

# **Smart Home Security Using SMS Gateway**

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## **APPROVAL**

The Project Titled “IOT: Smart Home Security” submitted by Mahmudul Hasan, Md. Sajal kaiser, Abdullah Muhammed Fahad and Abdul Aziz to the department of Computer science and Engineering, Daffodil International university, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of BSc in computer Science and engineering and approved as to its style and contents.

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## DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Aniruddha Rakshit**, Senior Lecturer Department of CSE Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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## **ABSTRACT**

This report aims to describe the process and procedure to built a very effective home security system. The main objective of our project is to gives the control of all sensors by user from the internet and SMS. Our project is a combination of hardware and Software. Water leakage sensor, Smoke detector sensor, Motion Sensor, Gas leakage detect sensor has been used the host system of the smart home security system which is configured by SMS. The Host device sends the sensor status by SMS. Then we are stored data to the database using API. We are controlling all sensors by mobile application. We can successfully setup all device by mobile application. Our application have multiple user notification based which is alarm generate multiple shared users with owner user. Each user will be able to add ten sensors. User can see real time sensor data by mobile application. User will be able to on/off each sensors. Our apps is very user friendly user can easily control his all sensors or devices and able to see historical all data.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

In our daily life we suffer from various problems including fire, gas leak problem, water leak problem, theft of goods from home. But there is no good application in our country for detecting these problems together. Smart Home Security is an app to ultimate control over your home and home Security systems. Smart home connect all the wireless detectors and receives detectors data. Smart home applications can notify users through app notification and app alarm. The expected outcome of the project is revealed by notification of an Android app so that the house will be safe.

### 1.2 Features

This App will be there –

1. Show detectors current Status
2. ON/OFF detectors
3. Check detectors battery status
4. User can get immediate alarm for Smoke detection.
5. User can get immediate alarm for Water leak detection
6. User can get immediate alarm for Gas leak detection
7. User can get immediate alarm for Motion detection
8. Check date to date alarm information and check date to date on/off history.
9. Users share their smart home devices with other users or their family members.

### 1.3 Overview

Smart Home Security System provide us an access to reach our desired Sensors to control it. There are some techniques and method available that gives people the opportunity to take this sensors Control. Our team have thought about implementing a new idea of smart home Security System. We have idea to control of sensors by SMS, Sensors are directly connected to a hub system. Which is communicated the SMS gateway. We are receiving data and stored to the MYSQL server using python. A user shared his home security system with another person.

A shared user can see alarmed historical data. Main user adding and deleting multiple sensors. If you would like to see alarmed data sensors control you should turn on the internet. Our Web server which is based on PHP Codeigniter synchronizes sensors status with SMS gateway which there is a local server built with flask framework of python.

#### **1.4 Objectives**

- a) Develop a Smart home security using SMS gateway and Android Application.
- b) Giving easy and flexible access to the devices from Android Application.
- c) Making the systems Secure for users.
- d) Use sensors to build the system to make it inexpensive.
- e) Make the system smarter using sensors .

## **CHAPTER 2 THEORY**

### **2.1 Introduction**

A theory provides an explanation of observed behavior, and contributes thus to understanding. A Theory provides a prediction of future behavior. On the basis of the theory, tools for analyzing, designing, and controlling can be built. In the theory Chapter we will discuss about mobile application, web dashboard, hardware, internet and SMS gateway and security and access.

### **2.2 Mobile Application**

Nowadays everyone use smart phone. So we are decide to make android Application for controlling sensors and generate Alarm. For Making Android apps we are using java. In this Application view data and controlling sensors we use API. This API created we uses PHP framework Codeigniter. In this App we are design from user registration, And Shared user Registration with barcode scan for check host device number valid or invalid. In this App dashboard have added individual sensors list with Sensors base historical data.

### **2.3 Web Application**

We are developed web dashboard or Application for changing host number and total user list view .When a user lost or breakdown his host device user wants to change his host device .Then we are provide new host device with new number. We are change this host number user wise in this web dashboard. We can also see the sensor user list and user details. We are using for this web dashboard PHP codeigniter with MYSQL database And user interface design using HTML, CSS and JQuery.

### **2.4 Hardware**

We are using 4 types of Sensors. 1.Water leakage sensor 2.Motion detect sensor 3.Smoke Detect Sensor 4.Gas leakage detect sensor. This Sensors are radio frequency enabled sensors that communicate with the host device during radio frequency. Host device contains a SIM card which is SMS enabled. This device communicates with server using SMS. In the server end we are using SMS gateway to receive and send data to the host device. We have developed the program using python that gets the received SMS in the SMS gateway and also send SMS to the host devices when required. This program is running all the time to provide information service.[1]

### **2.5 Internet and SMS Gateway**

The main objective of our project is to gives the control of all sensors by user from the internet and SMS gateway. In this system sensors are directly connected to hub.

From the hub we get the sensor data and status through the default SMS app. After reading the message received from the default SMS app, they send it to the cloud API and database via http.

And if necessary, cloud API and database from sensor data and status get through the http request. [2]

## **2.6 Security and Access**

Smart Home Security have two types of user. Main user and Shared user. Main user can access every devices listed in the System. Main user added shared user in this system. Shared user can only See the notification and alarm history.

## **CHAPTER 3**

### **Background of this Study**

#### **3.1 Introduction**

The background study for a project includes a review of the programming language, current information of the project. In this chapter we will discuss all programming language related to our project. Such as: python, java, PHP, MySQL etc.

#### **3.2 Python**

Python is a fast growing programming language and has excellent performance on every platform. Python can be used for hardware/machine control, web application, mobile platform and so on .It has a high and excellent security with a wide range library. [3]

#### **3.3 Why Python**

Python is well known for hardware, web and mobile platform and for server calls too. Python has rich coding structure and efficient coding style. In python it is called “less code, make easy”. Python Support OOP concept and it is very easy to use. Python is also Secure and faster than any other programming language.

#### **3.4 Working With Flask (Python framework)**

Flask is a micro web framework written in python. It is classified as a micro framework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third party libraries provide common functions. We using SMS gateway in this application. SMS gateway message send and receive part coding done by flask framework.

#### **3.5 PHP**

PHP is a server scripting language, and a powerful tool for making dynamic and interactive Web pages. PHP is a widely-used, free and efficient alternative to competitors such as Microsoft's ASP.

#### **3.6 Why PHP**

PHP is server side scripting language.PHP codes runs much faster than ASP because it runs in its own memory space while ASP use an overhead server and a COM based architecture. Less Expensive Software –In working with PHP, most tools associated with the program are open source software, Such as Wordpress, So you need not pay for them. In this app the server has been communicated with the mobile application through the API. This API has been created with PHP.

### **3.7 PHP CODEIGNITER**

Codeigniter is a PHP MVC framework for developing applications rapidly. Codeigniter provides out of the box libraries for connecting to the database and performing various Applications. In this app the server has been communicated with the mobile application through the API. This API has been created with PHP Codeiniter. Besides, While creating APIs, various logic implement have been made using the Codeigniter.[4]

### **3.8 MYSQL**

MYSQL is the world's most popular open source database. With its proven performance, reliability, and easy-of-use. MYSQL has become the leading database choice for web based Applications. Additionally, it is extremely popular choice as embedded database, distributed by thousands of ISVs and OEMS.

### **3.9 Uses Of MYSQL**

MYSQL is a freely available open source Relational Database Management System that uses structured query language. Our app uses MYSQL database. We uses MYSQL stored our sensors information data, user Information and shared user information.

### **3.10 Why Android**

Android the world most popular Mobile platform. Android's open platform helps people around the globe enjoy access to more information and opportunity then ever before. Nowadays most of the people uses Android mobile in the world. Our project was mainly smart home security. So we thought we could make an Android App most of the people can use it And from anywhere we will get home security alert and also it will be easy to use. [5]

# CHAPTER 4

## SYSTEM DESIGN

### 4.1 Introduction

Systems Design is the process of defining the architecture, modules, interfaces, and data for a system to satisfy specified requirements. Systems design could be seen as the application of systems theory to product development. In the System design Chapter we will discuss about application design, database relationship schema, use case, dataflow diagram and SMS gateway structure diagram.

### 4.2 Application Design

In this Application design & development we uses two IDE sublime text and android Studio. Android Studio we do a design and development of mobile application and use the sublime text to write the server language and create API. Also we use MYSQL to design the application Database.

Table 4.1: Application Design

<b>ID</b>	<b>Language, Tools &amp; Utilities</b>	<b>Platform</b>	<b>Usage</b>
1	PHP(Codeigniter)	Server coding	Create API for mobile application and database control.
2	Java & Android	Mobile application	Used in mobile application programming to control sensors and user instruction.
3	Python(Flask)	SMS Gateway	Using python forget SMS data for handling sensors data. Its directly work with server .
4	HTML,CSS, JavaScript	Web Dashboard	Markup of web User Interface.
5	MYSQL	Database	Stored all sensors history and users information. Using central data server.
6	Sublime text	IDE	Used in Python and PHP programming
7	Android studio	IDE	Used for mobile application development



### 4.3 Database Relationship Schema

First of all a user should registration to our system. Registration table have some attributes. There is an attributes alarm\_is which is come from alarm\_tyle table. There is another attributes host\_id which is come from qr\_tbl table. when generate aalarm then stored alarm data in alarmed\_device table. Alarmed\_device table have some attributes. There is an attribute user\_id which is come from registration table and alarm\_is which is also come from registration table. If you are device or sensor on off historical data which is come from arm table this table have some attributes and there is an attribute user\_id and alarm\_id which is come from registration table. Remove\_device table stored removed device history there is two attribute come from registration table one is user\_id and other one is alarm\_id. Qr table for user validity check user purchasing our device or purchase from local market. It have an attribute host\_id which is come from host table.

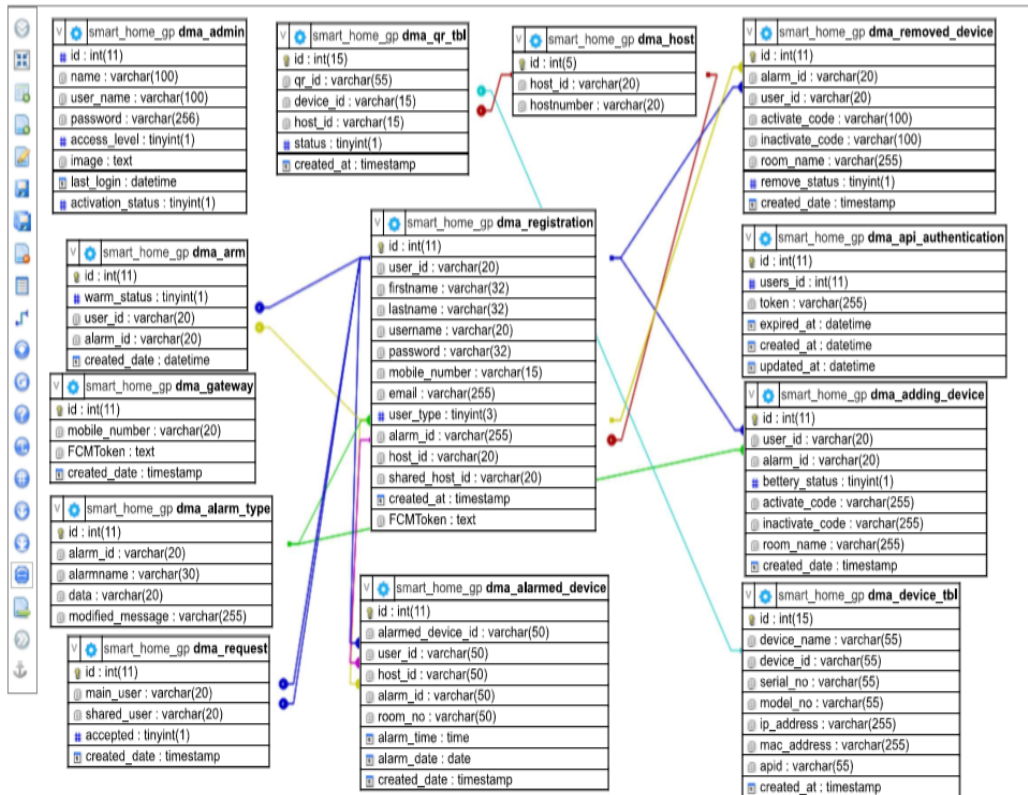


Figure 4.1: Database Relationship Schema

#### 4.4 Usecase

A use case diagram is a diagram that shows the relationships among actors and use cases within a system. We have two actor one is main user and other one is shared user. Any user will be able access application all activities after login. If any user wants to login he/she have to complete registration of our application. Our application have lots of feature like alarm notification, remove or add sensors, battery life status, shared user policy, turn of instant notification, individual sensors on off, change profile information and last one is even history. For Main user can access application all activities like alarm notification, remove or add sensors, battery life status, shared user request approve or remove, sensors on off control, even history. Shared user can see some activities like alarm notification, battery status, event history.

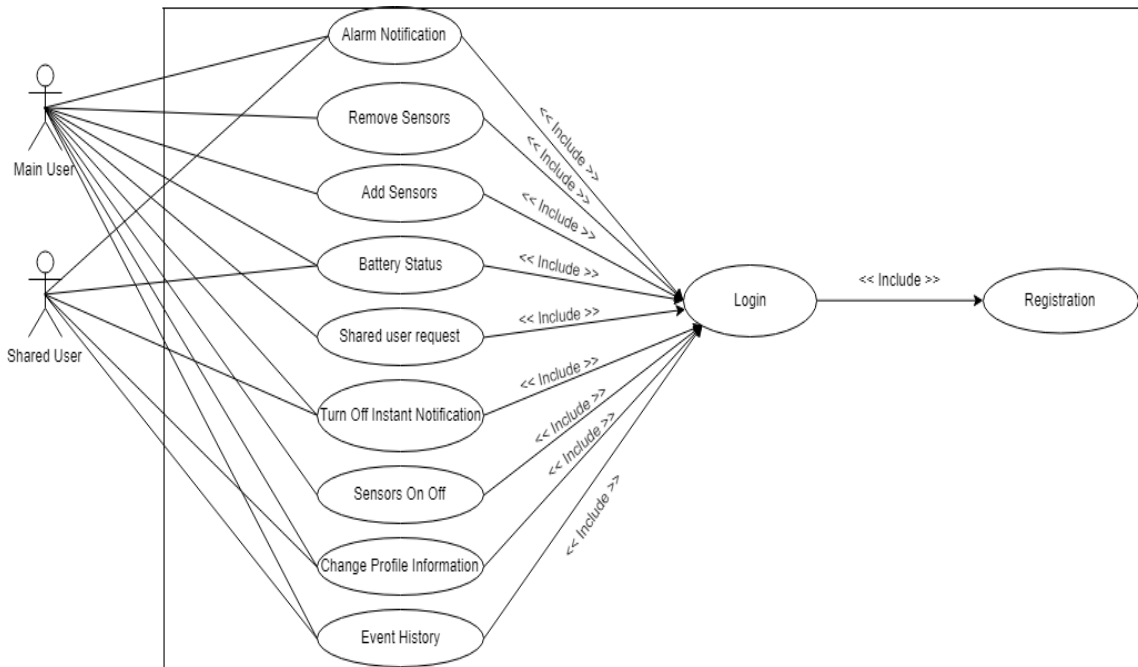


Figure 4.2: Usecase

#### 4.5 Data Flow Diagram

Data flow are used to graphically represent the flow of data in a business information system. DFD describes the processes that are involved in a system to transfer data from the input to the file storage and reports generation.

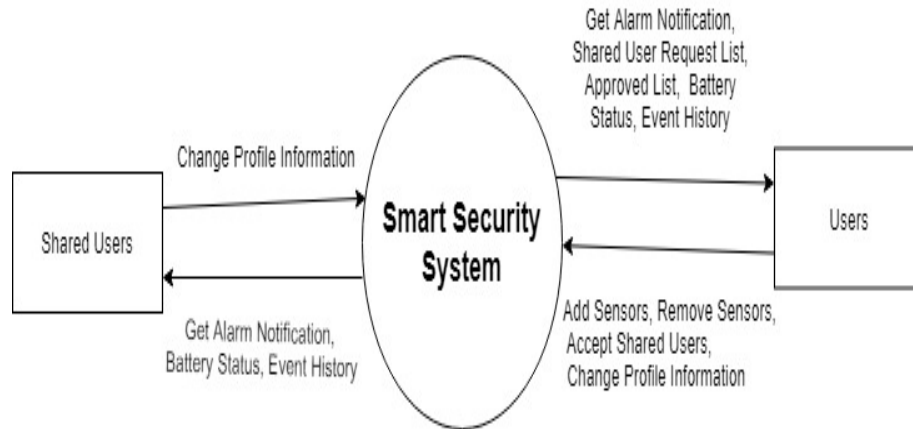


Figure 4.3: Data Flow Diagram

#### 4.6 SMS gateway

In this system sensors are directly connected to hub. From the hub we get the sensor data and status through the default SMS app. After reading the message received from the default SMS app, they send it to the cloud API and database via http. And if necessary, cloud API and database from sensor data and status get through the http request

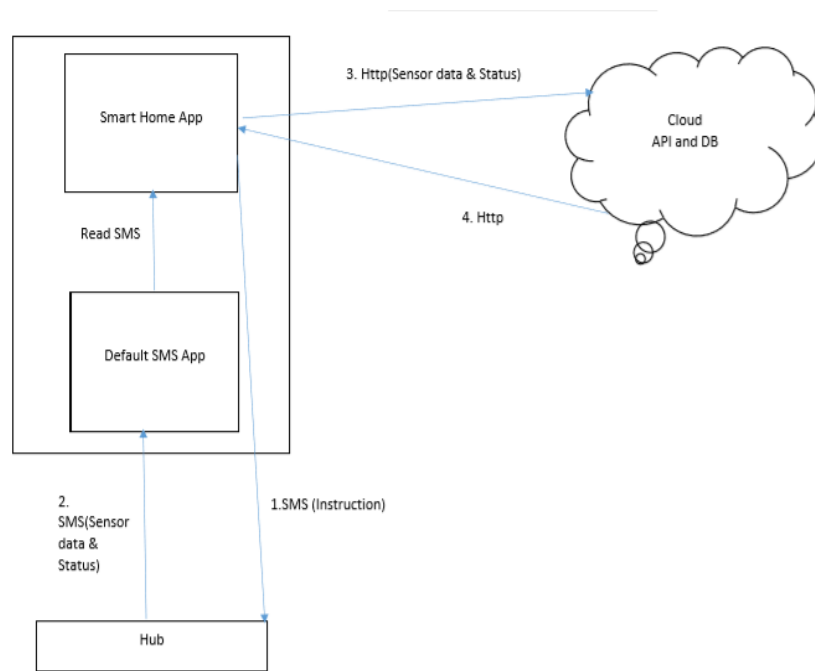


Figure 4.4: SMS gateway

# CHAPTER 5

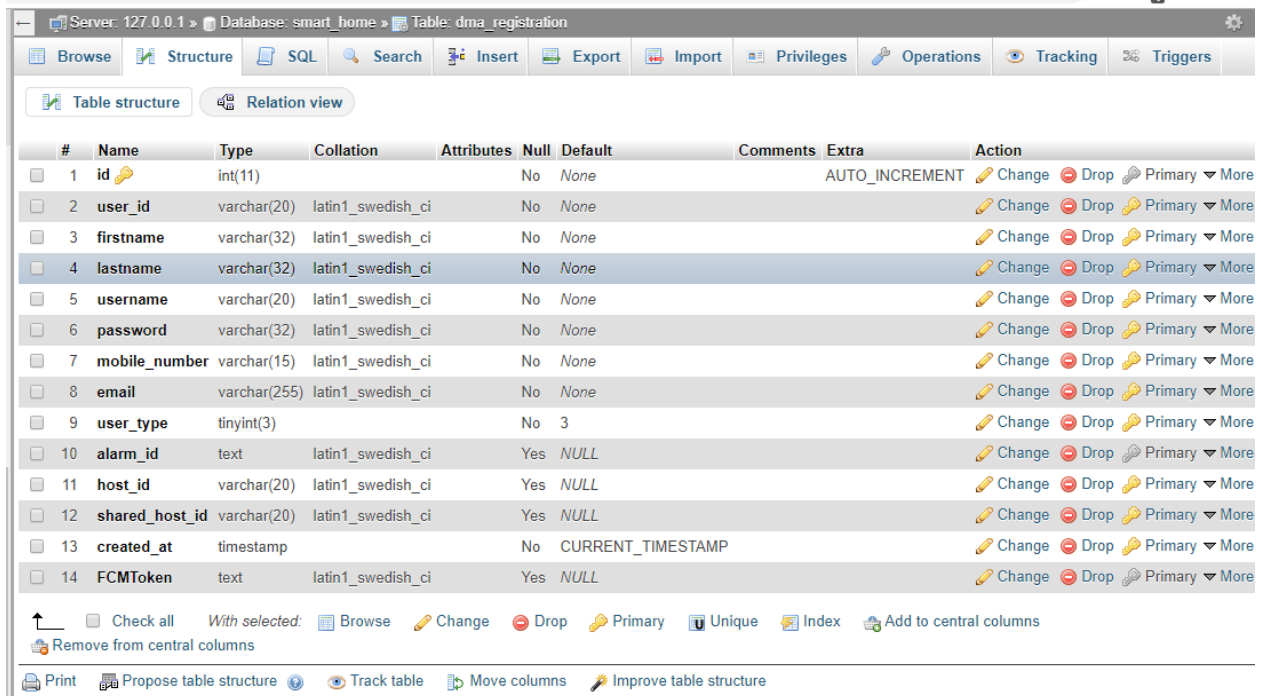
## IMPLEMENTATION

### 5.1 Introduction

Implementation is the phase where visions and plans become reality. In this chapter we will discuss about Implementation of database, Implementation of interactions, and testing implementation.

### 5.2 Implementation of Database

Implementation of a database is a difficult part of a project. Here in this project we used SQL database. We get real time alarm notification using firebase real-time database. Here data is saved as a MYSQL pattern.



The screenshot shows a database management interface for a table named 'dma\_registration'. The table structure is displayed in a table format with columns for column number, name, type, collation, attributes, nullability, default value, comments, and actions. The 'id' column is highlighted as the primary key and has the 'AUTO\_INCREMENT' attribute. Other columns include 'user\_id', 'firstname', 'lastname', 'username', 'password', 'mobile\_number', 'email', 'user\_type', 'alarm\_id', 'host\_id', 'shared\_host\_id', 'created\_at', and 'FCMToken'.

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id	int(11)			No	None		AUTO_INCREMENT	Change Drop Primary More
2	user_id	varchar(20)	latin1_swedish_ci		No	None			Change Drop Primary More
3	firstname	varchar(32)	latin1_swedish_ci		No	None			Change Drop Primary More
4	lastname	varchar(32)	latin1_swedish_ci		No	None			Change Drop Primary More
5	username	varchar(20)	latin1_swedish_ci		No	None			Change Drop Primary More
6	password	varchar(32)	latin1_swedish_ci		No	None			Change Drop Primary More
7	mobile_number	varchar(15)	latin1_swedish_ci		No	None			Change Drop Primary More
8	email	varchar(255)	latin1_swedish_ci		No	None			Change Drop Primary More
9	user_type	tinyint(3)			No	3			Change Drop Primary More
10	alarm_id	text	latin1_swedish_ci		Yes	NULL			Change Drop Primary More
11	host_id	varchar(20)	latin1_swedish_ci		Yes	NULL			Change Drop Primary More
12	shared_host_id	varchar(20)	latin1_swedish_ci		Yes	NULL			Change Drop Primary More
13	created_at	timestamp			No	CURRENT_TIMESTAMP			Change Drop Primary More
14	FCMToken	text	latin1_swedish_ci		Yes	NULL			Change Drop Primary More

Figure 5.1 Registration table.

QR code scanner table check the validity of the user. Here the above figure QR code scanner table.

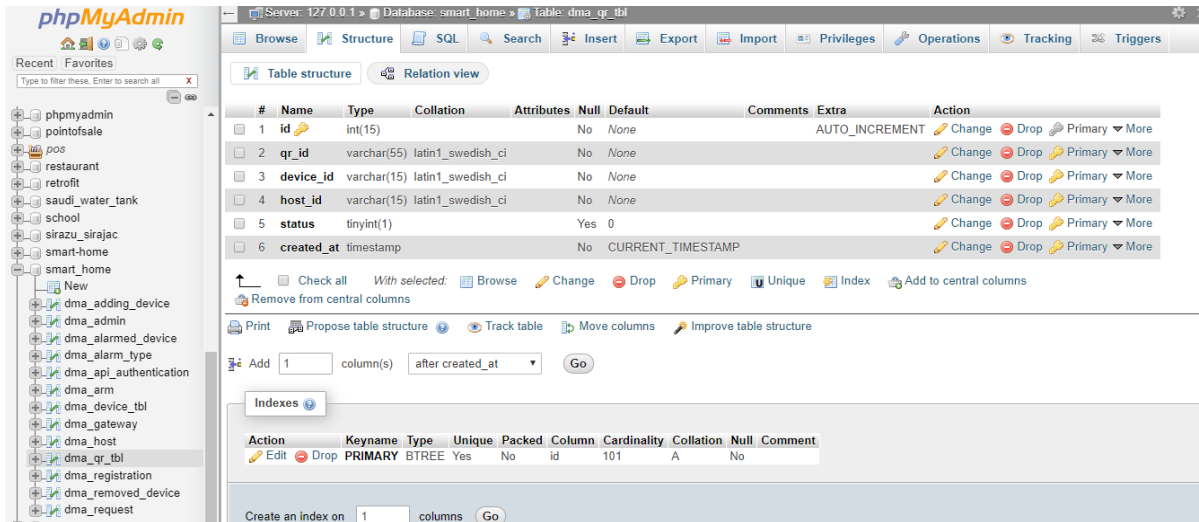


Figure 5.2: QR code Scanner table

When an alarm is generated, the history is entered from time to time in the history table. Here the above figure history table.

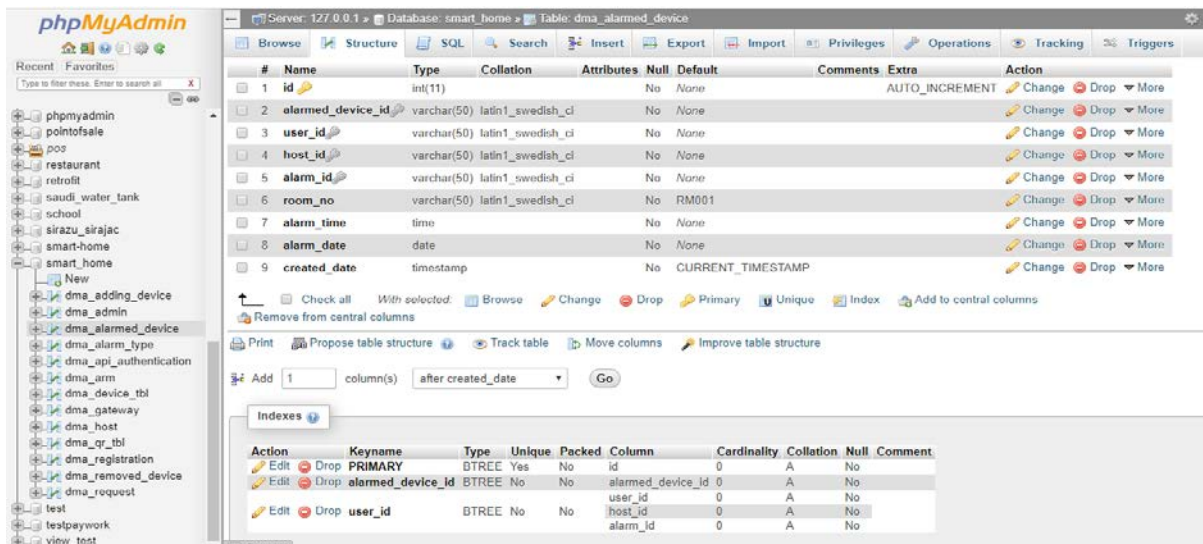


Figure 5.3 History table

### **5.3 Implementation of Interactions**

Implementation of interaction is most important part of a system. Interaction means when we are in a specific function and go to another function that we want those time. we separate the function for a variant of a user. We are design every user part very politely that user what he wants is indeed here. I design very carefully that the design attractive to users. An application Successions where a user is satisfied using the application. The Satisfaction level of our system is high.

### **5.4 Testing Implementation**

When a system is implemented and tested some specific function is called test implementation. I have tested our system several times. User Registration, Login, Alarm Historical data, Date wise alarm history, Sensor on off , Add extra sensor, Remove sensor and Battery life testing.

I have tested the following factors:

- User Registration
- User Login
- Alarm Notification generate
- Date wise alarm history
- Sensor on/off
- Add extra sensor
- Remove sensor
- Battery life

I test the whole system by maintains SDLC method.

## CHAPTER 6

### EXPERIMENTAL RESULTS

#### 6.1 Introduction

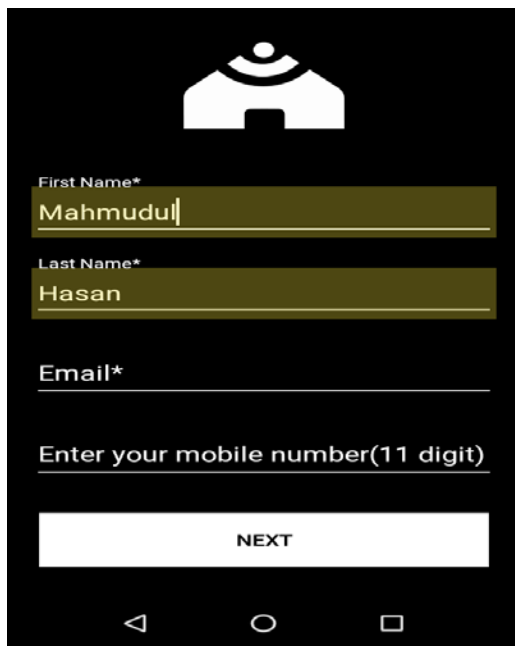
In Experimental results, we will discuss the output of our Application. We will look at the output of registration, login, dashboard, device control, sensors control and discuss what can be done with them.

#### 6.2 Registration

This is the registration form for a new user. In this registration user must provide email and 11digit mobile numbers. After the successful registration the users can login our application dashboard.

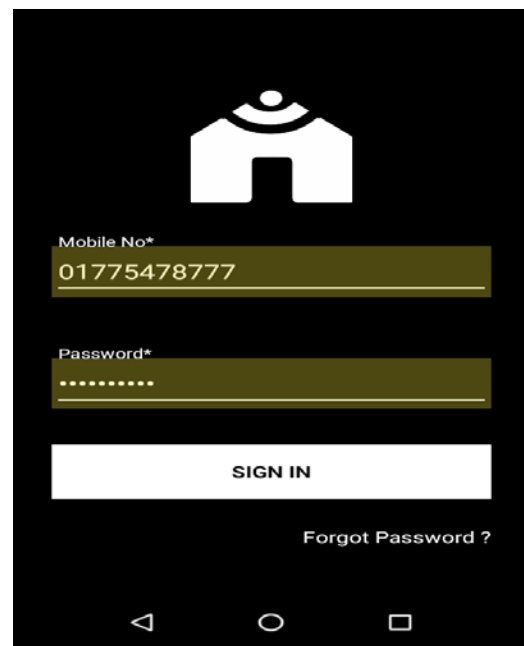
#### 6.3 Login

This is the Login form for a registered user. In this login page user must provide mobile number and password login our application dashboard. This is the Login form for a registered user. In this login page user must provide mobile number and password login our application dashboard.



A screenshot of a mobile application registration form. At the top, there is a white icon of a house with a signal tower on top. Below the icon, there are four input fields: 'First Name\*' with the text 'Mahmudu|', 'Last Name\*' with the text 'Hasan', 'Email\*', and 'Enter your mobile number(11 digit)'. At the bottom of the form is a white button labeled 'NEXT'. The background is black, and the text and input fields are white.

Figure 6.1: Registration Form



A screenshot of a mobile application login form. At the top, there is a white icon of a house with a signal tower on top. Below the icon, there are three input fields: 'Mobile No\*' with the text '01775478777', 'Password\*' with a series of dots, and a white button labeled 'SIGN IN'. At the bottom right, there is a link labeled 'Forgot Password?'. The background is black, and the text and input fields are white.

Figure 6.2: Login Form



## 6.4 Dashboard

From dashboard User can get immediate alarm for Gas leak detection, Motion detection, Smoke detection and Water leak detection.



Figure 6.3: Dashboard

## 6.5 Device control (Device on /off)

- Sensors On/Off – User can control sensors by On/Off option.
- Add Extra Sensors – The user can add additional sensors to the new location.
- Remove Sensor – User can remove sensors.
- Add Removed Sensors – After removed sensors, the user will be able to add removed sensors again.
- Turn off hub notification – User can turn Off /On hub notification by this option.

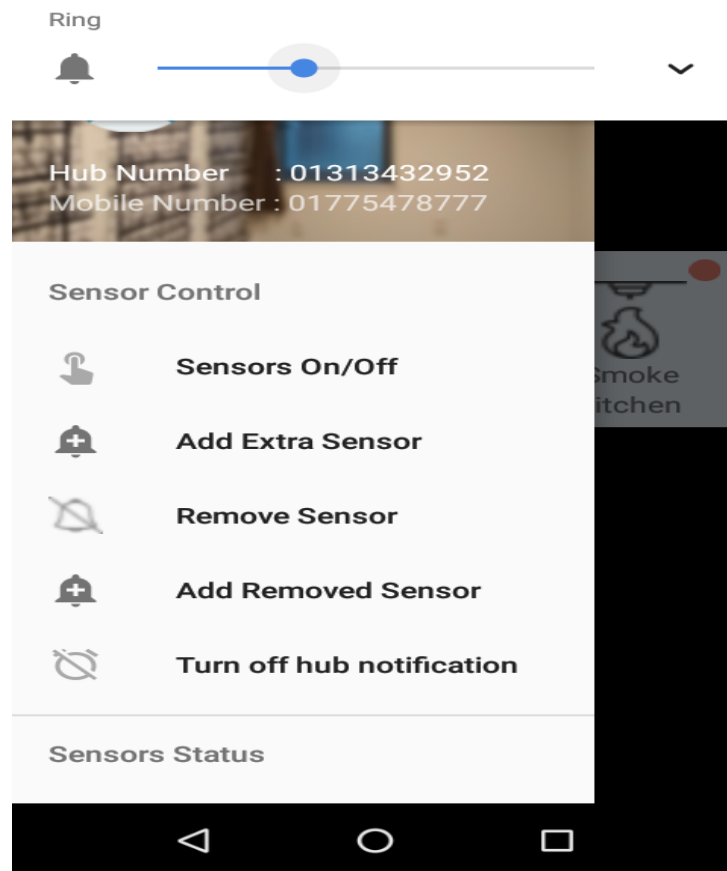


Figure 6.4: Device control (Device On / Off)

## 6.6 Sensors control

Users can control each sensor individually.

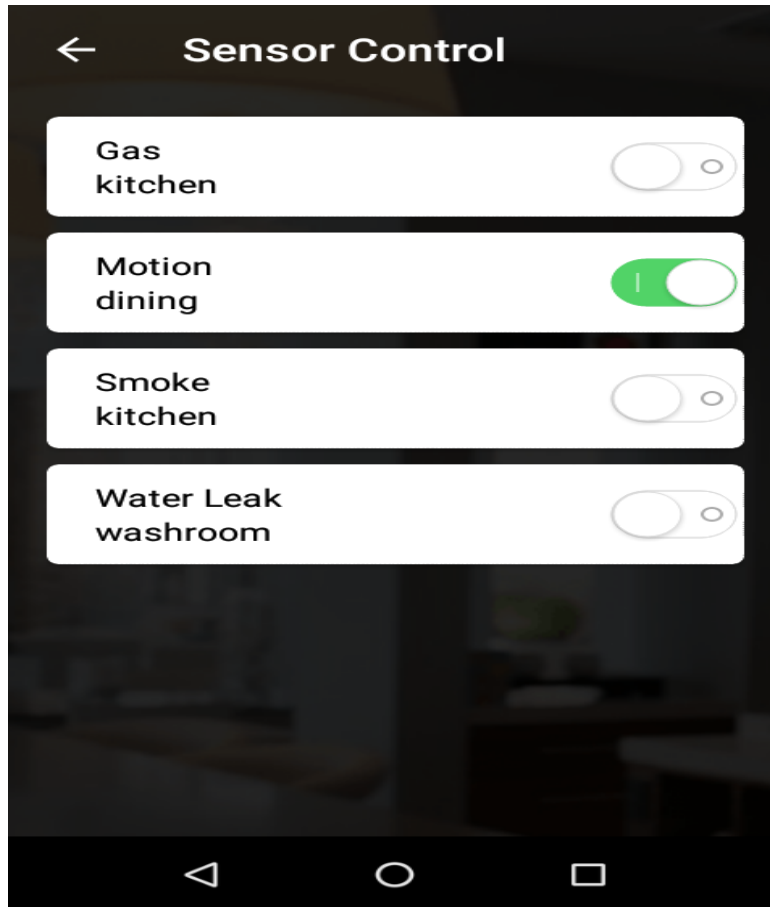


Figure 6.5: Sensors control

## 6.7 Add Extra Sensor

User can add additional sensors to the new location by 'Add Extra Sensor'.

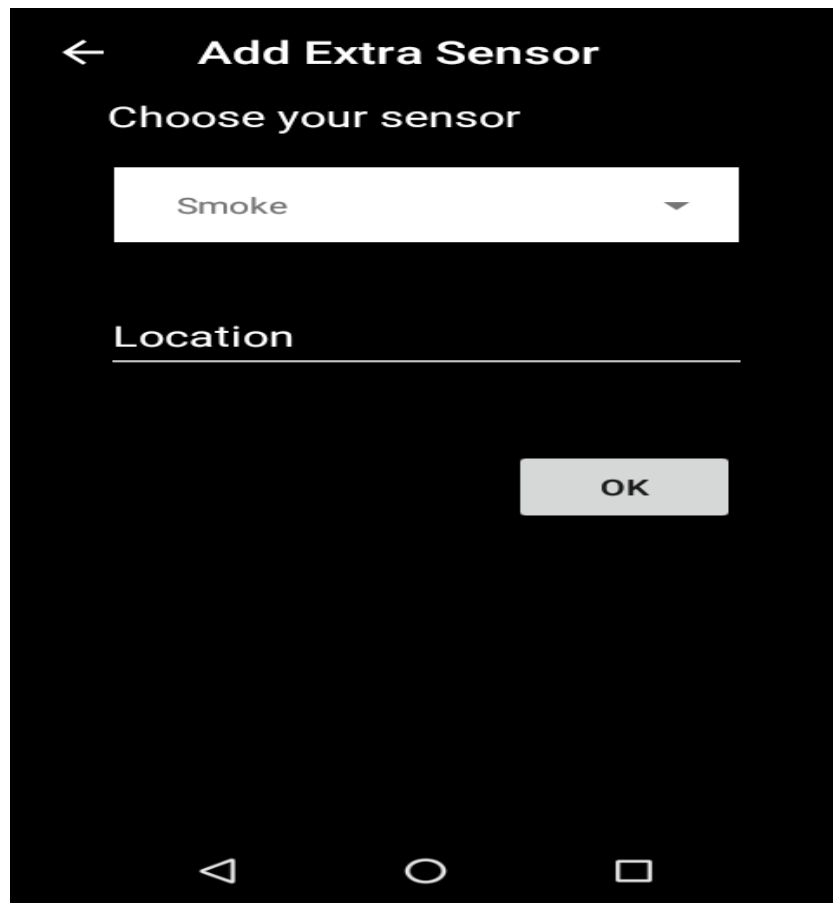


Figure 6.6: Add Extra Sensor

## **CHAPTER 7**

### **CONCLUSION**

Home security is very important to all. That's why our smart home application has been created. This Application will protect your home from fire damage, prevent the loss of water in your home, protect against gas accidents etc. We will get this support mainly through sensors and mobile SMS alerts. The sensors alarm notification has been done through API. It is expected that the application will be very effective and more people will be interested to use it.

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## IoT based home control

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