
20	Power Supply Cost	580
	TOTAL	5935

Table 5.2: Cost Estimate

5.2 Risk Management w.r.t. NP Hard analysis

A possibility of suffering from loss in software development process is called a software risk. Software risk exists because the future is uncertain and there are many known and unknown things that can't be incorporated in the project plan.

A software risk can be of two types :

- Internal risks that are within the control of project manager.
- External risks that are beyond the control of project manager
- Risk management is carried out to:
 - Identify the risk.
 - Reduce the impact of risk .
 - Reduce the probability or likelihood of risk .
 - Risk monitoring.

Software risk management is all about risk quantification of risk. This comprises of following processes:

- Risk Identification.
- Risk analysis.
- Risk Planning.
- Risk Prioritization.

5.2.1 Risk Identification

In order to identify the risks that your project may be subjected to, it is important to first study the problems faced by previous project. The possible risks related to hardware are:

- Sensors not able to take appropriate values.
- Poor connection .
- Power failure.

- Error in communication between micro controller and PC.

On the software side the risk is of poor internet connectivity (difficulty in connection between server, PC and android app)

5.2.2 Risk Analysis

The risks for the Project can be analyzed within the constraints of time and quality

ID	Risk Description	Probability	Impact		
			Schedule	Quality	Overall
1	Power failure	Low	Low	High	High
2	Loose connection and error in communication	Low	Low	High	High
3	Sensors not able to take appropriate values	Low	Low	High	High

Table 5.3: Risk Table

Probability	Value	Description
High	Probability of occurrence is	> 75%
Medium	Probability of occurrence is	26 – 75%
Low	Probability of occurrence is	< 25%

Table 5.4: Risk Probability definitions

5.2.3 Overview of Risk Mitigation, Monitoring, Management

Following are the details for each risk.

Impact	Value	Description
Very high	> 10%	Schedule impact or Unacceptable quality
High	5 – 10%	Schedule impact or Some parts of the project have low quality
Medium	< 5%	Schedule impact or Barely noticeable degradation in quality Low Impact on schedule or Quality can be incorporated

Table 5.5: Risk Impact definitions

Risk ID	1
Risk Description	Server Failure
Category	Server Development Environment.
Source	Software requirement Specification document.
Probability	Medium
Impact	High
Response	Mitigate
Strategy	Better testing will resolve this issue
Risk Status	Rarely Occurred

Risk ID	2
Risk Description	Live feedback
Category	Development environment
Source	Software Design Specification documentation review.
Probability	High
Impact	Very High
Response	Mitigate
Strategy	By reducing delay this issue will be solve
Risk Status	Identified

Risk ID	3
Risk Description	Application Failure
Category	Development environment
Source	Software Design Specification Documentation review
Probability	Medium
Impact	Very High
Response	Mitigate
Strategy	By testing again and again this issue will be solve
Risk Status	Identified

5.3 Project Schedule

5.3.1 Project task set

Major Tasks in the Project stages are:

- 1) Domain Selection and Problems in it
- 2) Requirements gathering
- 3) Survey on current existing system
- 4) Idea to overcome the drawback of existing system
- 5) Hardware and software specifications to be used
- 6) Implementations and design
- 7) Coding and integration
- 8) Testing of all the components as a entire system to ensure that all the requirements are satisfied or not.
- 9) Deployment of product.

5.4 Team Organization

5.4.1 Team structure

Sr.No.	Project Work	Contributors
1	Developing Project idea	Amirush, Tushar, Ankur, Jayant
2	Literature survey	Amirush, Tushar, Ankur, Jayant
3	System Description and Synopsis	Amirush, Tushar, Ankur, Jayant
4	Requirement Specification	Amirush, Tushar, Ankur, Jayant
5	Project Plan specification	Amirush, Tushar, Ankur, Jayant
6	Software Level coding	Amirush, Tushar, Jayant
7	Hardware Level Coding	Ankur, Jayant, Amirush
8	Test cases	Amirush, Tushar, Ankur, Jayant
9	Publishing Paper	Amirush, Tushar, Ankur, Jayant
10	Project Report	Amirush, Tushar, Ankur, Jayant

Table 5.6: Use Cases

5.3.2 Timeline Chart

Timeline chart Sem 1

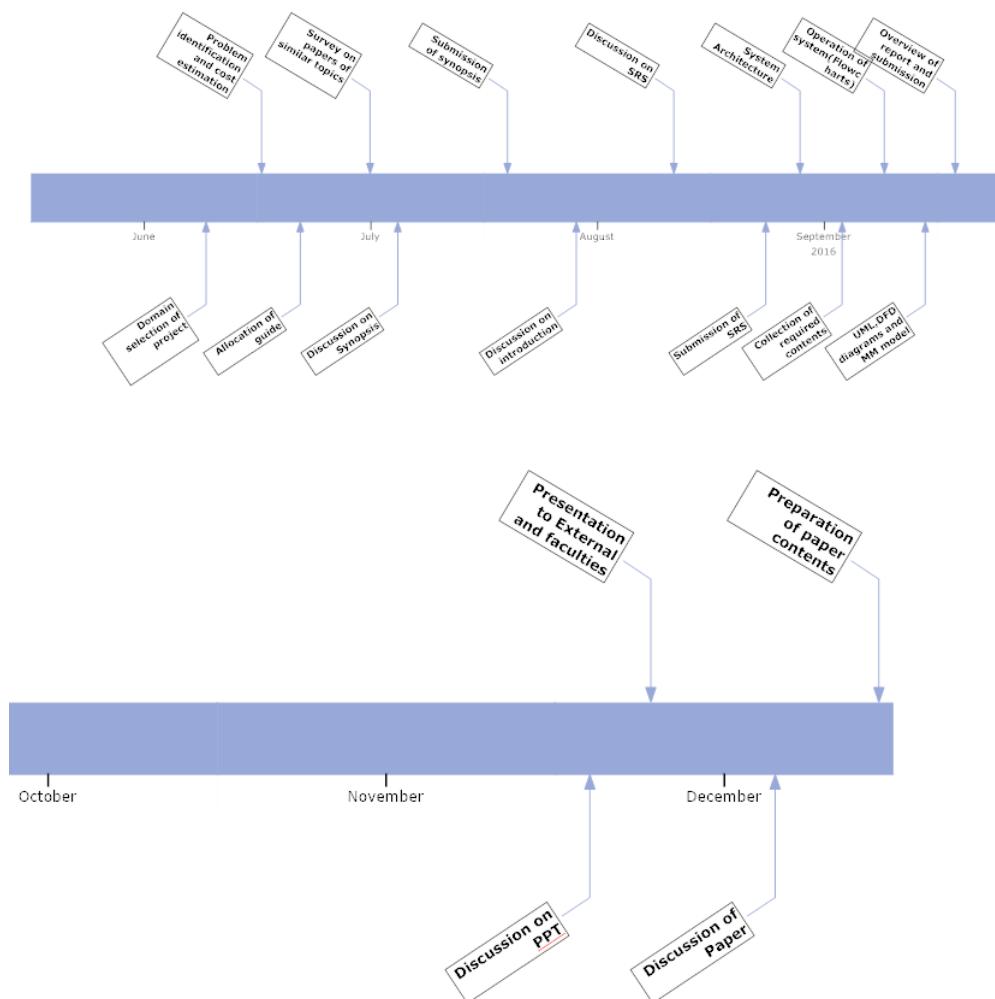


Figure 5.2: Timeline chart Sem 1

Timeline chart Sem 2

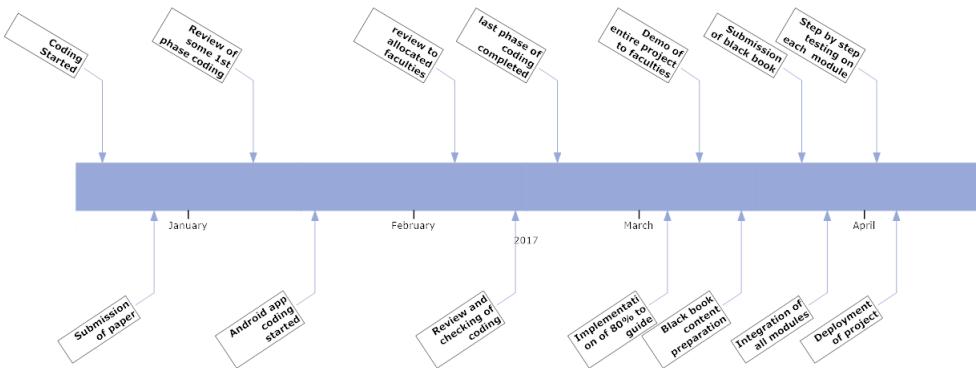


Figure 5.3: System Implementation Plan

CHAPTER 6

SOFTWARE REQUIREMENT SPECIFICATION

6.1 Introduction

6.1.1 Purpose and Scope of Document

A software requirements specification (SRS) is a detailed description of a software system to be developed with its functional and non-functional requirements. The SRS is developed based the agreement between customer and contractors. It may include the use cases of how user is going to interact with software system. The software requirement specification document consistent of all necessary requirements required for project development. To develop the software system we should have clear understanding of Software system. To achieve this we need to continuous communication with customers to gather all requirements. A good SRS defines the how Software System will interact with all internal modules, hardware, communication with other programs and human user interactions with wide range of real life scenarios. Using the Software requirements specification (SRS) document on QA lead, managers creates test plan. It is very important that testers must be cleared with every detail specified in this document in order to avoid faults in test cases and its expected results. It is highly recommended to review or test SRS documents before start writing test cases and making any plan for testing. Lets see how to test SRS and the important point to keep in mind while testing it.

6.2 Usage Scenario

First use case scenario is for the guest who interacts with the system so as to access the door

Secondly There is another use case for intruder purpose who try to access the door without owners permission

6.2.1 User profiles

- In the First use case there is an guest user who is at the door and bluetooth controller then fetches its B-id so as to authenticate the user
- Server is use to manage the B-id in the database
- Host uses the android app and check the surveillance by using the live feed options and then allow the user to access the door

- Admin uses micro controller and sensors so as to manage all the working of components in the system .
- Second use case the guest is attempting force full access
- Admin then sends the live feed to the server which is then seen by the host by using the android application.
- Admin also turns on the burglar alarm when the threshold value of vibration sensor is crossed

6.2.2 Use-cases and its Views

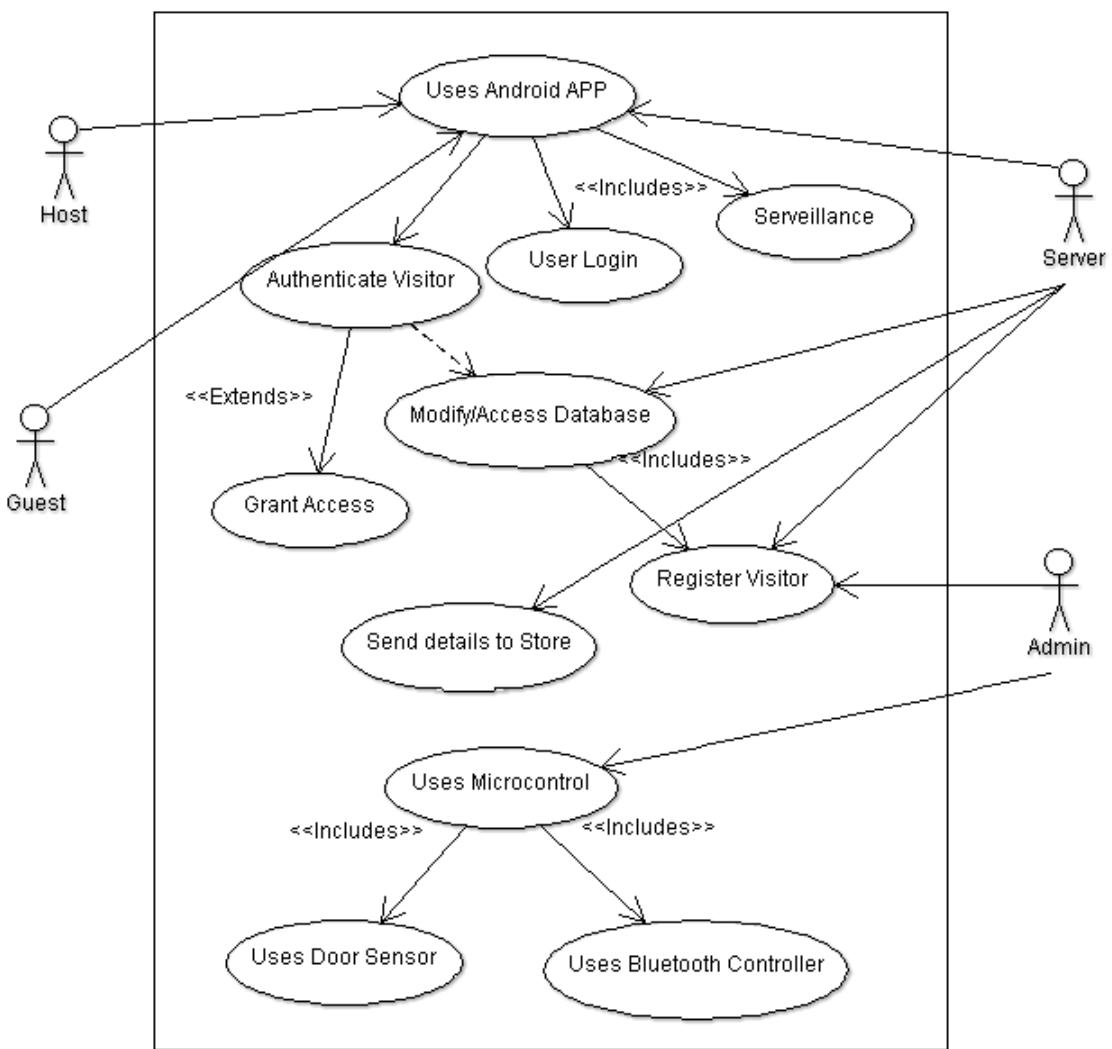


Figure 6.1: Use Case Diagram for Guest

Title	Description
Use Case Name	Door Lock System
Use Case Identifier	ID:0
Brief Description	use case for normal access
Primary Actor	Host, Guest
Secondary Admin	Server, Admin
Precondition	Motion Detection, Bluetooth Drivers
Post condition	log file updated
Main flow	1)Host logged into android application 2)Motion detector activated 3)Bluetooth attempting to connect 4)If guest B-id a)Establish connection goto 8 b)Else inform host and goto 5 5)Host sends request to admin to register B-id 6)Server register B-id 7)If guest B-id time limit not exceeded a)Establish connection b)Else connection denied 8)Authorize access 9)Enter information into database

Table 6.1: Use Case Description(Guest)

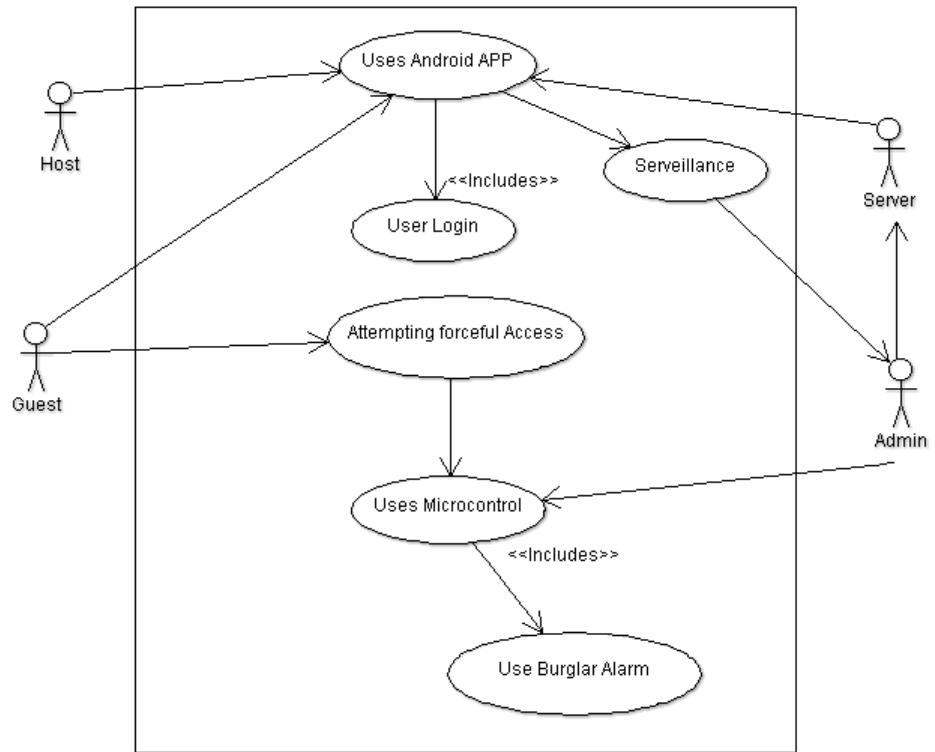


Figure 6.2: Use Case Diagram for Intruder

Title	Description
Use Case Name	Door Lock System
Use Case Identifier	ID:1
Brief Description	use case for intrusion
Primary Actor	Host, Guest
Secondary Admin	Server, Admin
Precondition	Motion Detection, Bluetooth Drivers
Main flow	1)Host logged into the android application 2)Motion detection activated and bluetooth on 3)Guest attempting forceful access 4)Vibration sensor reacting 5)Host witness the intruder through camera 6)Burglar alarm activated
Post condition	Alarm switch off if intrusion failed
Alternate Route	Not available

Table 6.2: Use Case Description(Intruder)

6.3 Functional Model and Description

A description of each major software function, along with data flow (structured analysis) or class hierarchy (Analysis Class diagram with class description for object oriented system) is presented.

6.3.1 Data Flow Diagram

6.3.1.1 Level 0 Data Flow Diagram

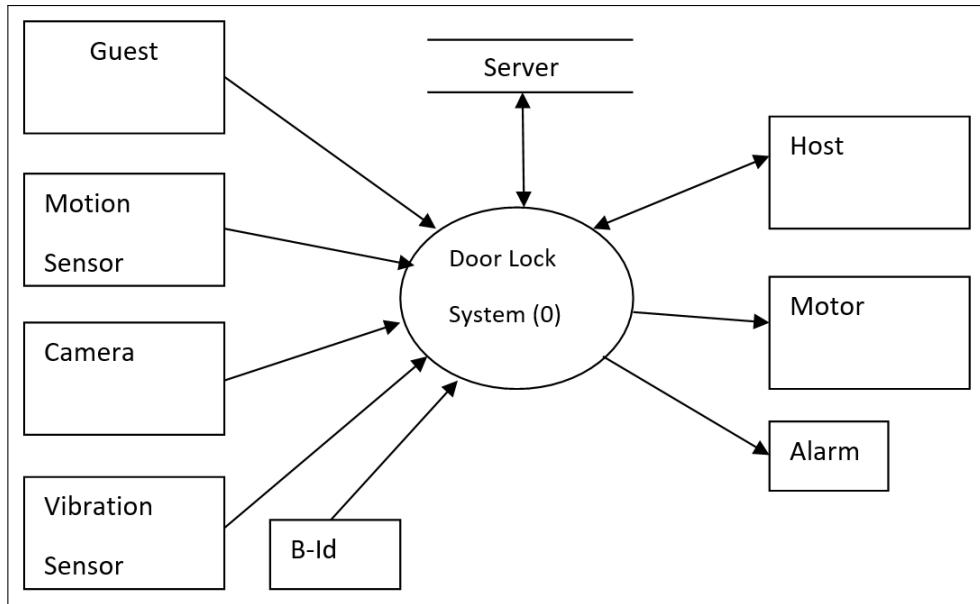


Figure 6.3: DFD Level 0

6.3.1.2 Level 1 Data Flow Diagram

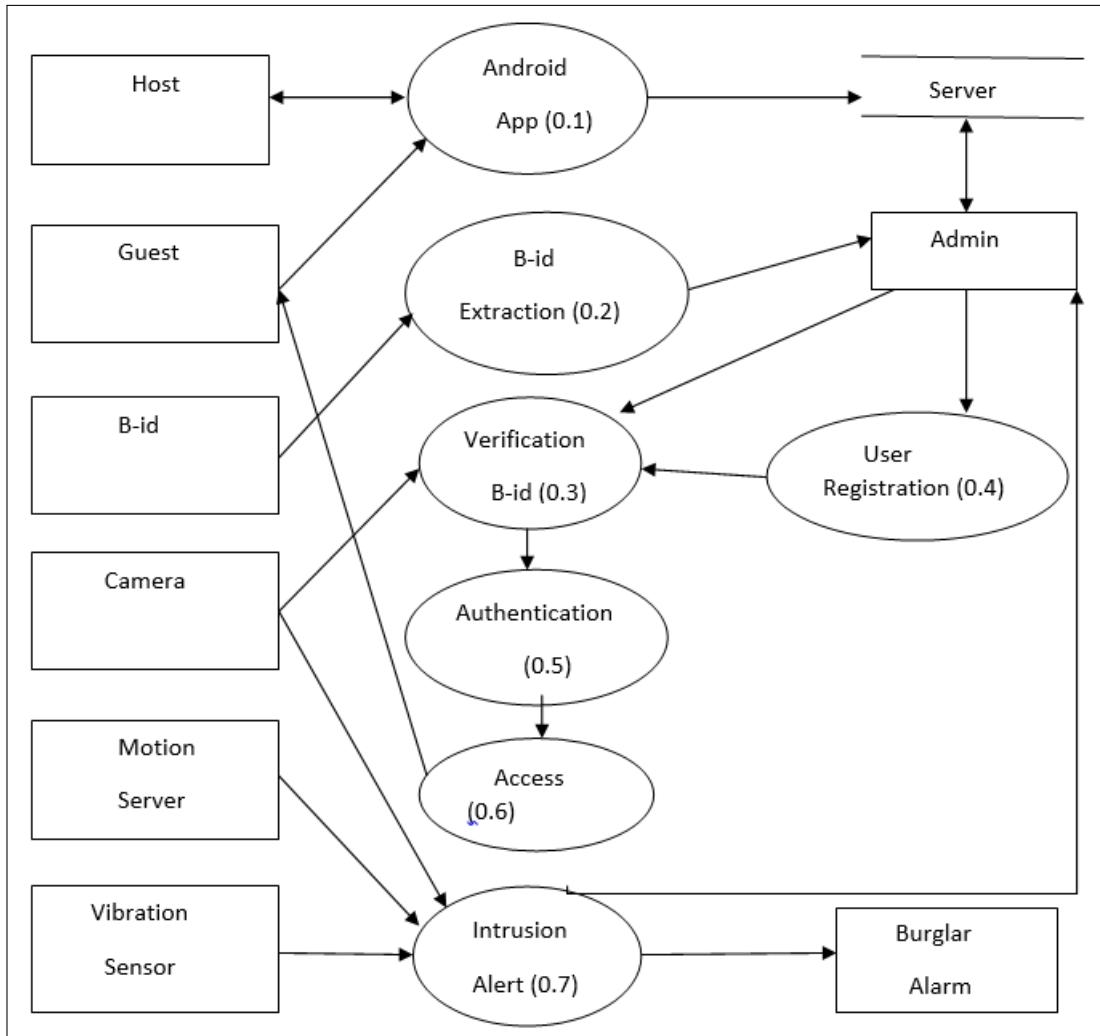


Figure 6.4: DFD Level 1

Process:-

- **Android Application**-The user android application to communicate with server and admin.
- **B-id Extraction**-Extract the B-id from user.

- Verification-Checking of B-id in database.
- User Registration-Register new B-id.
- Access-Grant access to the user.
- Intrusion alert-Take intrusion prevention measure.

Entities:-

- Host-Owner or main user.
- Guest-Other users or visitor.
- B-id-Bluetooth id.
- Camera-For sending pics and live feed to host.
- Motion Sensor-To detect movements at the door.
- Vibration sensor-To detect forceful door access.
- Admin-Administrator that controls the system and send data between sensor and server.
- Alarm-To avoid forceful intrusion.

Data Store:-

- Server-Stores the B-id of user and manage log file.

6.3.2 Activity Diagram:

Owner first enters the user name and password so as to get authenticate to the android application. The server sends live feed to the owner which can be seen in android app. Server also sends SMS to owner if user b-id does not exist. Server stores the b-id in database and also send signal after storing the b-id in database so that user can access the door. PC App is central component which have many devices connected to it bluetooth controller,micro controller,camera. Motion detector detects the user and send signal to micro controller which forwards that signal to PC app which starts fetching b-id by using bluetooth controller. Camera is turned on by the pc app if user is not authenticated so as to send the live feed to owner by using android app.

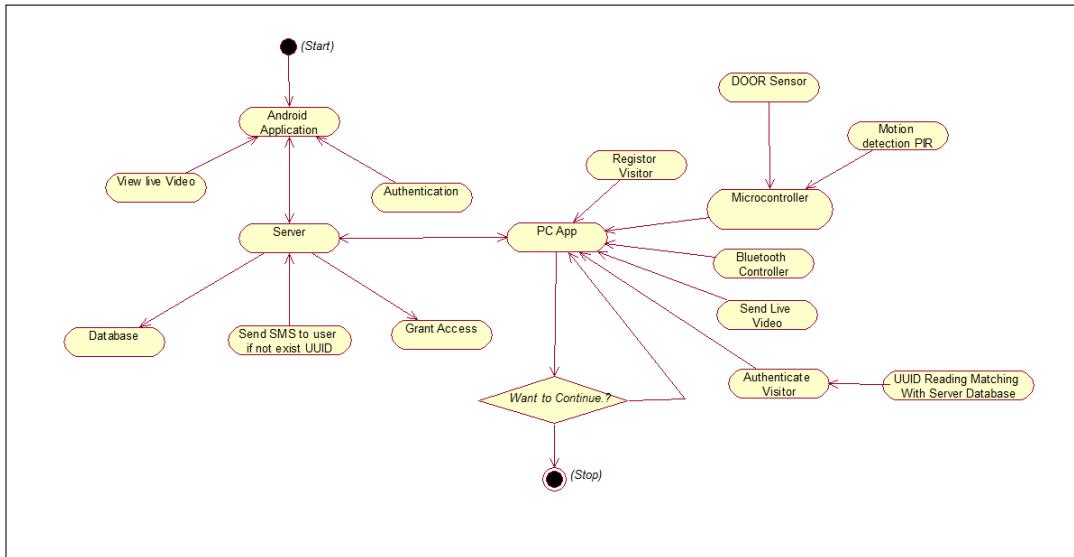


Figure 6.5: Activity Diagram

6.3.3 Non Functional Requirements:

6.3.4 USER INTERFACES

- Android Application :-** The user interface includes a login window for the owner to login to the android application. Once the owner is logged in then owner will get access to the door system and can monitor the system. The application will include live feed options and also one option to turn on burglar alarm.
- Process Builder:-** It is used to control applications from and within java. In case we need to call other application from within java, we need to use process builder API. These external application can be executable required to run from within java. These also can be applications as in VB, C++ etc. required for OS control or call other applications.

6.3.5 HARDWARE INTERFACES

- Java Native Interface:-** For hardware interfacing in java we need to use a technology from java called as JNI(java native interface). This

technology uses DLL files created in C++ to actually interface the hardware and the function call are implemented in java. This is how interfacing is managed in java.

6.3.6 SOFTWARE INTERFACES

Rich client side application:- When implementing client server application or even cloud based applications the client side application can be implemented using an architecture of java called as Java web Start. This allows us to create application with rich GUI which are also called rich Internet Application. It is smarter way then implementing conventional web pages.

6.3.7 NON FUNCTIONAL REQUIREMENTS

- **Usability:-** The system is user friendly as it provide an easy to access as well monitor the door lock system.
- **Correctness:-** The system works properly and ensure all the operation in system are performed correctly.
- **Safety:-** The system is accessible and usable only to authorized users and owner.
- **Performance:-** The system solve the problems with an good speed so that user can access the door.
- **Accuracy:-** The system tries to detect the user and perform actions accordingly.

6.3.8 SOFTWARE QUALITY ATTRIBUTES

The application software gives justice to important quality attributes such as:

- **Flexibility:-** The system should be flexible enough to take the inputs and further process the input to the database.
- **Reliability:-** The system should be designed in such a way that it should be reliable for people to easily use it and adopt it in the society.
- **Usability:-** Provides simple user interface easily by the concerned user.
- **Security:-** Security as the system fetches the user Bluetooth-id to provide access to the system.

6.3.9 State Diagram:

Set Theory

Let G be the set of all functions.

$$G = \{Ca, Oa, Ad, S, Bt, Buz, Md, Vs, Mc, Cm\}$$

- Ca be set of all client. $Ca = \{c1, c2, c3, c4, \dots, cn\}$
- Oa be set of owner app. $Oa = \{o1, o2\}$
- Ad is set of admin. $Ad = \{ad1\}$
- S be set of server. $S = \{s\}$
- Bt is set of bluetooth fetched. $Bt = \{b1, b2, b3, b4, \dots, bn\}$
- Buz is set of burglar alarm. $Buz = \{bu1\}$
- Vs is set of vibration sensor. $Vs = \{v1\}$
- Md is set motion detector. $Md = \{m1\}$
- Mc is set of micro-controller. $Mc = \{Mc1\}$
- Cm is set of web cameras used. $Cm = \{Ca1\}$

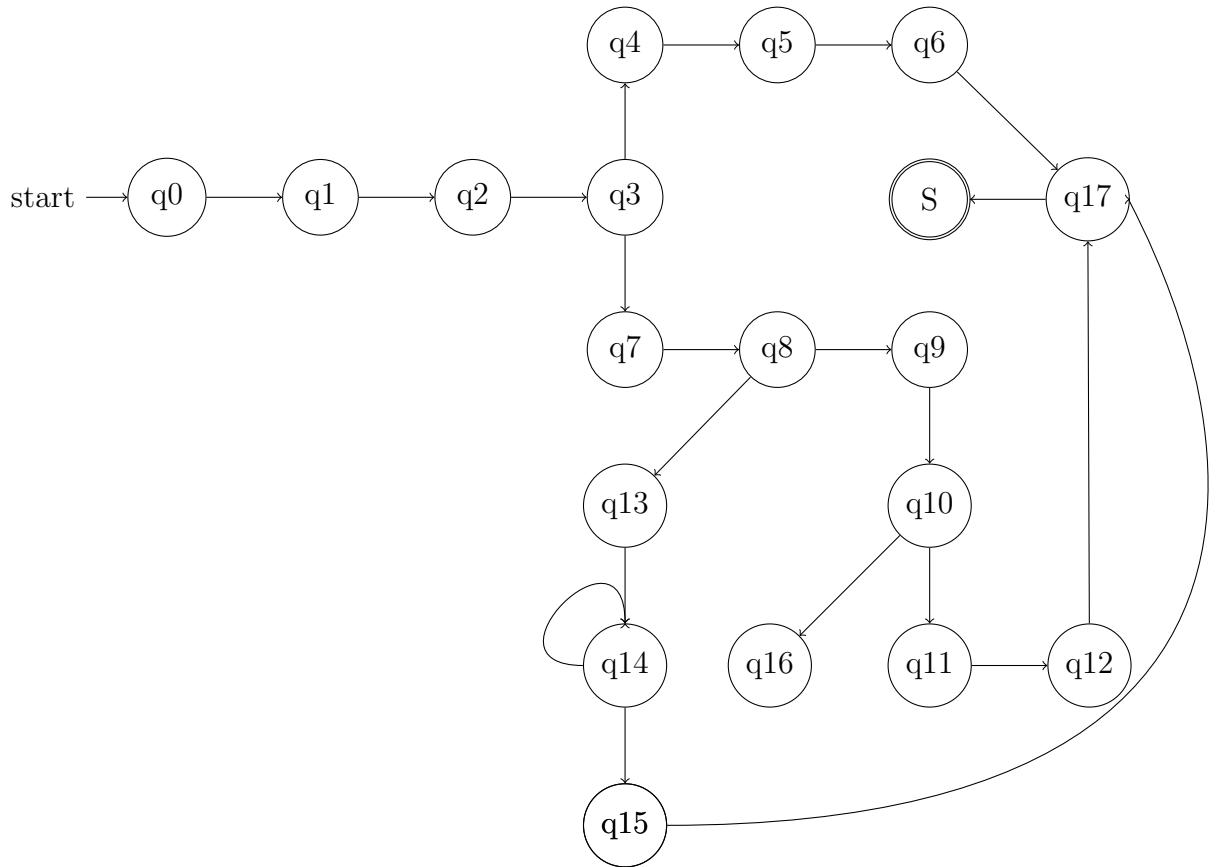
Success Condition:

- B-id register in the database so user can access the door.
- Activate burglar alarm when unauthorized user try to access the door.
- Notify owner about all user when they come in and out of the home.
- Send snaps to owner to the user at the door.
- Generate B-id for guest user when owner send request to the database.

Failure Conditions

- B-id not registered in the database.
- Alarm could not activated when authorized user try to access the door.
- couldn't receive snap of user at the door.

State Transition



Let A be the System $A = \{Q, \Sigma, Q_0, S, \delta\}$

Q_0 :Door locking system ready

Q_1 :motion sensor activated

Q_2 :trying access

Q_3 :checking into database

Q_4 :user B-id found

Q_5 :Establish connection

Q_6 :Authorize access

Q_7 :B-id not found in database

Q_8 :Asking host for access

Q_9 :Host authorizing access

Q_{10} :Checking the time window allotted by host

Q_{11} :Establishing connection if time not expired

Q_{12} :Authorize access

Q_{13} :Unknown user

Q_{14} :Send Image or snaps to the host

Q_{15} :Take appropriate actions

Q_{16} :Time expired

Q_{17} :Enter into log file

$$\Sigma = \{Db, M, C, L\}$$

Db= Database

M = Motion Sensor

C = Camera

G = Guest

L = Log file

Certainty

	Y1	Y2
$\delta(G, Db)$	1	1
$\delta(G, Db)$	0	0
$\delta(G, Db)$	1	0
$\delta(G, Db)$	0	1

Success= $\{(1,1), (0,0)\}$

Failure= $\{(1,0), (0,1)\}$

6.3.10 Design Constraints

- Serial communication between H/W and PC : Serial communication is required between hardware and Admin PC because of voltage difference between them.
- PC and server , Android and server Wi-Fi connection : Wi-Fi connection must be between cloud server and admin PC and android client to get logs stored on server.
- Power supply to hardware : Power supply must be given to hardware (Microcontroller) for working of it.

CHAPTER 7

DETAILED DESIGN DOCUMENT USING ANNEXURE A AND B

7.1 Introduction

Smart digital door lock is a system to monitor and control several devices in the home. Our smart digital door lock system operates over wireless sensor network. It is a network of sensor nodes with digital door lock as sink node. The smart digital door lock system can be divided into five parts: the control module(PC app), the sensor module, the communication module(server) and the I/O module, Android application. The control module is the brain of the system. The locking operation is controlled by the micro controller. The communication module is used to connect the devices and micro controller. The user can access to the door lock system through I/O module. The I/O module is connected to micro controller that will fetch the B-id from the user or visitor.

Once the user is authenticated by the system it can access the door and for particular user if time stamp is allocated in the database then user can access the door for that time stamp only and after the time stamp is expired then visitor cannot access the door and have to register B-id in the database again. If user try to access the door without permission of the owner then micro controller will turn on the camera and take repetitive snaps of the user and store the snaps in the database. Parallel notification will be send to the owner and owner can have option that it can also get live feed of the user at the door and can take appropriate action like turn on alarm and also call 100 as help from police.

7.2 Architectural Design

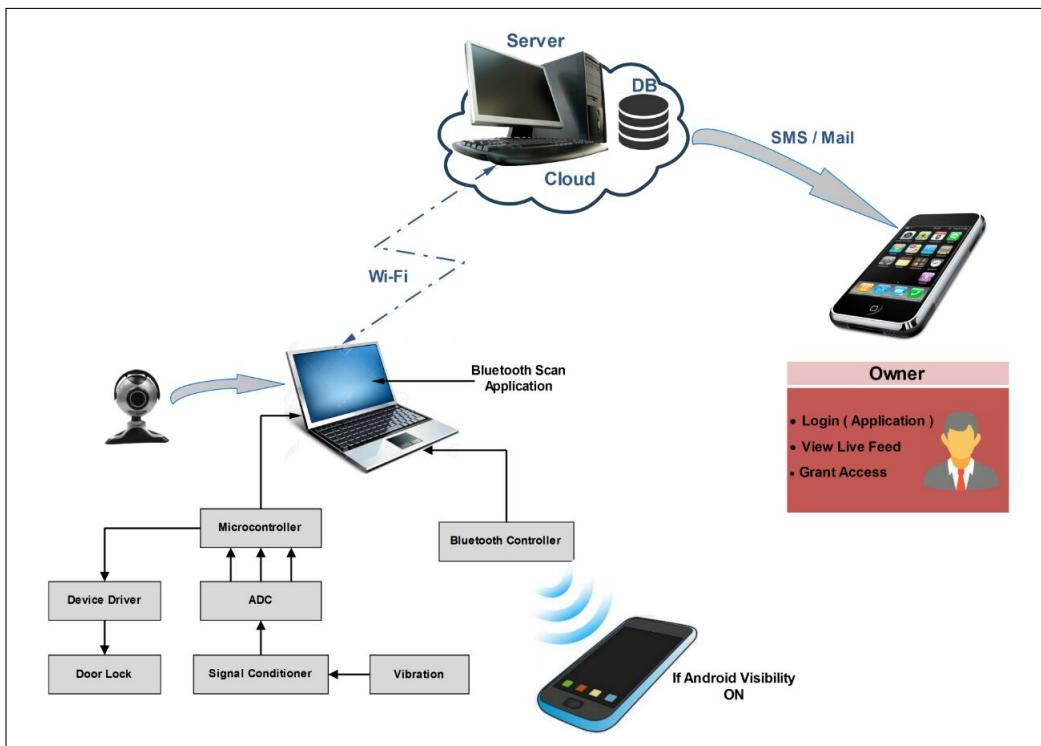


Figure 7.1: System Architecture

7.3 Data design

7.3.1 Internal software data structure

In our system motion detector first sense the object in its area and then send signal as 0 or 1 to the admin Pc that has all the components connected to it. This signal is then send to bluetooth adapter to fetch the b-id of user at the door. which further sends the signal to server to check its b-id availability in the database.

7.3.2 Global data structure

In this case the Admin Pc is considered as main component of system that sends and receives signal to and from server,guest and android app which is

available in the owner smartphone .Admin PC stores the b-id in database if granted by owner or perform operations accordingly like turn on alarm.Admin also takes care about the threshold value that is set for vibration sensor when user tries to do forcefull attempt.

7.3.3 Temporary data structure

Admin turns on Camera which takes snaps of user at the door.These Images are stored in bitmap form which are converted into bytes before transferring it to the server.Owner on the other hand can see the live feed by clicking on the live feed option in android application.In this case the images that are stored in bytes are then can be easily seen by the owner

7.4 Component Design

- **Communication module(Server):-** Smart digital door lock system works in two communication modes: centralized mode and emergency mode. In centralized mode, digital door takes the control of overall communication in the network and sensor nodes act accordingly as instructed by door lock. This type of communication is generally done in normal situation when everything is all right. This communication mode reduces unnecessary communication between sensor nodes and central controller and also saves energy consumption. On the other hand, when there is emergency situation such as burglary or fire, the communication is in emergency mode. Upon detection of the emergency mode by the sensor node, the respective action is taken such as turn on alarm and also call 100 for police help.
- **Sensor module:-** Sensor module includes vibration and motion detector sensors.The motion sensor used in this system is REES52 PIR(Passive Infra-Red). PIR Sensor Module Sensor is an electronic semiconductor type sensor that measures infrared (IR) light radiating from objects in its field of view. This module detects and gives a trigger when there is any motion by a heat radiating object in its range of view.
This sensor is passive as it does not emit or radiate any energy for detection. Every object above absolute zero emits heat, this heat signature is in Infrared wavelength which cannot be seen by naked eye, but they can be measured by infrared devices. This Sensor is covered with Fresnel Lenses, which create a wide angle of detection and also used for noise filtering. This PIR includes an adjustable delay before

firing (approx 0.5 - 200 seconds), has adjustable sensitivity. It runs on 4.5V-20V power (or 3V by bypassing the regulator with a bit of soldering) and has a digital signal output (3.3V) high, 0V low. Its sensing range is up to 7 meters in a 100 degree cone[11].

- **Input and output module:-** The input to the control module is bluetooth id of the user or visitor smart phone. Control module then start the camera recording and send the file to the database. Sensors like vibration and motion detector are used as another input which will try to detect any motion in the specified area near the door and vibration sensor is will detect vibration at the door knob which is done by the user. The output basically include access to the door for the user at the door. It also include turning on alarm and also sending proper live feed to the owner and notify the owner about the user when he/she enters and live the house.
- **Control module:-** It control camera, alarm communication between server and all the important processes are done by this module. The control module is the center of the door lock system all the process cycle starts from control module. This module connects the server for verification of the user b-id and to the micro controller. Camera is connected to control module which will take the snaps. All the operations are done by the control module which includes sending SMS, turning on alarm, send notify to the owner, check that the door is open and if it is opened then it will accordingly close the door.

7.4.1 Class Diagram

- Android user application consists of login, grant access, live feed. It is developed in JDK.
- Server is used to store live feed, file log and default b-id. It is developed in MySQL.
- PC Application is used for connection of components, visitor authentication and send live feed to server. It is developed on NetBeans and has 2D graphics.
- Hardware consists of bluetooth controller, MAX 232, microcontroller and door sensor. It is used to fetch b-id.

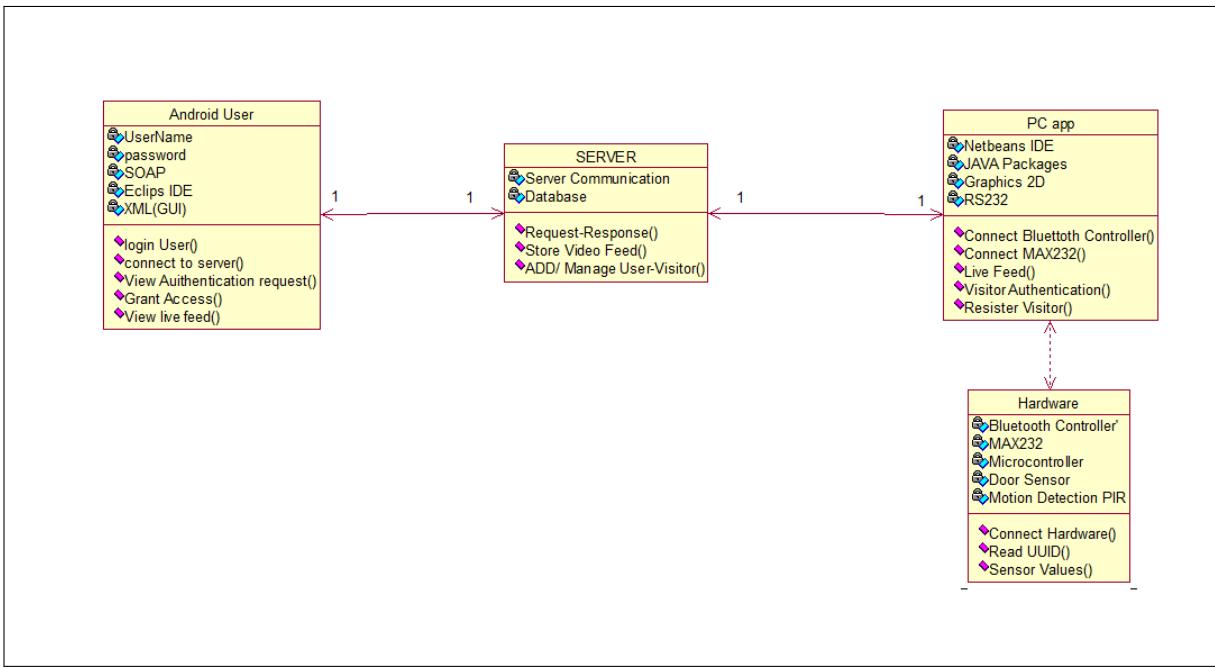


Figure 7.2: Class Diagram

CHAPTER 8

PROJECT IMPLEMENTATION

8.1 Tools and Technologies Used

8.1.1 Hardware Design

In this system mainly three ICs has been used: ATmega32, MAX232, ULN2803.

ATmega32 :

It is used because of; ATmega32 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega32 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed. Because of these features we are using ATmega32 microcontroller.

MAX232 :

The MAX232 IC is used to convert the TTL/CMOS logic levels to RS232 logic levels during serial communication of microcontrollers with PC. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals. The drivers provide TIA-232 voltage level outputs (approx. 7.5 volts) from a single five volt supply via on-chip charge pumps and external capacitors. This makes it useful for implementing TIA-232 in devices that otherwise do not need any other voltages. The receivers reduce TIA-232 inputs, which may be as high as 25 volts, to standard five volt TTL levels. These receivers have a typical threshold of 1.3 volts and a typical hysteresis of 0.5 volts.

ULN2803 :

A ULN2803 is an Integrated Circuit (IC) chip with a High Voltage/High Current Darlington Transistor Array. It allows you to interface TTL signals with higher voltage/current loads. In English, the chip takes low level signals (TLL, CMOS, PMOS, NMOS - which operate at low voltages and low currents) and acts as a relay of sorts itself, switching on or off a higher level signal on the opposite side. The ULN2803 comes in an 18-pin IC configuration and includes eight (8) transistors. Pins 1-8 receive the low level signals; pin 9 is grounded (for the low level signal reference). Pin 10 is the common on the high side and would generally be connected to the positive of the voltage you are applying to the relay coil. Pins 11-18 are the outputs (Pin 1 drives Pin 18, Pin 2 drives 17, etc.).

Power Supply :

For power supply transformer, diode bridge, capacitor, 7805 and 7812 ICs has been used.

- Transformer: Used transformer was Step down transformer. That has been used to decrease actual voltage (230v AC) to 0-15v AC.
- Diode Bridge: Diode Bridge is AC to DC convertor. That has been used to convert voltage from AC to DC, as per the requirement of all other ICs.
- Capacitor: Capacitor has been used to remove fluctuation of AC voltage from DC voltage Generated by Diode Bridge.

8.1.2 Circuit Diagram

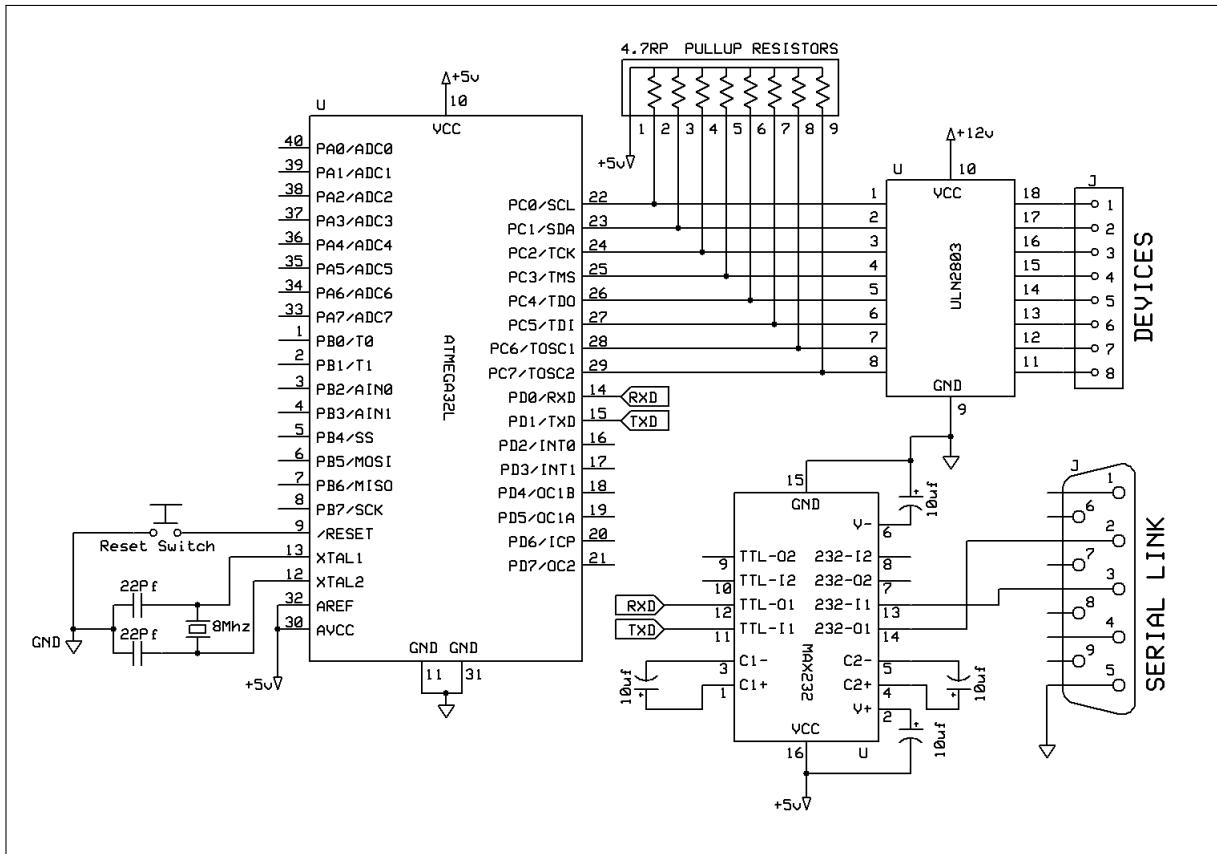


Figure 8.1: ULN2803

8.1.3 Software Design

We have designed GUI using java on the admin PC which will have all the components connected to it. It also include different features like update owner info, add B-id, manage B-id, close door button. In normal mode the system fetches B-id from smart phone and checks it into the database if exist then allow access to user. While in case of emergency mode If value of sensors are reached beyond the threshold then respective device will be turned on like burglar alarm and also send notifications to the owner that some user is trying to access the door without permission. We have also developed an

android application for owner which includes live feed option to check the user at the door and if user is known to owner then owner can add its B-id into the database. Then clicking on the button which is open door that user is allowed to access the door. Object is detected by HDM PIR which is given to admin PC through USB port. This data then allows the Bid to fetch the B-id from user phone and checks its availability in the database. Admin PC can change the data that is stored in the database when needed. Android user has limited functionality only such as allow user to access the door ,live feed. As server, Admin PC and android app are on wifi network admin and app has to give IP address of hotspot(access point).

8.2 Methodologies/Algorithm Details

8.2.1 User Registration

This flow includes user registration in the android application. Firstly the user establishes connection with the system. Then the Bluetooth adapter will try to fetch the Bluetooth Id of user. The accordingly the B-id that is fetched is stored in database server with the user information.

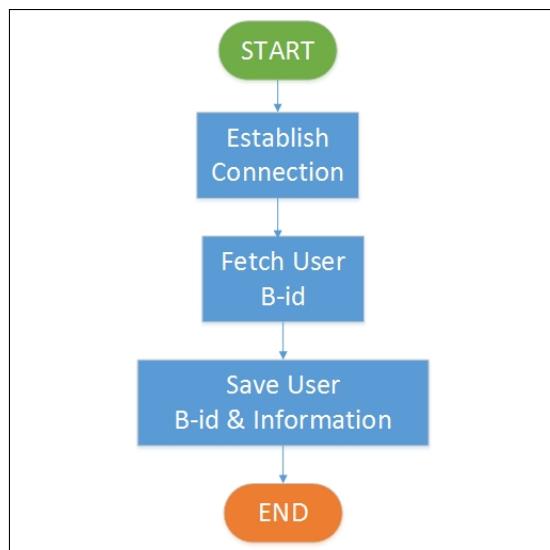


Figure 8.2: Use Case Diagram for Guest

8.2.2 Door lock/Unlocking for guest and owner

PIR which is the motion detection module detects the movements at the door. It then sends signal to control module which then establish connection with the guest and fetch b-id. Control module then sends the fetched B-id to the server for verification. Server then searches for guest b-id and if the b-id exists in the database then server sends signal back to control module as a response. Control module then rotates the motor which is connected to microcontroller and unlocks the door. If the server does not find b-id then server sends signal to control module which further sends command to activate camera and take snaps of the user at the door. Simultaneously the server notifies the owner that guest has appeared at the door. Then later owner can see snaps of guest and send signal to server to register b-id of that user and update the log. Otherwise owner can take appropriate action. Fig 9.2 shows user trying to access the door with b-id.

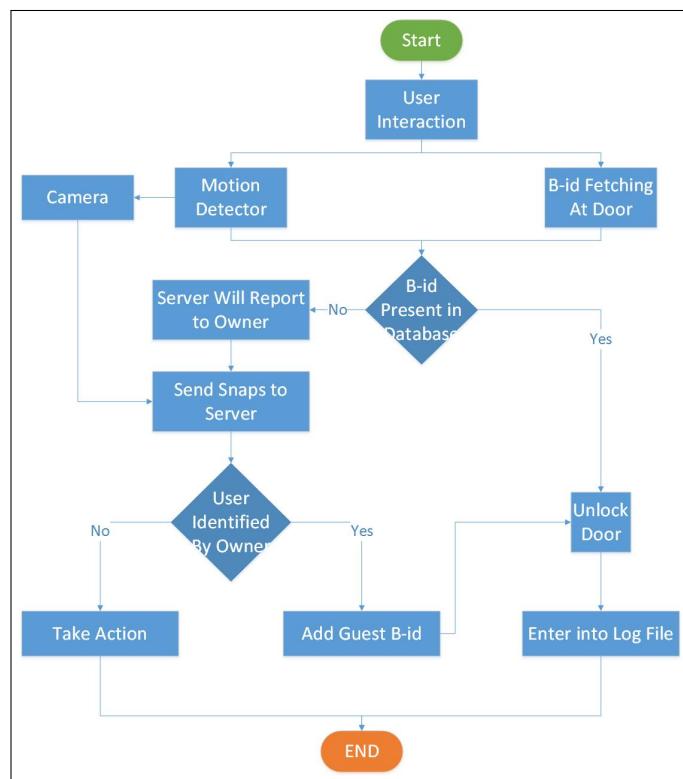


Figure 8.3: Use Case Diagram for Door Lock/Unlock

8.2.3 Emergency Mode

Motion detector will detect the guest at the door. control module then fetches b-id from guest and communicate with server to verify the user and if bi-d does not exist then camera will be activated to take snaps of the guest. If guest tries to access the door by using some equipment or if sensor threshold limit has been crossed, then alarm is triggered and the owner is notified that unauthorized user is trying to access. Fig 9.3 shows user trying to unauthorized access to the door.

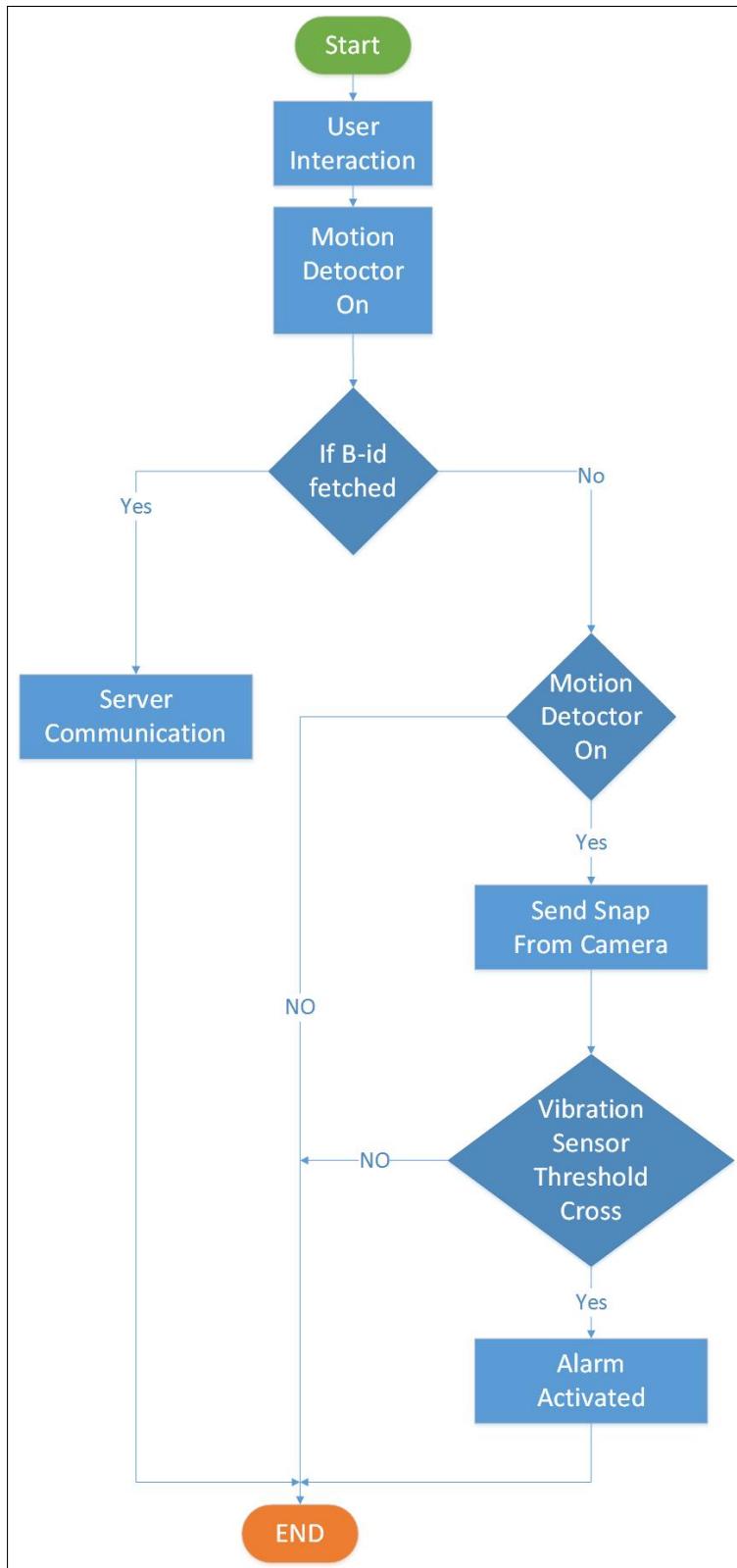


Figure 8.4: Use Case Diagram for User Identification
 AISSMS COE, Department of Computer Engineering 2016-17

8.3 Verification and Validation for Acceptance

- **Verification :**

Verification is done at the starting of the development process. It includes reviews and meetings, walk-throughs, inspection, etc. to evaluate documents, plans, code, requirements and specifications. According to the Capability Maturity Model (CMM) we can also define verification as the process of evaluating software to determine whether the products of a given development phase satisfy the conditions imposed at the start of that phase. In our project verification was performed by defining the requirements as well as working of the component which were decided by all the group members and allocated guide. While performing verification all the attributes were taken care off and also fulfilled the requirements which were given during the earlier phase of software development

- It answers the questions like: Am I building the product right?
- Am I accessing the data right (in the right place; in the right way).
- It is a Low level activity
- Performed during development on key artifacts, like walkthroughs, reviews and inspections, mentor feedback, training, checklists and standards.
- Demonstration of consistency, completeness, and correctness of the software at each stage and between each stage of the development life cycle.

- **Validation :**

Validation is determining if the system complies with the requirements and performs functions for which it is intended and meets the organization's goals and user needs.

According to the Capability Maturity Model (CMM) we can also define validation as The process of evaluating software during or at the end of the development process to determine whether it satisfies specified requirements.

In our project validation process usually started after the product was completely developed and was performed after verification. We also ensured that product was developed correctly and also ensured that the system requirements were also fulfilled.

- Validation is done at the end of the development process and takes place after verifications are completed.
- It answers the question like: Am I building the right product?
- Am I accessing the right data (in terms of the data required to satisfy the requirement).
- It is a High level activity.
- Performed after a work product is produced against established criteria ensuring that the product integrates correctly into the environment.
- Determination of correctness of the final software product by a development project with respect to the user needs and requirements.

CHAPTER 9

SOFTWARE TESTING

9.1 Type of Testing Used

9.1.0.1 Unit Testing

Unit Testing is a level of software testing where individual units/ components of a software are tested. The purpose is to validate that each unit of the software performs as designed. A unit is the smallest testable part of software. It usually has one or a few inputs and usually a single output. In procedural programming a unit may be an individual program, function, procedure, etc. In object-oriented programming, the smallest unit is a method, which may belong to a base/ super class, abstract class or derived/ child class. Unit Testing is performed by using the White Box Testing method .Unit Testing is the first level of testing and is performed prior to Integration Testing. In our project the first module is tested to see that it works as per expectations.The fig of first module is shown below.



Figure 9.1: Unit Testing 1

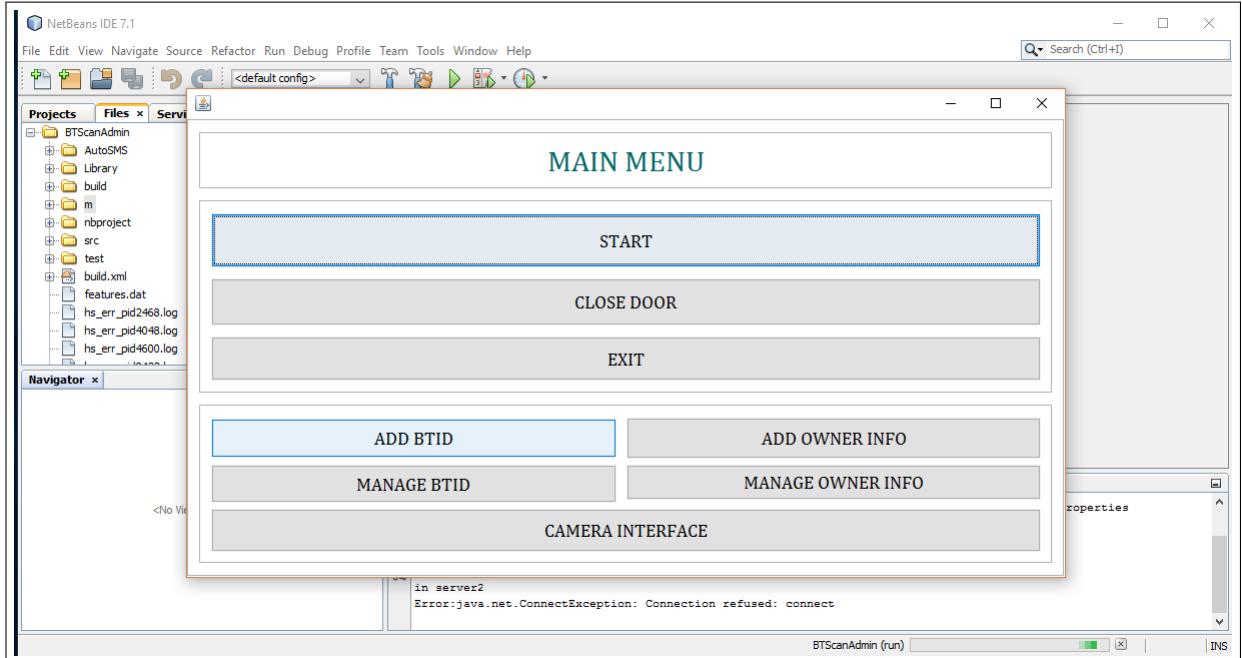


Figure 9.2: Unit Testing 2

9.1.1 Integration testing

Integration Testing is a level of software testing where individual units are combined and tested as a group. Integration Testing is performed after Unit Testing and before System Testing

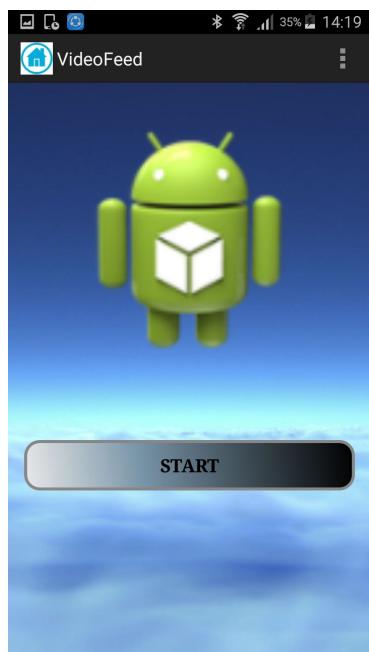


(a) Component 1

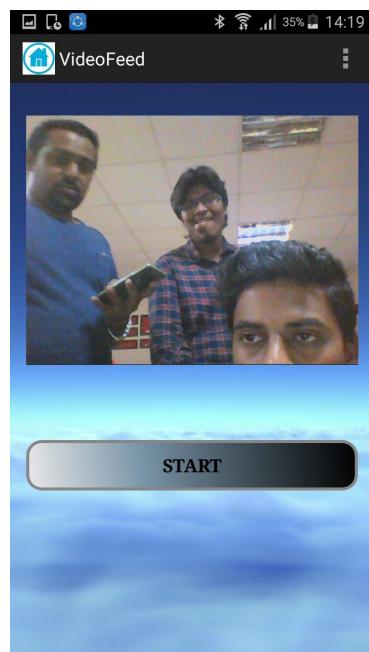


(b) Component 2

Figure 9.3: Testing of Android App



(a) Component 3



(b) Component 4

Figure 9.4: Testing of Android App



Figure 9.5: Component 5

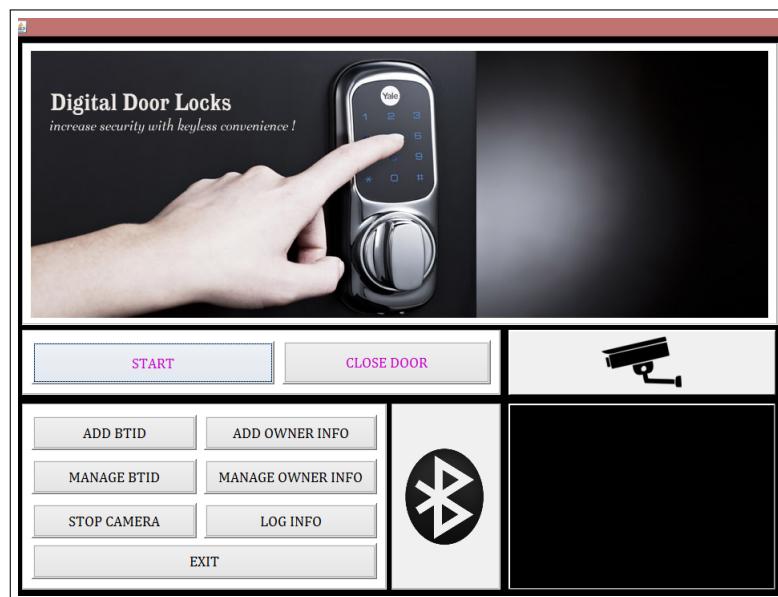


Figure 9.6: Component 6

9.1.2 Alpha Testing

- Alpha testing is simulated or actual operational testing by potential users/customers or an independent test team at the developers site. Alpha testing is often employed for off-the-shelf software as a form of internal acceptance testing, before the software goes to beta testing.
- Alpha testing is testing of an application when development is about to complete. Minor design changes can still be made as a result of alpha testing.
- Alpha testing is typically performed by a group that is independent of the design team, but still within the company, e.g. in-house software test engineers, or software QA engineers.
- Alpha testing is final testing before the software is released to the general public. It has two phases:
 - In the first phase of alpha testing, the software is tested by in-house developers. They use either debugger software, or hardware-assisted debuggers. The goal is to catch bugs quickly.
 - In the second phase of alpha testing, the software is handed over to the software QA staff, for additional testing in an environment that is similar to the intended use.
- Alpha testing is simulated or actual operational testing by potential users/customers or an independent test team at the developers site. Alpha testing is often employed for off-the-shelf software as a form of internal acceptance testing, before the software goes to beta testing.

9.1.3 Beta testing

- Beta testing comes after alpha testing and can be considered a form of external user acceptance testing.
- Versions of the software, known as beta versions, are released to a limited audience outside of the programming team known as beta testers. The software is released to groups of people so that further testing can ensure the product has few faults or bugs.
- The goal of beta testing is to place your application in the hands of real users outside of your own engineering team to discover any flaws or issues from the users perspective that you would not want to have

in your final, released version of the application. Example: Microsoft and many other organizations release beta versions of their products to be tested by users.

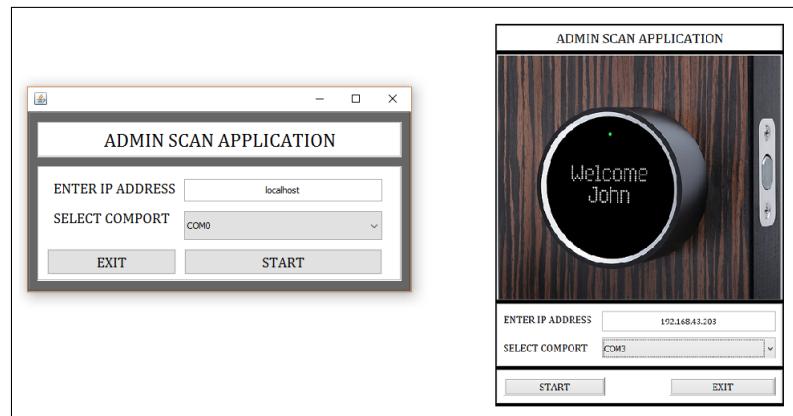


Figure 9.7: Alpha Beta Testing

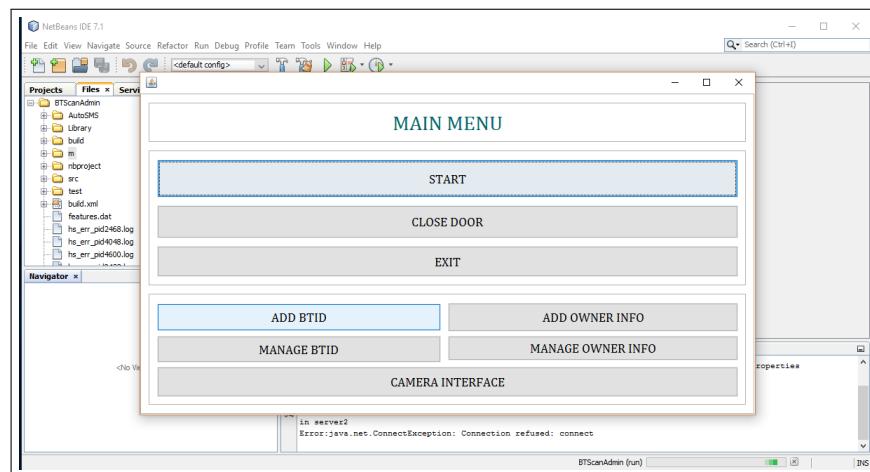


Figure 9.8: View after Login

9.2 Test Cases and Test Results

9.2.1 Introduction:

This document is a procedural guide for listing the testing activities that should be carried out for the door lock system. It describes the software test environment for testing, identifies the tests to be performed and provides schedules for test activities. As with many terms, scenario means different things to different people in the world of software testing. So we use test scenarios to tell the test case examiner which test cases to process and how to process them.

9.2.2 Purpose of the document:

Software testing can also be stated as the process of validating and verifying a software program/application/product. The prime purpose and objective of STP are:

- Identifying all the activities involved in testing.
- Meets the business and technical requirements that guided its design and development.
- Works as expected.
- Can be implemented with the same characteristics.

Software testing, depending on the testing method employed, can be implemented at any time in the development process. However, most of the test effort occurs after the requirements have been defined and the coding process has been completed. As such, the methodology of the test is governed by the software development methodology adopted.

9.2.3 Test Environment:

A testing environment is a setup of software and hardware on which the testing team is going to perform the testing of the newly built software product. This setup consists of the physical setup which includes hardware, and

logical setup that includes Server Operating system, client operating system, database server, front end running environment, browser (if web application), IIS (version on server side) or any other software components required to run this software product. This testing setup is to be built on both the ends i.e. the server and client.

9.2.4 hardware:

This section states all the hardware resources required for the testing .

SR NO.	Name of the hardware	Minimum configuration	Quantity
1	PC or Laptop	Intel i3 core processor, 4GB RAM, Windows 7	1

Table 9.1: Hardware Resources

9.2.5 software:

This section states all the software resources required for testing.

SR NO.	Name of the software	Version/release details
1	Windows 7	Any version
2	NetBeans	7.1 or higher
3	Eclipse ADT	
4.	MySQL	5.1

Table 9.2: Software Resources

9.2.6 Test Strategy:

A test strategy is an outline that describes the testing approach of the software development cycle. It is created to inform project managers, testers, and developers about some key issues of the testing process. This includes the testing objective, methods of testing new functions, total time and resources required for the project, and the testing environment. The Test Strategy document is a static document meaning that it is not updated too often. It sets the standards for testing processes and activities and other documents such as the Test Plan draw its contents from those standards set in the Test Strategy Document.

9.2.6.1 Test Design:

In software engineering, test design is the act of creating and writing test suites for testing a software. Test design could require all or one of:

- Knowledge of the software, and the business area it operates on,
- Knowledge of the functionality being tested,
- Knowledge of testing techniques and heuristics.
- Planning skills to schedule in which order the test cases should be designed, given the effort, time and cost needed or the consequences for the most important and/or risky features.

Well-designed test suites will provide for an efficient testing. The test suite will have just enough test cases to test the system, but no more. This way, there is no time lost in writing redundant test cases that would unnecessarily consume time each time they are executed. In addition, the test suite will not contain brittle or ambiguous test cases.

9.2.6.2 Test Function:

Functional Testing is a testing technique that is used to test the features/functionality of the system or Software, should cover all the scenarios including failure paths and boundary cases. Functions are tested by feeding them input and examining the output, and internal program structure is rarely considered (not like in white-box testing). Functional testing usually describes what the system does.

9.2.7 Test Cases of Individual Module

9.2.7.1 Test Case for Android App

Test case No.	Test Case	Input	Expected Result	Actual Result	Pass/Fail
1	Check IP of Network	Enter wrong IP	User should not get authenticated	As expected	pass
		Enter correct IP	User should get authenticated	As expected	pass
2	Check Login Activity	Leave all fields blank and click login	Error message should display as Login failed	As expected	pass
		Enter invalid Username	Error message should appear as Login Failed	As expected	pass
		Enter valid Username	should allow the user to proceed	As expected	pass
		Enter invalid password	Error message should appear as Login Failed	As expected	pass
		Enter valid password	Should allow user to proceed	As expected	pass
		Enter invalid Username and password	Error message should appear as login failed	As expected	pass
3	Check live feed activity	Press Button	Live feed back best be shown on app	As expected	pass
		Enter valid Username and password	Message should appear as Login Successful	As expected	pass
4	Grant access activity	Press Button	The actuator will be activated	As Expected	pass
5	Close door	Press Button	Actuator should close door	As expected	pass
6	Add User	Press Button	Add B-id to database	As expected	pass

Table 9.3: Test cases for Android App

Test case No.	Test Case	Input	Expected Result	Actual Result	Pass/Fail
1	Check IP of Network	Enter wrong IP	User should not get authenticated	As expected	pass
		Enter correct IP	User should get authenticated	As expected	pass
2	Check Login Activity	Leave all fields blank and click login			pass
		Enter invalid Username	Error message should appear as Please enter valid username		pass
		Enter valid Username	should allow the user to proceed	As expected	pass
		Enter invalid password	Error message should appear as please enter valid Username	As expected	pass
		Enter valid password	Should allow user to proceed	As expected	pass
		Enter invalid Username and password	Error message should appear as login failed	As expected	pass
Test case No.	Test Case	Input	Expected Result	Actual Result	Pass/Fail
3	Com port selection	Enter wrong Com port	error massage should appear as Enter Correct port	As Expected	pass
		Enter correct com port	Use should navigate to next window	As expected	pass
4	Option Selection from main menu	select any option	User should allow to go to next respective page	As Expected	pass
		Click exit	Application should get closed	As Expected	pass

5	Start up of System	Press Button	System should be initialized	As Expected	pass
6	Add B-id of user	Live all fields blank and click button	Error message should be displayed as All fields are mandatory	As Expected	pass
		Enter Existing Username	error message shown as user exists	As expected	pass
		Enter new B-id of user	Allow new user to add in database successfully	As Expected	pass
7	Add owner Info	Live all fields blank and click button	Error message should be displayed as All fields are mandatory	As Expected	pass
		Enter Existing Owner	error message shown as Owner exists	As expected	pass
		Enter new owner information	Allow new owner to add in database successfully	As Expected	pass
8	Manage B-id	Pres delete button without selecting any B-id	Error message displayed	As Expected	pass
		Select appropriate B-id of user	Delete selected B-id of user	As Expected	pass
9	Manage Owner Informstion	Press update button without selecting owner info	Error message will be displayed	As Expected	pass
		Select owner and update owner info	Reflect updates in database	As Expected	pass
10	Log info	Press Button	Display all user logs with B-id	As Expected	pass

Table 9.4: Test cases for Java Client App

Test case No.	Test Case	Input	Expected Result	Actual Result	Pass/Fail
1	Authenticate user	Username and password	Authentication must be successful	As Expected	pass
2	Store data	Registration data	Data should get stored	As Expected	pass
3	Fetch data for android user	Requested data	Data should get fetched	As Expected	pass
4	Update data	Data from user/system	Data should get updated	As Expected	pass
5	Change password	New password	Password must get saved to database	As Expected	pass

Table 9.5: Test cases for Server

Test case No.	Test Case	Input	Expected Result	Actual Result	Pass/Fail
1	Power Supply	230 V	Power supply must convert it into 5V and 12V	As Expected	pass
2	ADC	Analog value from sensors	Values must get converted to digital	As Expected	pass
3	Relay Board	Signal from ULN 2803	Devices and LEDs must get ON after signal	As Expected	pass

Table 9.6: Test cases for Hardware

CHAPTER 10

RESULTS

10.1 Screen shots

Outputs / Snap shots of the results

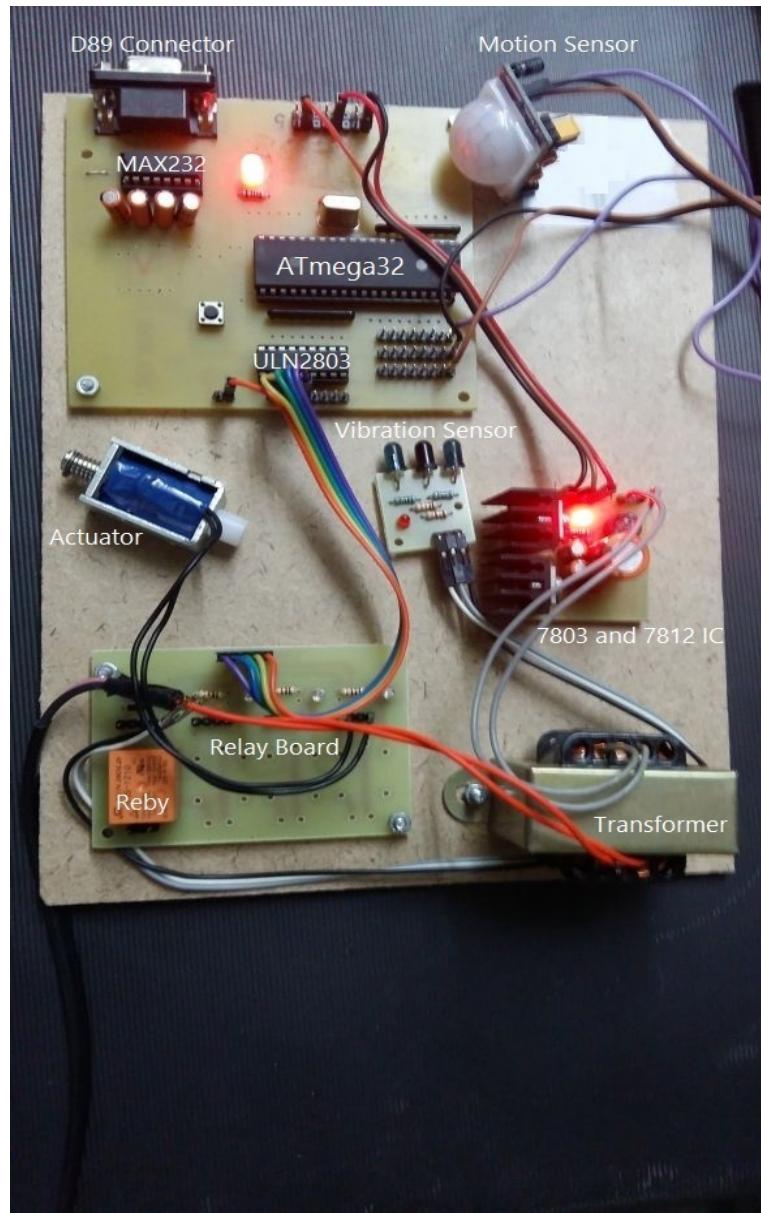
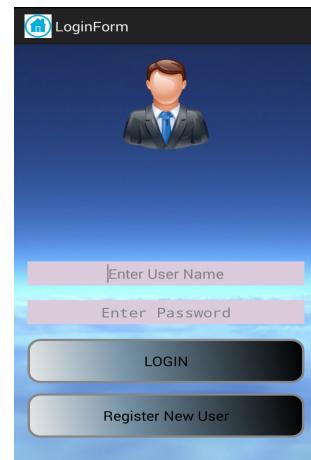


Figure 10.1: Hardware Configuration



(a) Enter IP



(b) Login Page

Figure 10.2: Android App Activities



(a) User Registration



(b) User Registered Successfully

Figure 10.3: Android App Activities



(a) Login Successful



(b) Door Opening Operation

Figure 10.4: Android App Activities



(a) View Live Feed



(b) Live Feed

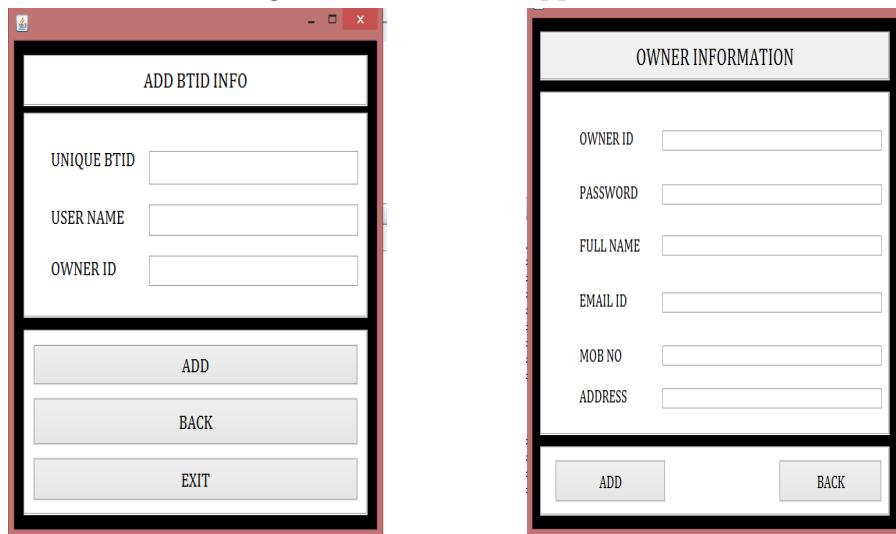
Figure 10.5: Android App Activities



(a) Enter IP

(b) Application Startup

Figure 10.6: Admin Application



(a) New BTID Registration

(b) Update Owner Info

Figure 10.7: Admin Application

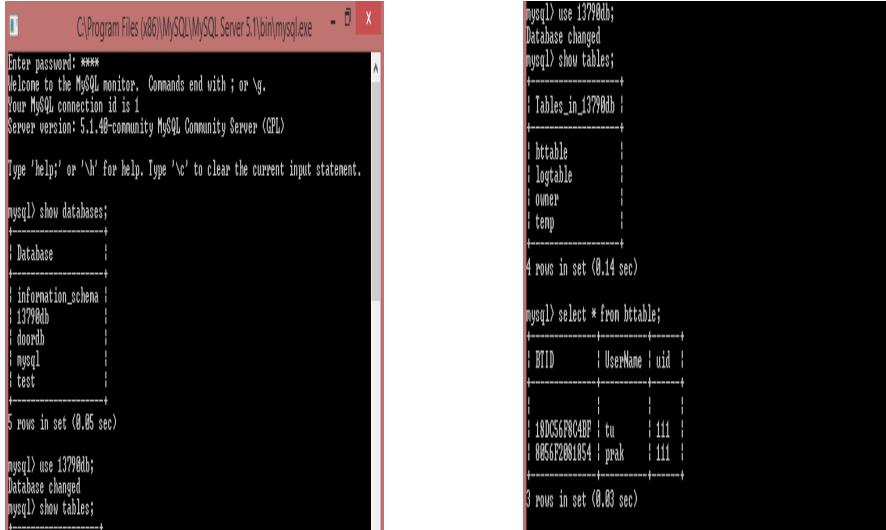


Figure 10.8: Admin Application

BTID LOG INFORMATION		
S.No	ENTER BTID	DATE
00	18DC56F8C4EF	2017-02-23 02:40:00
01	18DC56F8C4EF	2017-02-23 02:40:08
02	18DC56F8C4EF	2017-02-23 02:40:18
03	18DC56F8C4EF	2017-02-23 02:40:24
04	18DC56F8C4EF	2017-02-23 02:40:35
05	18DC56F8C4EF	2017-02-23 02:41:44
06	18DC56F8C4EF	2017-02-23 02:41:45
07	18DC56F8C4EF	2017-02-23 02:41:54
08	18DC56F8C4EF	2017-02-23 02:41:58
09	Unknown Voter	2017-02-24 11:21:07
10	Unknown Voter	2017-02-24 11:21:27
11	18DC56F8C4EF	2017-02-24 11:31:01
01	18DC56F8C4EF	2017-02-24 11:31:11
02	18DC56F8C4EF	2017-02-24 11:31:46
03	18DC56F8C4EF	2017-02-24 11:31:56
04	8056F2081854	2017-02-24 11:38:34
05	8056F2081854	2017-02-24 11:38:44
06	Unknown Voter	2017-02-24 11:51:00
07	Unknown Voter	2017-02-24 11:51:40
08	Unknown Voter	2017-02-24 11:57:15

(a) View Logs

Figure 10.9: Admin Application



```

C:\Program Files (x86)\MySQL\MySQL Server 5.1\bin\mysql.exe - D X

Enter password: ****
Welcome to the MySQL monitor. Commands end with ; or '\g'.
Your MySQL connection id is 1
Server version: 5.1.48-community MySQL Community Server (GPL)

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

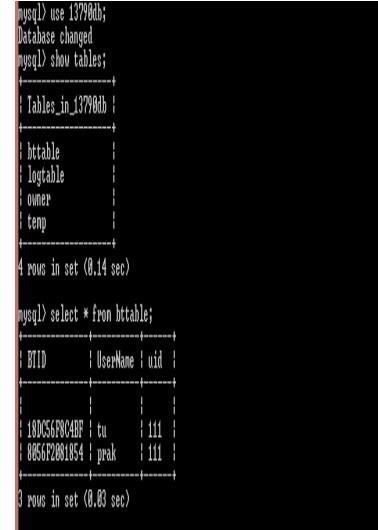
mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| 13798db |
| dborah |
| mysql |
| test |
+-----+
5 rows in set (0.05 sec)

mysql> use 13798db;
Database changed
mysql> show tables;
+-----+
| Tables_in_13798db |
+-----+
| btable |
| logtable |
| owner |
| temp |
+-----+
4 rows in set (0.14 sec)

mysql> select * from btable;
+-----+
| BTID | UserName | uid |
+-----+
| 180C56F904BF | tu | 111 |
| 8050F2B01854 | prak | 111 |
+-----+
3 rows in set (0.03 sec)

```

(a) Select Database



```

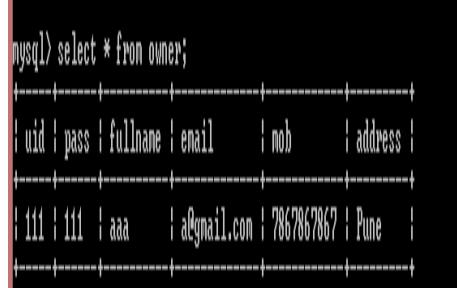
mysql> use 13798db;
Database changed
mysql> show tables;
+-----+
| Tables_in_13798db |
+-----+
| btable |
| logtable |
| owner |
| temp |
+-----+
4 rows in set (0.14 sec)

mysql> select * from btable;
+-----+
| BTID | UserName | uid |
+-----+
| 180C56F904BF | tu | 111 |
| 8050F2B01854 | prak | 111 |
+-----+
3 rows in set (0.03 sec)

```

(b) BTID Table

Figure 10.10: Server

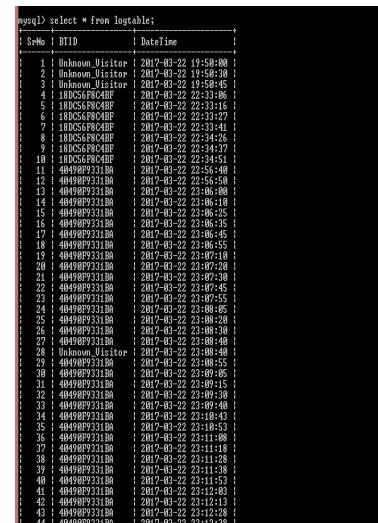


```

mysql> select * from owner;
+-----+
| uid | pass | fullname | email | mob | address |
+-----+
| 111 | 111 | aaa | a@gmail.com | 7867867867 | Pune |
+-----+

```

(a) Owner Table



```

mysql> select * from logtable;
+-----+
| SNo | BTID | DateTime |
+-----+
| 1 | Unknown_Visitor | 2017-03-22 19:58:00 |
| 2 | Unknown_Visitor | 2017-03-22 22:15:00 |
| 3 | Unknown_Visitor | 2017-03-22 22:15:45 |
| 4 | 180C56F904BF | 2017-03-22 22:13:06 |
| 5 | 180C56F904BF | 2017-03-22 22:33:16 |
| 6 | 180C56F904BF | 2017-03-22 22:33:27 |
| 7 | 180C56F904BF | 2017-03-22 22:33:27 |
| 8 | 180C56F904BF | 2017-03-22 22:34:26 |
| 9 | 180C56F904BF | 2017-03-22 22:34:37 |
| 10 | 180C56F904BF | 2017-03-22 22:34:51 |
| 11 | 180C56F904BF | 2017-03-22 22:34:51 |
| 12 | 40490P9331DB | 2017-03-22 22:54:59 |
| 13 | 40490P9331DB | 2017-03-22 23:06:00 |
| 14 | 40490P9331DB | 2017-03-22 23:06:18 |
| 15 | 40490P9331DB | 2017-03-22 23:06:25 |
| 16 | 40490P9331DB | 2017-03-22 23:06:25 |
| 17 | 40490P9331DB | 2017-03-22 23:06:45 |
| 18 | 40490P9331DB | 2017-03-22 23:06:55 |
| 19 | 40490P9331DB | 2017-03-22 23:07:00 |
| 20 | 40490P9331DB | 2017-03-22 23:07:28 |
| 21 | 40490P9331DB | 2017-03-22 23:07:38 |
| 22 | 40490P9331DB | 2017-03-22 23:07:45 |
| 23 | 40490P9331DB | 2017-03-22 23:07:53 |
| 24 | 40490P9331DB | 2017-03-22 23:07:55 |
| 25 | 40490P9331DB | 2017-03-22 23:08:28 |
| 26 | 40490P9331DB | 2017-03-22 23:08:38 |
| 27 | 40490P9331DB | 2017-03-22 23:08:40 |
| 28 | Unknown_Visitor | 2017-03-22 23:11:00 |
| 29 | 40490P9331DB | 2017-03-22 23:11:18 |
| 30 | 40490P9331DB | 2017-03-22 23:09:05 |
| 31 | 40490P9331DB | 2017-03-22 23:09:15 |
| 32 | 40490P9331DB | 2017-03-22 23:09:30 |
| 33 | 40490P9331DB | 2017-03-22 23:09:46 |
| 34 | 40490P9331DB | 2017-03-22 23:10:43 |
| 35 | 40490P9331DB | 2017-03-22 23:10:53 |
| 36 | 40490P9331DB | 2017-03-22 23:11:00 |
| 37 | 40490P9331DB | 2017-03-22 23:11:18 |
| 38 | 40490P9331DB | 2017-03-22 23:11:28 |
| 39 | 40490P9331DB | 2017-03-22 23:11:38 |
| 40 | 40490P9331DB | 2017-03-22 23:11:45 |
| 41 | 40490P9331DB | 2017-03-22 23:12:03 |
| 42 | 40490P9331DB | 2017-03-22 23:12:13 |
| 43 | 40490P9331DB | 2017-03-22 23:12:28 |
| 44 | 40490P9331DB | 2017-03-22 23:12:38 |

```

(b) Log Table

Figure 10.11: Server

10.2 Test Data

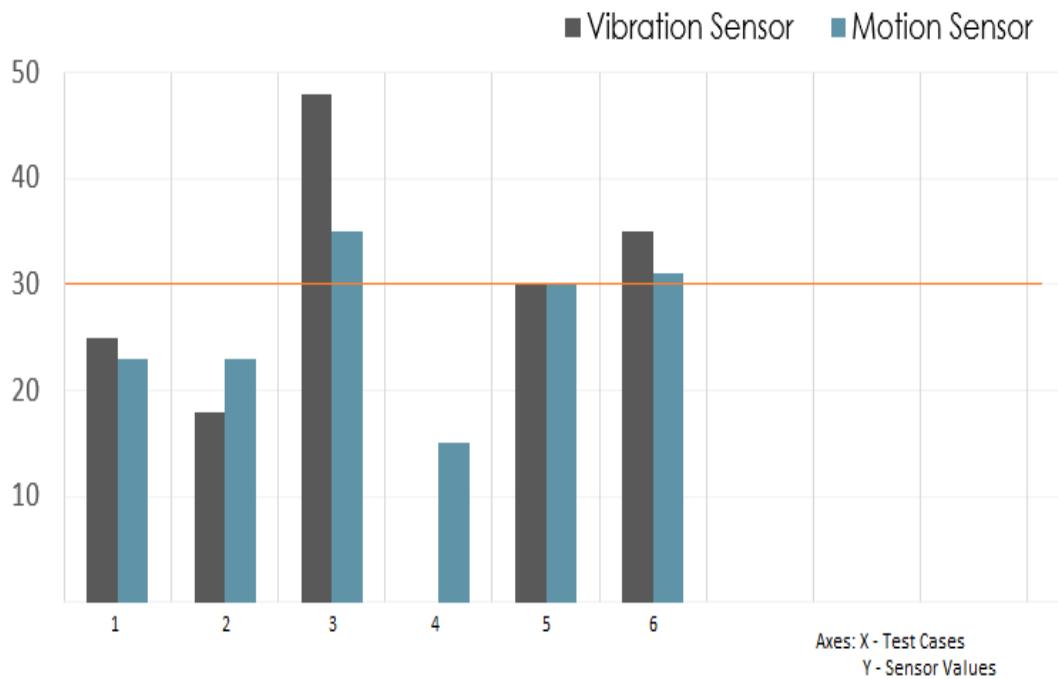


Figure 10.12: Vibration and Motion sensors Test cases

In the above graph, the vibration sensor and motion sensor values are displayed. The threshold value has been set to 30.

- If the vibration sensor and motion sensor goes above threshold then these values are considered to be abnormal. The values on or under threshold are considered to be normal.
- The vibration obtained in the 4th reading is undefined as it does not fit in either of the categories. We can either say that the sensor is not connected.
- Both the values of vibration sensor and motion sensor should be in certain range to qualify as normal. Even on the occurrence of single value conflict, the measurement is considered as abnormal. Among all the readings that we obtained we obtained 3 normal, 2 abnormal and 1 undefined(Vibration) values.

CHAPTER 11

DEPLOYMENT AND MAINTENANCE

11.1 Installation of Softwares

11.1.1 NetBeans IDE Installation Process

- Starting to download
 - 1) Go to <https://netbeans.org/downloads/>.
 - 2) In the upper right area of the page, select the language and platform from the drop-down list. You can also choose to download and use the platform-independent zip file.
 - 3) Click the Download button for the download option that you want to install.
 - 4) Save the installer file to your system.
- Installing Software on Windows and Linux
 - 1) After the download completes, run the installer. For Windows, the installer executable file has the .exe extension. Double-click the installer file to run it. For Linux platforms, the installer file has the .sh extension. For these platforms, you need to make the installer files executable by using the following command: chmod +x `{installer-file-name}`. Type `./{installer-file-name}` to run the installer.
 - 2) If you downloaded the All or Java EE bundle, you can customize your installation. Perform the following steps at the Welcome page of the installation wizard: Click Customize. In the Customize Installation dialog box, make your selections. Click OK.
 - 3) At the Welcome page of the installation wizard, click Next.
 - 4) At the License agreement page, review the license agreement, click the acceptance check box, and click Next.
 - 5) At the NetBeans IDE installation page, do the following: Accept the default installation directory for the NetBeans IDE or specify another directory. Note: The installation directory must be empty and the user profile you are using to run the installer must have read/write permissions for this directory. (Applicable only to All or Java EE bundle.) Accept the default JDK installation to use with the NetBeans IDE or select a different installation from the drop-down list. If the installation wizard did not find a compatible JDK installation to use with the NetBeans IDE, your JDK is

not installed in the default location. In this case, specify the path to an installed JDK and click Next, or cancel the current installation. After installing the required JDK version you can restart the installation.

- 6) Click Next.
- 7) If the GlassFish Server Open Source Edition 4.1.1 installation page opens, accept the default installation directory or specify another installation location and click Next.
- 8) If you are installing Apache Tomcat, on its installation page, accept the default installation directory or specify another installation location. Click Next.
- 9) At the Summary page, do the following: Verify that the list of components to be installed is correct. Select the Check for Updates check box if you want to check the Update Center for possible updates. Verify that you have adequate space on your system for the installation.
- 10) Click Install to begin the installation.
- 11) At the Setup Complete page, provide anonymous usage data if desired, and click Finish

- ECLIPSE ADT

- 1) Setup Java Development Kit
- 2) Configure Android SDK
- 3) Setup Eclipse IDE
- 4) Setup Android Development Tools (ADT) Plugin
- 5) Create Android Virtual Device
- 6) You can start creating Your Android application then

- Installing MySQL

- 1) Download MySQL Download MySQL from dev.mysql.com/downloads/. Follow MySQL Community Server, Windows and download the Without installer version.
- 2) Extract the files
- 3) Move the data folder (optional)
- 4) Create a configuration file

- 5) Test your installation The MySQL server is started by running C:mysqlbinmysqld.exe. Open a command box (Start → Run → cmd) and enter the following commands:
cd mysqlbin mysqld This will start the MySQL server which listens for requests on localhost port 3306. You can now start the MySQL command line tool and connect to the database. Open another command box and enter: cd mysqlbin mysql -u root This will show a welcome message and the mysql> prompt. Enter show databases; to view a list of the pre-defined databases.
 - 6) Change the root password The MySQL root user is an all-powerful account that can create and destroy databases. If you are on a shared network, it is advisable to change the default (blank) password. From the mysql> prompt, enter: UPDATE mysql.user SET password=PASSWORD("my-new-password") WHERE User='root'; FLUSH PRIVILEGES; You will be prompted for the password the next time you start the MySQL command line. Enter exit at the mysql> prompt to stop the command line client. You should now shut down MySQL with the following command: mysqladmin.exe -u root shutdown
 - 7) Install MySQL as a Windows service
- Installing of JDK on Windows
 - 1) Go to link. Click on Download JDK. For java latest version <http://www.oracle.com/technetwork/java/javase/downloads/index-jsp-138363.html>
 - 2) Accept License Agreement
 - 3) Download latest java JDK for your version(32 or 64 bit) of java for Windows
 - 4) Once the download is complete, run the exe for install jdk . Click Next
 - 5) Once install is complete click Close
 - 6) Set Environment Variable
 - 7) Restart your PC. Go to command prompt and type javac

CHAPTER 12

CONCLUSION AND FUTURE SCOPE

Conclusion

Digital door lock is one of the most popular digital consumer devices because of the user convenience and affordable price. In actuality, it is replacing a lot of conventional types of locks. In this report we proposed a novel wireless access and monitoring control system which consist of different phases:

- Detecting user
- Fetching b-id
- Verification
- Notifications
- Process according to request
- Performing actions in case of emergency.

A low cost authentication system based on bluetooth technology, making home automation more secure and cost efficient. This technology can surely make change in the society to drop the percentage of crime. Both NFC, RFID can be used in securing home but implementation cost and availability of supply to hardware requirements is not upto the mark. So bluetooth technology should be inconsideration.

Future Scope

In future, the android application may offer assistance in controlling more doors, windows and basic home electronic appliances. Battery backup system could also be considered to ensure the completeness of the system.

Many new ideas related to home automation can be worked on in order to reduce trespassing. An auto trigger report of the attempt to theft can be sent to nearest police station along with residential address. This idea can be considered to make the proposed system better.

CHAPTER 13

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ANNEXURE A

LABORATORY ASSIGNMENTS ON

PROJECT ANALYSIS OF

ALGORITHMIC DESIGN

Feasibility on basis of Class of Problem

Complexity classes are one way to talk about how difficult or easy a problem is. Complexity theory gets very technical but the basics are actually extraordinarily intuitive, and it's possible to understand the P versus NP issue with very little math background.

If there is a fast solution to the search version of a problem then the problem is said to be Polynomial time, or P for short. If there is a fast solution to the verification version of a problem then the problem is said to be Non deterministic Polynomial time, or NP for short. The question of "P=NP" is then the question of whether these sets are identical.

Some problems can be translated into one another in such a way that a fast solution to one problem would automatically give us a fast solution to the other. There are some problems that every single problem in NP can be translated into, and a fast solution to such a problem would automatically give us a fast solution to every problem in NP. This group of problems are known as NP Hard. Some problems in NP Hard are actually not themselves in NP the group of problems that are in both NP and NP Hard is called NP Complete

Classes of problems

- **NP**

A lot of programs that don't (necessarily) run in polynomial time on a regular computer, but do run in polynomial time on a non deterministic Turing machine. These programs solve problems in NP, which stands for non deterministic polynomial time. An equivalent way to define NP is by pointing to the problems that can be verified in polynomial time.

- **NP Hard**

If a problem is NP hard, this means I can reduce any problem in NP to that problem. This means if I can solve that problem, I can easily solve any problem in NP. If we could solve an NP hard problem in polynomial time, this would prove P = NP.

- **NP Complete**

A problem is NP complete if the problem is both NP hard, and in NP. Our system satisfies and also solve both the problems of detecting any unauthorized user and also provide ease of control to the owner. Since we have tried to obtain fast solution of problems in our project, it is said to be P type problem which tries to solve the problem in

polynomial time. We can also say that the verification process of the user does not have fast solution so it is not NP complete problem.

Relation Between Classes of Problems

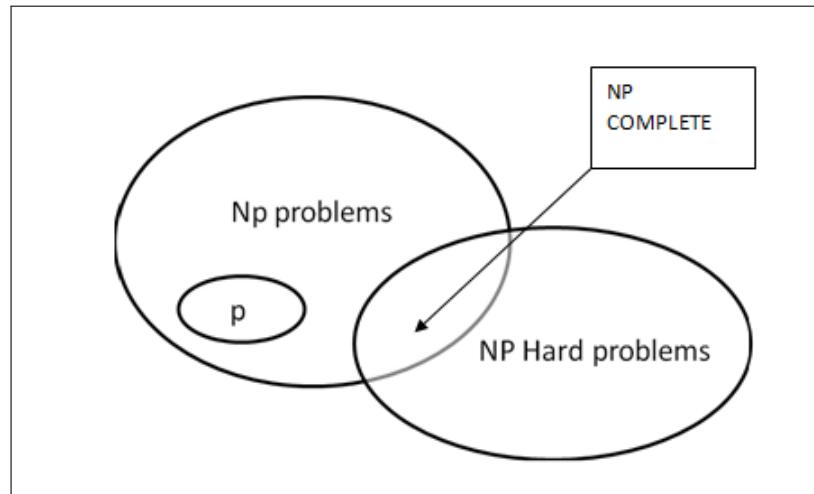


Figure A.1: Relation between Classes of Problems

Mathematical Model

Set Theory

Let G be the set of all functions.

$$G = \{Ca, Oa, Ad, S, Bt, Buz, Md, Vs, Mc, Cm\}$$

- Ca be set of all client. $Ca = \{c1, c2, c3, c4, \dots, cn\}$
- Oa be set of owner app. $Oa = \{o1, o2\}$
- Ad is set of admin. $Ad = \{ad1\}$
- S be set of server. $S = \{s\}$
- Bt is set of bluetooth fetched. $Bt = \{b1, b2, b3, b4, \dots, bn\}$
- Buz is set of burglar alarm. $Buz = \{bu1\}$
- Vs is set of vibration sensor. $Vs = \{v1\}$
- Md is set motion detector. $Md = \{m1\}$

- Mc is set of micro-controller. $Mc=\{Mc1\}$
- Cm is set of web cameras used. $Cm=\{Ca1\}$

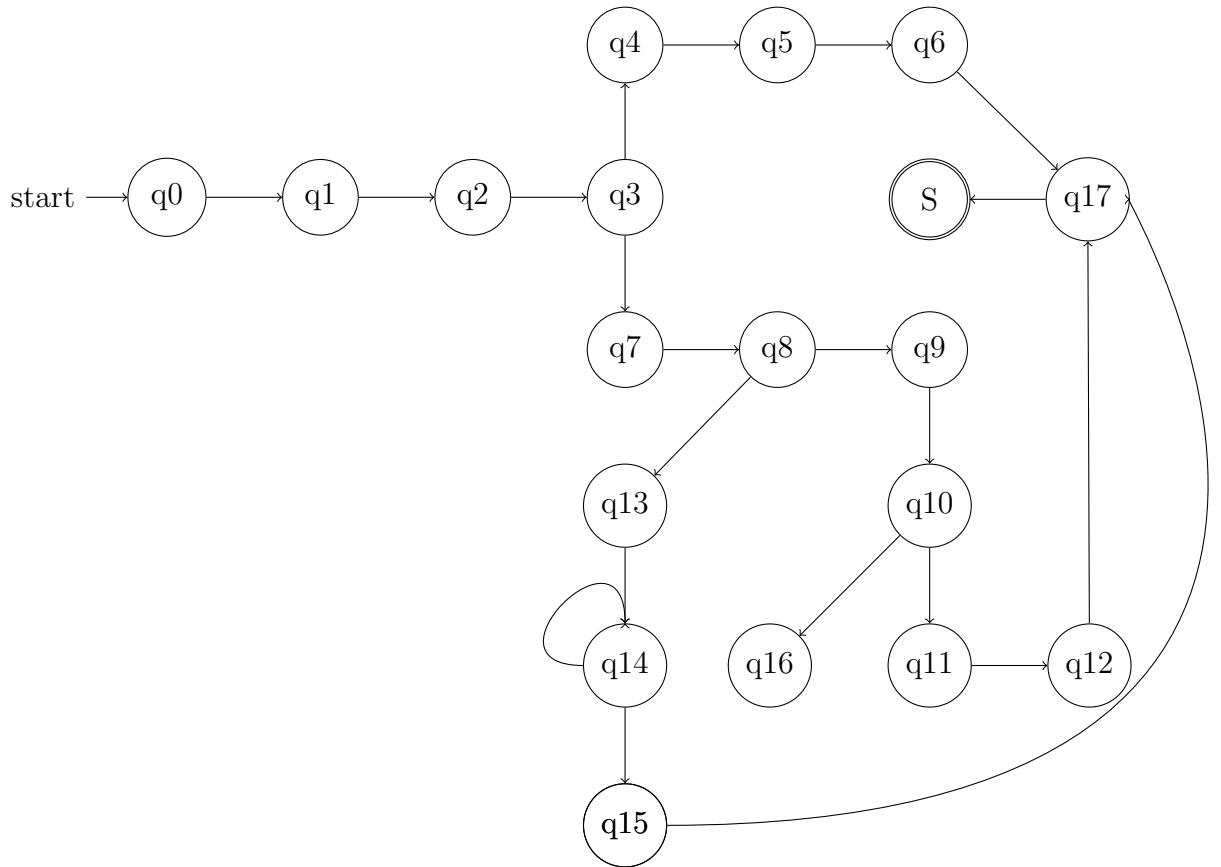
Success Condition:

- B-id register in the database so user can access the door.
- Activate burglar alarm when unauthorized user try to access the door.
- Notify owner about all user when they come in and out of the home.
- Send snaps to owner to the user at the door.
- Generate B-id for guest user when owner send request to the database.

Failure Conditions

- B-id not registered in the database.
- Alarm could not activated when authorized user try to access the door.
- couldn't receive snap of user at the door.

State Transition



Let A be the System $A = \{Q, \Sigma, Q_0, S, \delta\}$

Q_0 :Door locking system ready

Q_1 :motion sensor activated

Q_2 :trying access

Q_3 :checking into database

Q_4 :user B-id found

Q_5 :Establish connection

Q_6 :Authorize access

Q_7 :B-id not found in database

Q_8 :Asking host for access

Q_9 :Host authorizing access

Q_{10} :Checking the time window allotted by host

Q_{11} :Establishing connection if time not expired

Q_{12} :Authorize access

Q_{13} :Unknown user

Q_{14} :Send Image or snaps to the host

Q_{15} :Take appropriate actions

Q_{16} :Time expired

Q_{17} :Enter into log file

$$\sum = \{ \text{Db}, \text{M}, \text{C}, \text{L} \}$$

Db= Database

M = Motion Sensor

C = Camera

G = Guest

L = Log file

Certainty

	Y1	Y2
$\delta(\text{G}, \text{Db})$	1	1
$\delta(\text{G}, \text{Db})$	0	0
$\delta(\text{G}, \text{Db})$	1	0
$\delta(\text{G}, \text{Db})$	0	1

Success= $\{(1,1), (0,0)\}$

Failure= $\{(1,0), (0,1)\}$

Project Canvas

Purpose 1. To provide better security in home automation. 2. To provide easy access to the visitor and owner	Goal 1.Hand free door access without compromising security. 2.Active infusion detection intrusion avoidance measures. 3.Maintaining user log.	User 1.Home Networking system. 2.For disable people (wheel chair user). 3.In bank locker system. 4.In industry offices
Activation 1.Log into the android application 2.Authentication 3.Surveillance 4.User log data storage 5.User registration	Deliverables 1.SRS and project design. 2.Project report and project implementation.	Risk 1.Power failure 2.Slow network
Milestone 1.Create door lock with Bluetooth connectivity. 2.Develope android app for user and database server and PC app (Admin)	Constraint 1.Limited to smart phone having android OS. 2.Work specification for latch type door. 3.Compitable to devices having Bluetooth hardware.	Scope 1.Scope of the project range between general public to IT / Industry who need effective automated door lock system.

ANNEXURE B

LABORATORY ASSIGNMENTS ON

PROJECT QUALITY AND

RELIABILITY TESTING OF

PROJECT DESIGN

Concept of Divide and Conquer

A divide and conquer algorithm works by recursively breaking down a problem into two or more sub-problems of the same (or related) type (divide), until these become simple enough to be solved directly (conquer). So have divided our problem based on algorithm used and those are:

- B-id Authentication
- Registration
- Develop android application
- Action perform

Divide and conquer (D & C) is an algorithm design paradigm based on multi-branched recursion. So we have to recursively divide our problem into sub-problems of the same (or related) type (divide), until these sub-problem become simple enough to be solved directly (conquer). The solutions to the sub-problems are then combined to give a solution to the original problem.

In our project we have divided our project into 4 phases which are :Admin, Client app, owner app, Database Server

Description:

1. Admin app:-

- Check for Bluetooth connection.
output-T\F
- Create bluetooth connection.
output-T\F
- Fetch B-id and verify in database.
output-T\F
- B-id exist then provide access to the door.
- B-id not registered then send request to owner for further operations.
- Any unauthorized access to door turn On alarm.
- Turn on camera for taking snaps of user at the door and send snaps to the database.

2. Owner app:-

- Owners registration details.
output-T\F
- Authenticate owners with user name and password.
output-T\F
- Read message or notifications send from the server.
- Grant access to the particular client by sending request to database to register user B-id into database.

3. Database Server:-

- Check for B-id send from admin in the database.
output-T\F
- Send notifications to owner about the current status of the door.
- After receiving request from owner register B-id into the database.
output-T\F
- Store of snaps of user in some file so that it can be further send to the owner when required.
- After particular time span delete the history of the database to improve efficiency and performance.

4. Client App:-

- Turn on Bluetooth
output=T\F
- B-id not register then wait until B-id gets registered into the database.
- Receive notifications of B-id registration.
- Guest user can then access the door.

System Specifications and Dependencies

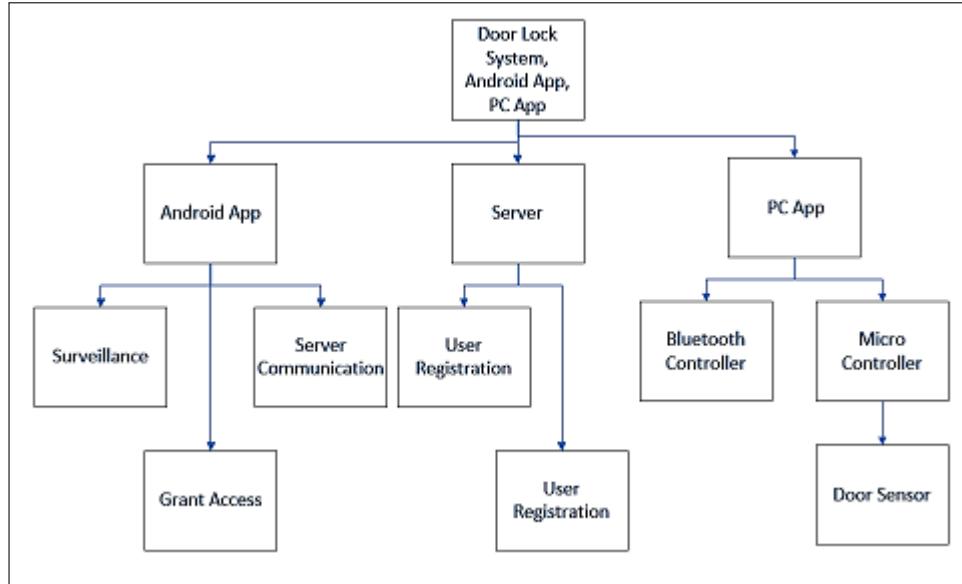


Figure B.1: Dependency

Components	Dependency	Development platform
Android Application	Grant access, server, communication, surveillance	Eclipse(IDE),XML(GUI)
Server	Database, user registration	Tomcat server,MySQL
PC Application	Micro controller, Bluetooth controller, Door sensors	NetBeans(IDE), Java

Table B.1: Dependency

B.1 UML Diagrams

Use-cases

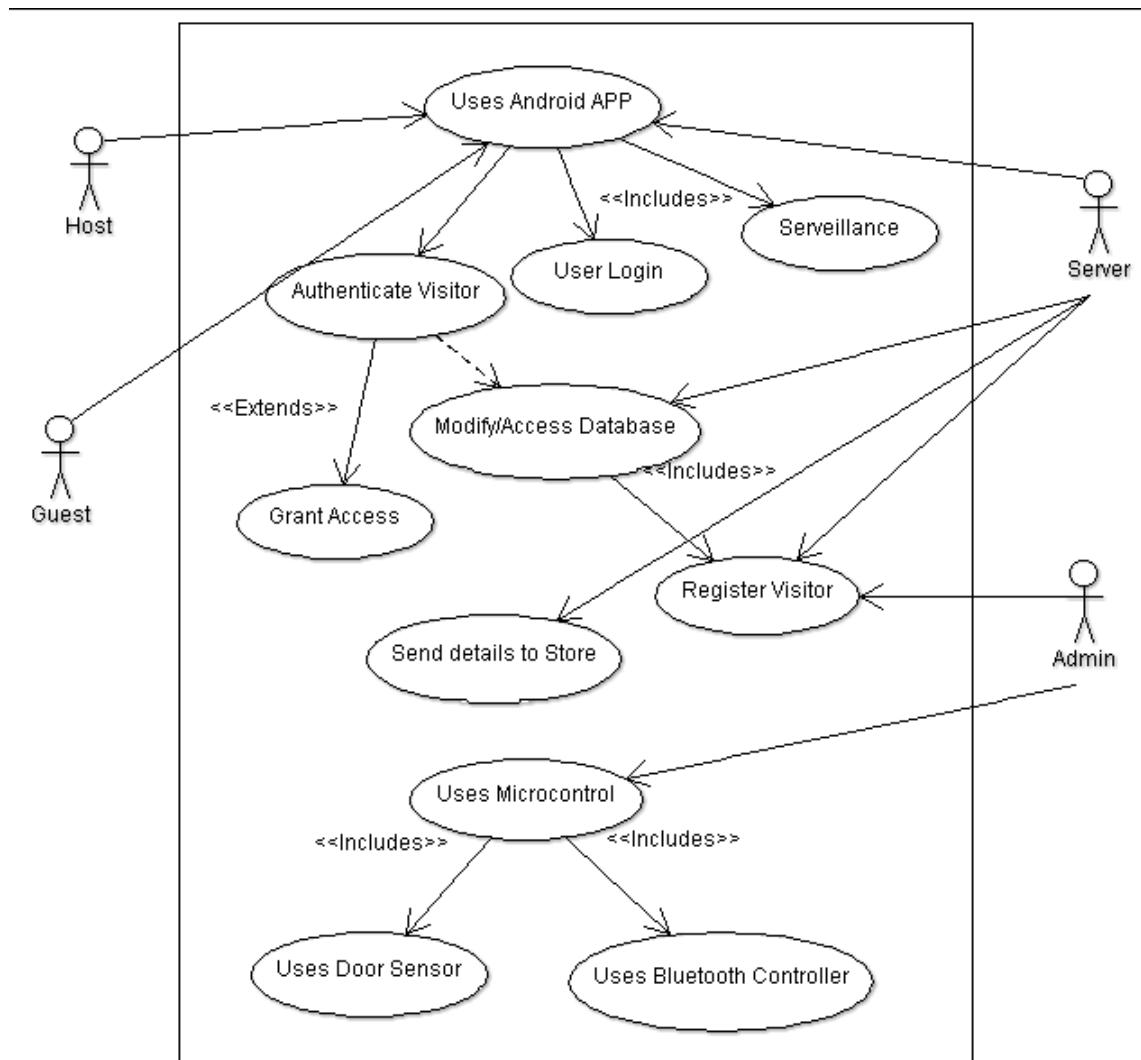


Figure B.2: Use Case Diagram for Guest

Title	Description
Use Case Name	Door Lock System
Use Case Identifier	ID:0
Brief Description	use case for normal access
Primary Actor	Host, Guest
Secondary Admin	Server, Admin
Precondition	Motion Detection, Bluetooth Drivers
Post condition	log file updated
Main flow	<p>1) Host logged into android application</p> <p>2) Motion detector activated</p> <p>3) Bluetooth attempting to connect</p> <p>4) If guest B-id</p> <p>a) Establish connection goto 8</p> <p>b) Else inform host and goto 5</p> <p>5) Host sends request to admin to register B-id</p> <p>6) Server register B-id</p> <p>7) If guest B-id time limit not exceeded</p> <p>a) Establish connection</p> <p>b) Else connection denied</p> <p>8) Authorize access</p> <p>9) Enter information into database</p>

Table B.2: Use Case Description(Guest)

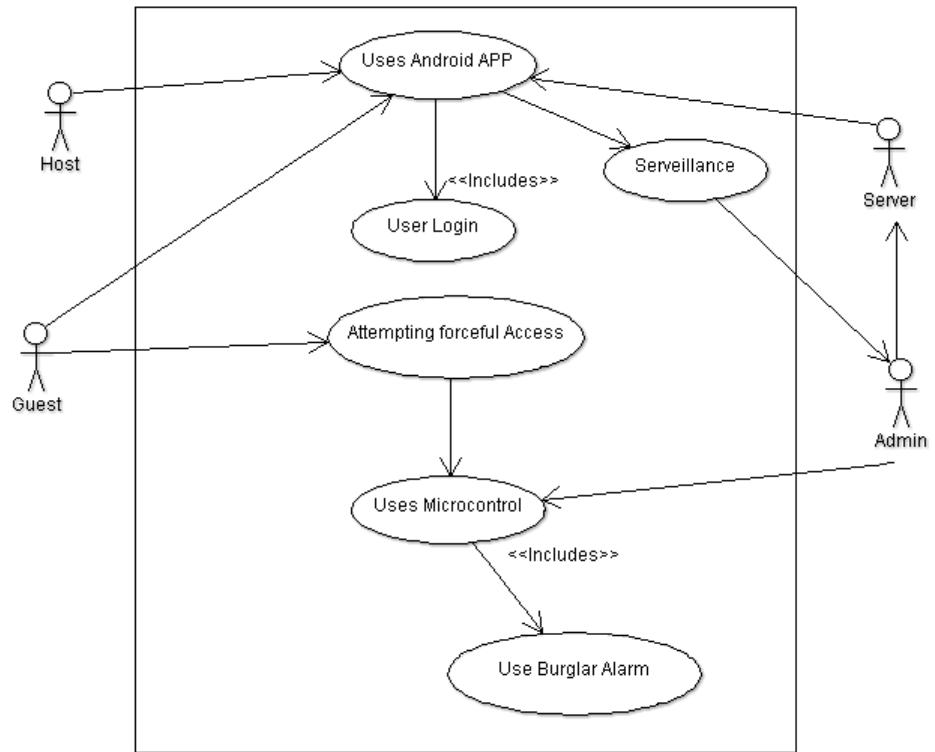


Figure B.3: Use Case Diagram for Intruder

Title	Description
Use Case Name	Door Lock System
Use Case Identifier	ID:1
Brief Description	use case for intrusion
Primary Actor	Host, Guest
Secondary Admin	Server, Admin
Precondition	Motion Detection, Bluetooth Drivers
Main flow	1)Host logged into the android application 2)Motion detection activated and bluetooth on 3)Guest attempting forcefull access 4)Vibration sensor reacting 5)Host witness the intruder through camera 6)Burglar alarm activated
Post condition	Alarm switch off if intrusion failed
Alternate Route	Not available

Table B.3: Use Case Description(Intruder)

SEQUENCE DIAGRAM

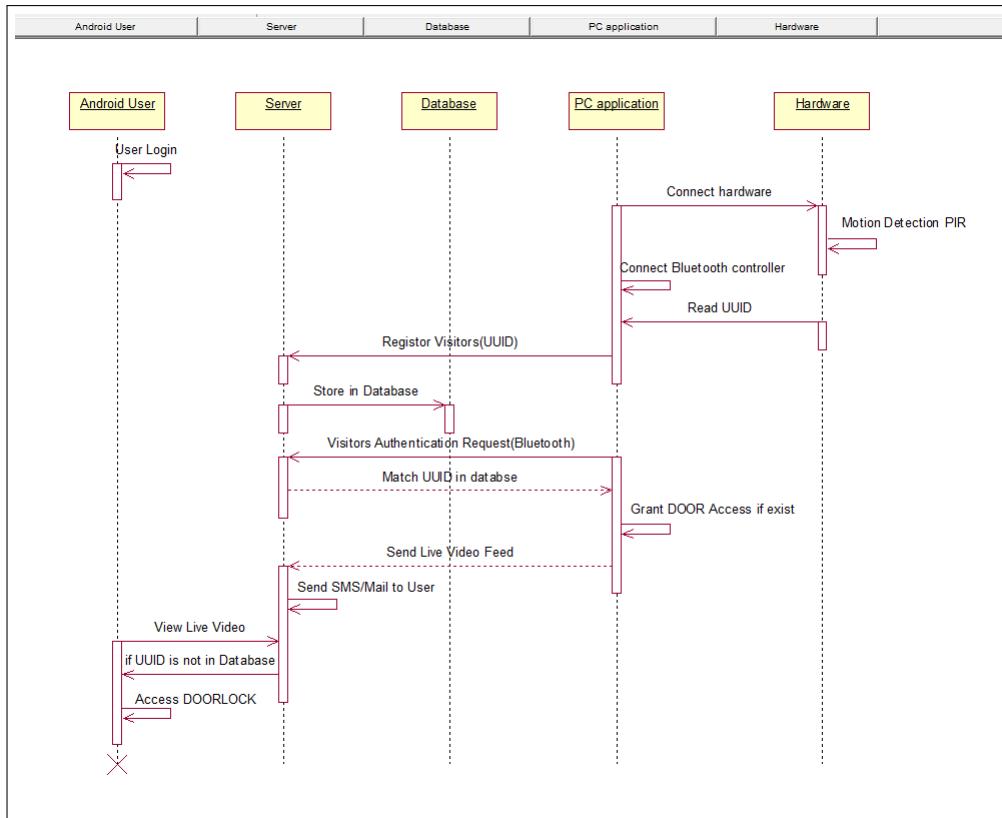


Figure B.4: Sequence Diagram

Sequence Diagram Description

- User logging into android app.
- PC application(admin) prepare component for processing.
- Read UUID from guest.
- UUID is send to server for verification.
- If UUID exist in database then send request to admin to grant access.
- If UUID not present then live feed from the camera will be send to server.

- Host will be notified about presence by SMS/ Mail.
- Host can directly log into server and watch live feed and also have the ability to grant access directly from app.

CLASS DIAGRAM

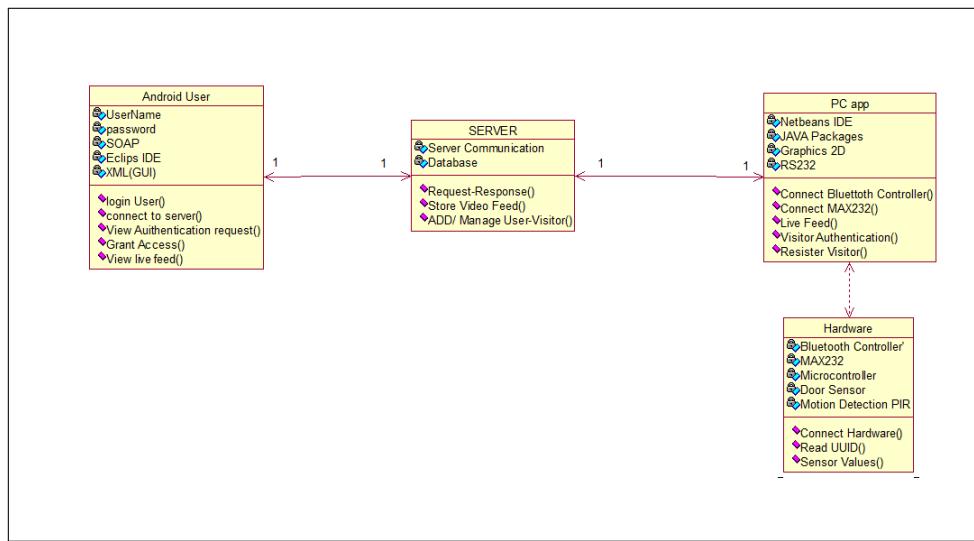


Figure B.5: Class Diagram

Class Diagram Description

- Android user application consists of login, grant access, live feed. It is developed in JDK.
- Server is used to store live feed, file log and default b-id. It is developed in MySQL.
- PC Application is used for connection of components, visitor authentication and send live feed to server. It is developed on NetBeans and has 2D graphics.
- Hardware consists of bluetooth controller, MAX 232, microcontroller and door sensor. It is used to fetch b-id.

Collaboration Diagram

Collaboration diagram is another form of interaction diagram. It represents the structural organization of a system and the messages sent/received. Structural organization consists of objects and links. The purpose of collaboration diagram is similar to sequence diagram. But the specific purpose of collaboration diagram is to visualize the organization of objects and their interaction.

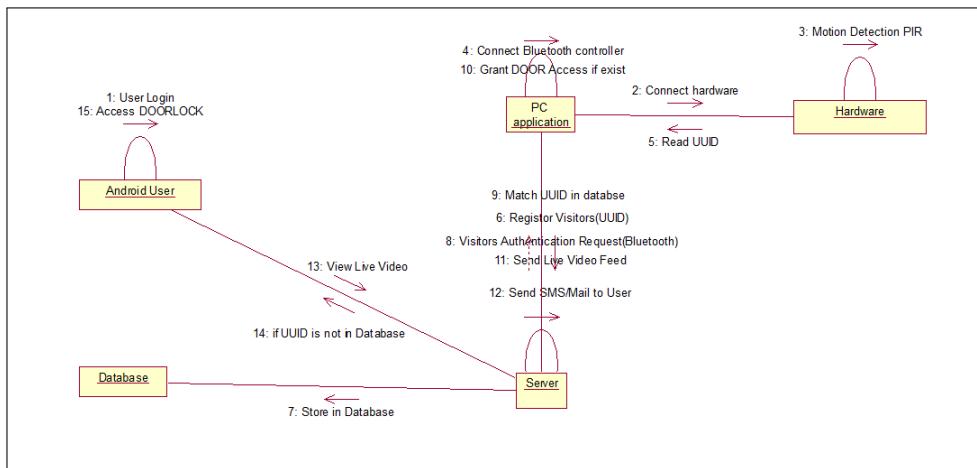


Fig.10.5 Collaboration Diagram

In proposed system of our project, collaboration of the module /parts of s/w takes place in the way as follows:

1. Admin user:

After authentication from admin PC,it select any one operation of following as

- (a) Set threshold
- (b) Control hardware
- (c) Test hardware
- (d) Hardware status

2. Android user:

After authentication from android application,it select any one operation of following as

- (a) Set threshold

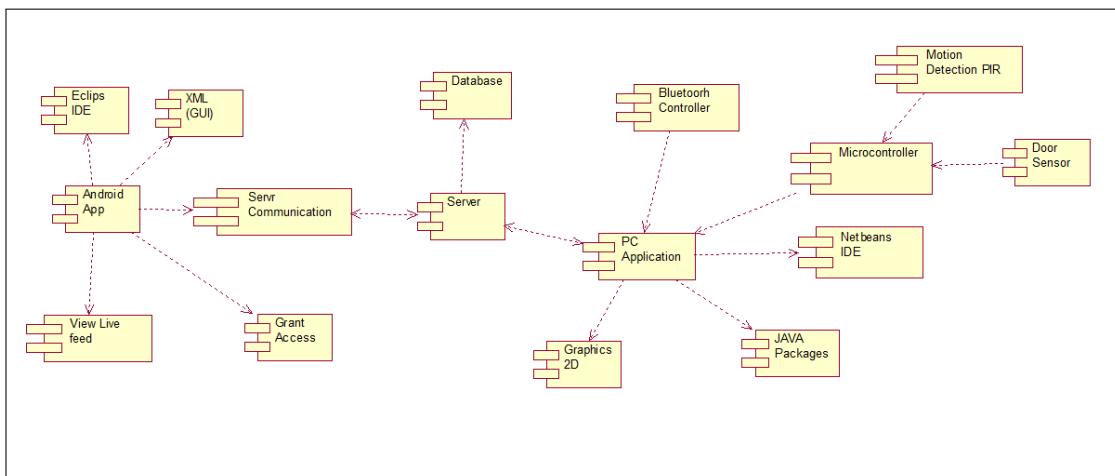
(b) Control hardware

3. Server:

Server contains data on database,it sends update and receive data coming from admin PC and android application.

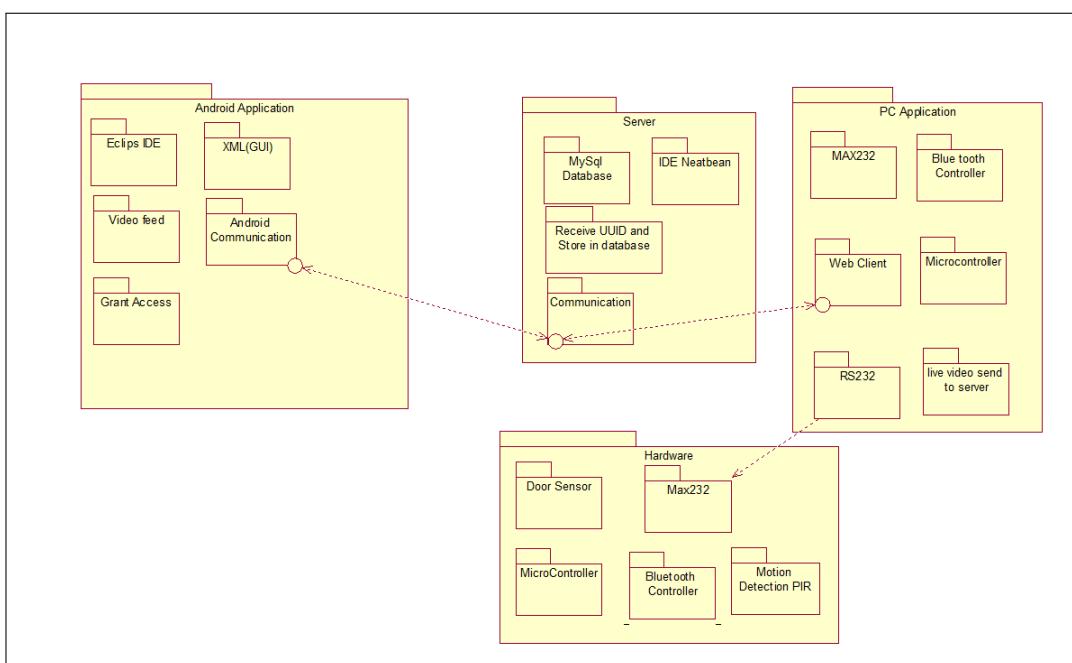
Component diagram

Component diagrams represent a set of components and their relationships. These components consist of classes, interfaces or collaborations. So Component diagrams represent the implementation view of a system. During design phase software artifacts (classes, interfaces etc) of a system are arranged in different groups depending upon their relationship. Now these groups are known as components. Finally, component diagrams are used to visualize the implementation.



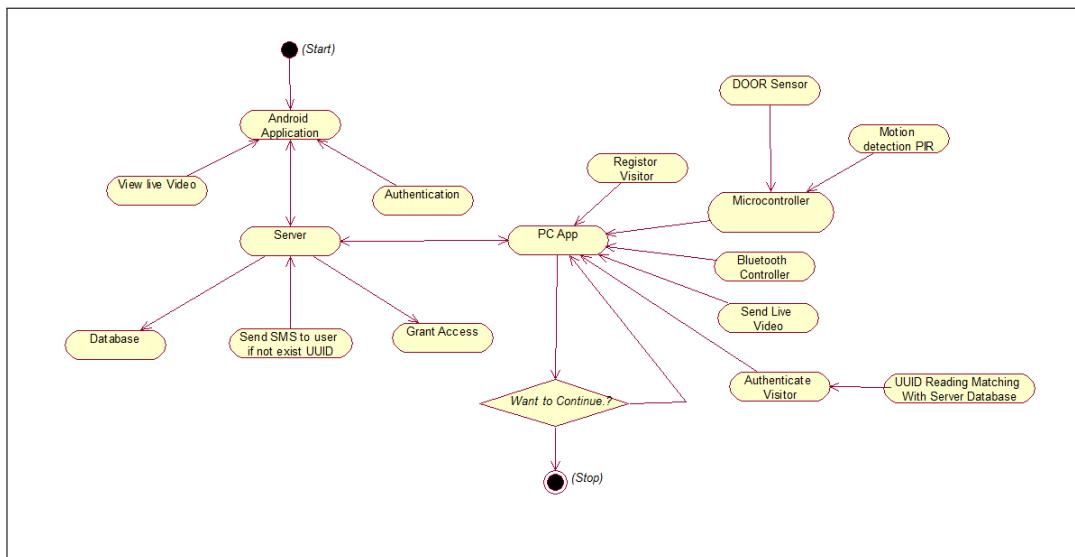
Package diagram

Package diagram is UML structure diagram which shows packages and dependencies between the packages. Package is a namespace used to group together elements that are semantically related and might change together. It is a general purpose mechanism to organize elements into groups to provide better structure for system model.



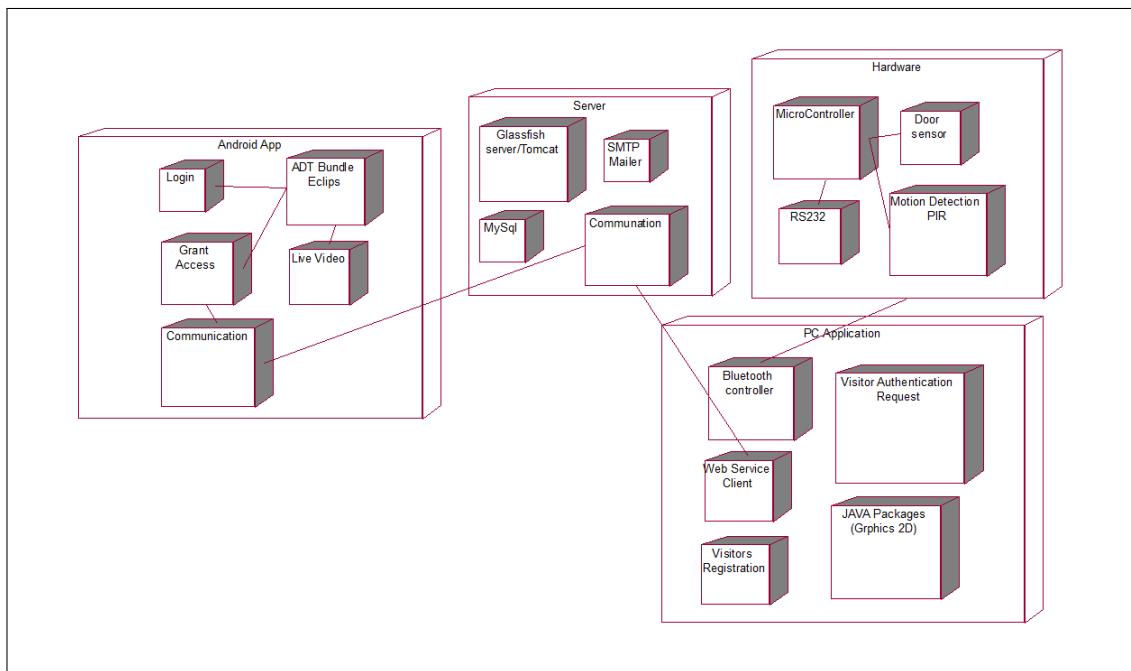
Activity diagram

Owner first enters the username and password so as to get authenticate to the android application. The server sends live feed to the owner which can be seen in android app. Server also sends SMS to owner if user b-id does not exist. Server stores the b-id in database and also send signal after storing the b-id in database so that user can access the door. PC App is central component which have many devices connected to it: Bluetooth controller, micro controller, camera. Motion detector detects the user and send signal to micro controller which forwards that signal to PC app which starts fetching b-id by using Bluetooth controller. Camera is turned on by the PC app if user is not authenticated so as to send the live feed to owner by using android app.



Deployment diagram

Deployment diagrams are a set of nodes and their relationships. These nodes are physical entities where the components are deployed. Deployment diagrams are used for visualizing deployment view of a system. This is generally used by the deployment team.



Modules

1. Admin PC:

We have developed GUI using JAVA and NeatBeans IDE as a platform. The first form of GUI provides login option to existing users and registration option to new user. After successful login, the next form asks for the com port to which the hardware is connected. After giving correct port number, next page provides various operation list to user. The operations include:

- Test Sensors : checks for proper working of sensors.
- Test Devices : checks for proper working of devices.
- Set values according to user : allows user to change the values of sensors.

We have used RXTX a JAVA library for serial communication with microcontroller. It basically provides the port id through which communication is to be done. It allows sending and receiving data to /from microcontroller.

2. Server:

We have used Apache Tomcat Server. Coded in JAVA and on Neat-Beans IDE. On the server side , we have written program for database connectivity and webservices . The webservices includes various methods which are used by the Admin PC and android application .

3. Android Application:

The application is developed using Eclipse ADT. The apk file of the application is transferred to the android phone and installed on it. Until the Admin PC provides android client permission, the client cant have control over the farm. All the changes made by the client is available on Admin PC and vice versa.

4. Hardware Assembling:

First we have made circuit diagram of the hardware kit. Then we have made the PCB layout. After that PCB. We soldered all the ICs to PCB. Then we made all the connections according to circuit diagram. As the PC works on RS232 logic and microcontroller on TTL/CMOS logic, we have used MAX232 IC which converts the TTL/CMOS logic to RS232 logic during serial communication of microcontroller with PC.

ANNEXURE C

PROJECT PLANNER

C.1 Plan of Project Execution

Number	Task	Start	End	Duration	2016						2017	
					July	August	September	October	November	December	January	February
1	Concept	26/8/2016	2/9/2016	6								
2	Synopsis Preparation	26/8/2016	6/10/2016	30								
3	SRS Preparation	26/8/2016	2/9/2016	6								
4	Overview and report submission	1/10/2016	4/10/2016	2								
5	Preparation of paper	30/12/2016	13/1/2017	11								
6	Literature survey	30/7/2016	12/8/2016	10								
7	Module Identification	20/8/2016	30/8/2016	7								
8	Design and Implementation	27/12/2016	10/2/2017	34								
9	Error Correction and Testing	13/2/2017	21/2/2017	7								

Figure C.1: System Implementation Plan

Project Plan execution

Semester 1 Plan	
Date	Project Activity
24/06/2016	Domain Selection for project
01/07/2016	Problem identification and estimation cost
08/07/2016	Allocation of guide and discussion of domain and problems in it
15/07/2016	Survey on papers on similar topics and problem selection of base papers
22/07/2016	Discussion on Synopsis
29/07/2016	Discussion on Synopsis
05/08/2016	Submission of Synopsis to guide as well as coordinator
12/08/2016	Discussion on how to write introduction and its template with guide
26/08/2016	Discussion of software requirement specification(SRS)
02/09/2016	Submission of SRS to guide and Coordinator
09/09/2016	1.Survey on 10 papers of similar or reference papers. 2.System Architecture
16/09/2016	Collection of required contents for preparing report
23/09/2016	Operation of system (Flowchart)
30/09/2016	Design of all diagrams UML, Use case diagram, Sequence diagram, Mathematical model, class diagram, DFD level 1,level 2,
03/10/2016	Overview of report and submission
04/12/2016	Discussion of Presentation with guide
06/12/2016	Presentation of project to external and faculties

Semester 2 Plan

Date	Project Activity
23/12/2016	Discussion on paper templates and Journals
30/12/2016	Preparation of paper content
06/01/2017	Started with some software coding related to project
13/01/2017	Submission of paper and overview of it with guide
27/01/2017	Review of some first phase coding done to guide
03/02/2017	Started with Some coding in android as well as Net Beans
23/02/2017	Review of Project to allocated faculties (work done till 23 feb)
30/02/2017	Coding and appropriate checking of its outputs
17/03/2017	Implementation of project 80 percent to guide
23/03/2017	Demo of project to allocated faculties
30/03/2017	Collection of contents for preparing black book
03/04/2017	Submission of black book to guide and coordinator
05/04/2017	Integration and Testing with all the components prepared
07/04/2017	Deployment of project

ANNEXURE D

REVIEWERS COMMENTS OF

PAPER SUBMITTED

- **Paper Title :** Smart Door Lock System: Improving Home Security using Bluetooth Technology
- **Name of the Conference/Journal :** International Journal of Computer Applications (IJCA)
- **Impact Factor :** 3.12
- **Paper accepted/rejected :** Accepted
- **Review comments by reviewer :** No
- **Year of Publication :** February 2017 Edition Volume 160
- **Authors :**
 - Ankita Gupta
 - Amirush Javare
 - Tushar Ghayal
 - Jayant Dhabade
 - Ankur Shelar
- **Link for paper published is given below :**
<http://www.ijcaonline.org>

ANNEXURE E

**REVIEWERS COMMENTS OF
PAPER SUBMITTED**



REFEREE'S REPORT: SUMMARY SHEET

Paper Title: Smart Door Lock System: Improving Home Security using Bluetooth Technology

EVALUATION CRITERIA	SCORE (0-10)
1. Relevance of Topic	6
2. Scholarly Quality	6
3. English Usage	6
4. Use of Theory	7
5. Novelty and Originality of the idea	6
6. Technical Content and Correctness	7
7. Critical Qualities	6
8. Clarity of Conclusions	6
TOTAL SCORE %	62.5%

RECOMMENDATION

- The following are indicative score ranges:
[] ACCEPT * Accept (without qualification): 75-100%
[⇒] ACCEPT WITH MINOR REVISIONS * Accept with minor revisions: 55-75%
[] ACCEPT WITH MAJOR REVISIONS * Accept with major revisions 35-54%
[] REJECT * Reject: Below 35%



REFEREE'S COMMENTS

Referee Comments:

1. More comprehensive evaluations are needed.
2. Authors must develop original **image/figures** with **high resolution** for proper rendering of the final published paper and should not distort on zooming. The text labels in the images/figures must be clearly visible.
3. **The research paper should be written in perspective of third person.** Words such as 'I' 'we' 'our' etc. needs to be avoided.
4. The **Experimental analysis** in the paper is **minimal**. Authors should present the research with detailed analysis.

The paper is **suitable for publication** with IJCA after **minor revisions**. Use **IJCA paper template** for preparation of **camera ready copy (CRC)** of the paper.

Final Checklist for authors:

- Perform Spell and grammar check.
- No word breaks at the end of lines.
- References appear consecutively in the paper.

ANNEXURE F

PLAGIARISM REPORT

75% Unique

Total 16539 chars (2000 limit exceeded) , 307 words, 11 unique sentence(s).

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Results	Query	Domains (original links)
About 2,370 results	Smart Door Lock System	august.com ackermansecurity.com link.springer.com ss-wi.com community.getkisi.com researchgate.net atss.in slideshare.net amazon.com people.kth.se
Unique	Improving Home Security using Bluetooth Technology Jayant Dabhadka1 1AISSMS College of Engineering, Kennedy Road, Pune jayantdabhadka@yahoo	
Unique	in Amirush Javare2 2AISSMS College of Engineering, Kennedy Road, Pune amirushiavare@gmail.com Tushar Ghava3 3AISSMS College of Engineering, Kennedy Road, Pune tusharghaval@gmail.com Ankur Shelar4 4AISSMS College of Engineering, Kennedy Road, Pune ankur shelar2012@gmail.com Ankita Gupta5 5AISSMS College of Engineering, Kennedy Road, Pune aqupta@aiissmscoe.com Abstract	
Unique	In today's world, smart home control system is necessary in daily life	
Unique	As the technology is emerging a lot it's time for us to be more technical related to home secure security and easy access to the user	
About 1 results	This technique basically deals with key less door lock system using smart phone in which SMS, E-mail, Image, anti-burglar will be used and for guest users it will generate b-id	search.proquest.com
About 1 results	This will allow the guest user key to access the door for a given particular time only	search.proquest.com
About 1 results	The system also includes motion detectors that will help to determine the user	search.proquest.com
About 1 results	If an unauthorized person is trying to access the door, then camera will take snaps of user at the door	search.proquest.com
About 1 results	These snaps will be sent to owner	search.proquest.com
About 1 results	Furthermore, this approach can be applied and extended to different institutions like banks and offices	search.proquest.com
About 124,999,600 results	Keywords	adwords.google.com keywordtool.io moz.com wordstream.com wordstream.com wordstream.com knowledge.hubspot.com

ANNEXURE G

**TERM-II PROJECT LABORATORY
ASSIGNMENTS**

Formal technical reviews

A formal technical review (FTR) is a software quality assurance activity performed by software engineers with the following objectives:

- To uncover errors in function, logic or implementation of the software
- To verify that the software meets its requirements
- To ensure that the software has been developed according to the standards
- To achieve uniform software
- To make projects manageable The formal technical review serves to promote backup and continuity because a number of people become familiar with parts of the software that they may not have otherwise seen.

Each FTR is conducted as a meeting and is considered successful only if it is properly planned, controlled and attended.

Formal Technical Review - 1

By:

Mrs. B. R. Quazi

Mrs. A. S. Deokar

Mrs. B. A. Patil

- Planning: Thursday, February 23, 2017 Decided to make a review meeting regarding the basic functionality of the system.
A.S Deoker acted as the moderator and B. R. Quazi acted as the inspector.
- Overview: We explained them the overview of the project about its working and what can be the possible outcomes on possible inputs.
- Preparation: The project GUI was prepared and the Database was shown.
- Meeting: The meeting began by A.S. Deokar asked questions regarding the working of the system and the efficiency of the system. B.R. Quazi was concerned with how deployment will take place and some questions on hardware were asked. And also found out the GUI design needs to be more improvised.

- Rework: The GUI and deployment of system.
- Follow-up: We started the work regarding the rework points.

Formal Technical Review - 2

By:

Mrs. B. R. Quazi
Mrs. A. S. Deokar
Mrs. B. A. Patil

- Planning: Thursday, March 23, 2017 Decided to make a review meeting regarding the complete functionality of the system B. R. Quazi acted as the inspector A. S. Deokar acted as the moderator.
- Overview: We explained them the complete overview of the project about its working.
- Preparation: The project setup was prepared and the hardware working was started.
- Meeting: The meeting began by A. S. Deokar queried regarding the rework points made in last meeting. We explained and showed her the rework. The run time system was checked by B. A. Patil
- Rework: Nothing much required
- Remark: Satisfactory.

GUI In Sem-I

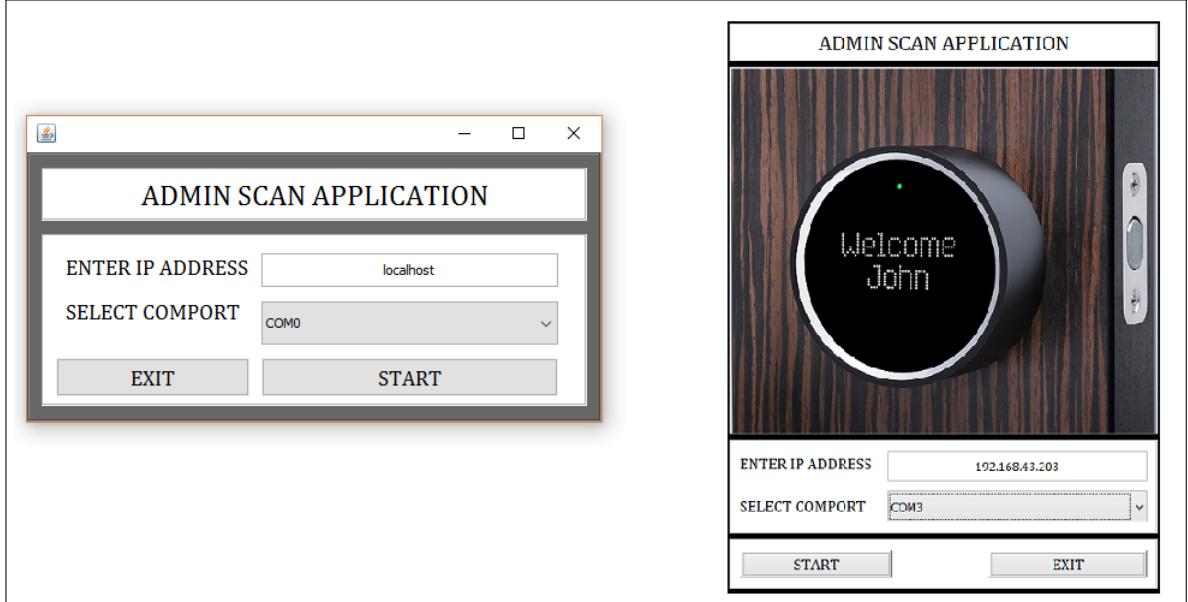


Figure G.1: GUI In Sem-I

GUI In Sem-II(With Correction)

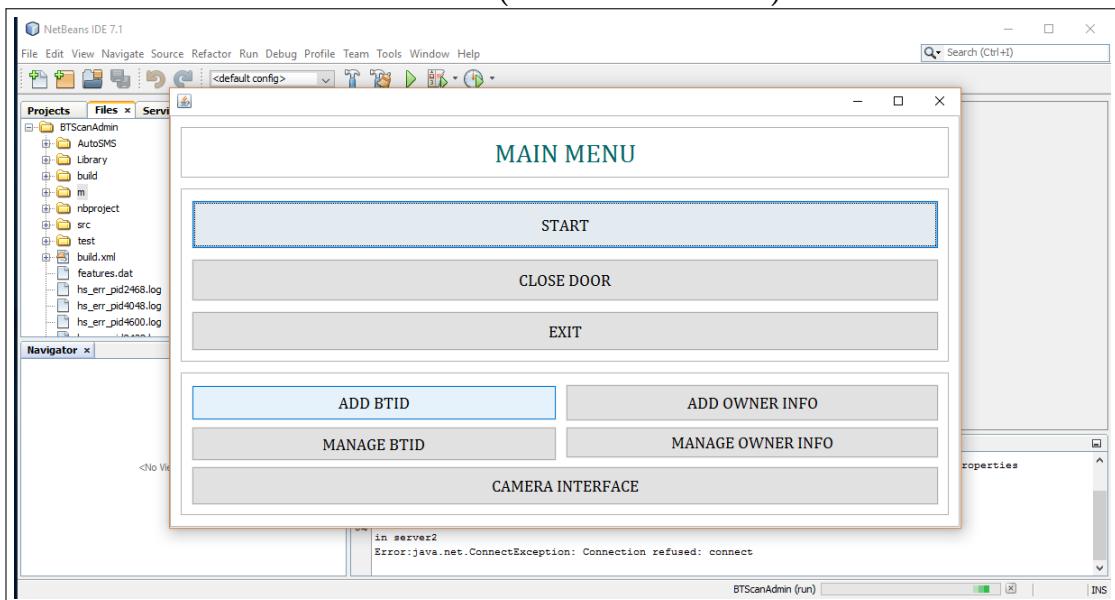


Figure G.2: GUI In Sem-II(With Correction)

Glossary:

API	Application Programming Interface
JDK	Java Development Kit
GUI	Graphical User Interface
UML	Unified Modeling Language
DB	Database
J2SE	Java 2 Standard Edition
IDE:NetBeans	Integrated Development Environment
JNI	Java Native Interface
JWS	Java Web Start
HDM	Human Detection Module
Eclipse ADT	Android Development Tool Kit
TCP/IP	Transmission Control Protocol
HTTP	Hyper Text Transfer Protocol
SOAP	Simple Object Access Protocol
RxTx	Rx Technology Holding Inc
COCOMO	Constructive Cost Model

CONTRIBUTION :

NAME	WORK
Amirush	JAVA GUI(NetBeans IDE), Server coding and Documentation
Tushar	JAVA GUI and Information gathering and Documentation work
Jayant	UML diagrams, android application, information gathering
Ankur	UML diagrams, Hardware Development, embedded C coding

ANNEXURE H

**INFORMATION OF PROJECT
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6. Mobile/Contact No. : 9028666573
7. Paper Published : International journals of Computer Applications.