

A  
Project Report  
on  
**Smart Home Central Control System**  
Developed at  
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A  
**Project Report**  
On

# **Smart Home Central Control System**

BTech-sem VIII

**In partial fulfillment of requirements for**

**Bachelor of Technology**

in

**Information Technology**

**Submitted By:**

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**Under the Guidance of**

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## **CANDIDATE'S DECLARATION**

I declare that final semester report entitled “Smart Home Central Control System” is my own work conducted under the supervision of the external guide Mr. Sagar Sukhanandi from Vethics Solutions LLP.

I further declare that to the best of my knowledge the report for B.Tech. Final semester does not contain part of the work which has been submitted for the award of B.Tech. Degree either in this or any other university without proper citation.

Also I declare that following students also worked in this project:

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**CERTIFICATE**

This is to certify that the project entitled “Smart Home Central Control System” **is a bonafied report of the work carried out by**

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With sincere regards,

Saloni Goyal

Shiv Hansoti

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## ABSTRACT

**Smart Home Central Control System** is a web-application, integrated with IOT for home automation. This system contains two major nodes i.e. Service provider and Subscriber. It aims to provide the subscribers with affordable home automation which can be controlled wirelessly by choosing different plans which contain a limited number of devices to be automated along with expiration period.

The service provider has various functionalities like adding new subscribers, updating the records of existing subscribers and viewing the records of its associated subscribers. Furthermore, service providers can revoke the access of subscribers if they fail to pay the subscription fee for the automation system. The system also adheres to the safety measures by incorporating high-temperature checks during the device access by the user and admin. In sum, the whole project provides a user friendly web application that contains all the above mentioned functionalities on a PHP based platform integrated with IOT.

# **COMPANY PROFILE**



- Vethics Solution LLP was founded in 2014 with the aim to develop a common understanding of the problem, the business, the customer, the value proposition, and how success will be determined. Their mission is to humanize the computer screen and make it better for users and customers.
- Vethics creates digital products to address complex business requirements using Mobile, Web and all latest underlying technologies.
- Vethics Solution LLP specializes in Software development, E-commerce web design, Graphic designing, Mobile App design, Digital marketing, Brand identity design, Web development, SEO, SMO.

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## ABBREVIATIONS

<b>Sr. No.</b>	<b>Abbreviation</b>	<b>Full Form</b>
1	GUI	Graphic User Interface
2	PHP	PHP: Hypertext Preprocessor
3	IOT	Internet Of Things
4	CRUD	Create/Read/Update/Delete
5	Sr. No.	Serial Number
6	No.	Number
7	Wi-Fi	Wireless Fidelity
8	IDE	Integrated Development Environment
9	SoC	System on Chip
10	LM	Linear Monolithic
11	RAM	Random Access Memory
12	ROM	Read Only Memory
13	CPU	Central Processing Unit
14	HTML	HyperText Markup Language
15	OS	Operating System
16	Fig.	Figure
17	USB	Universal Serial Bus
18	ghz	gigahertz
19	GB	Giga Byte
20	TB	Tera Byte
21	URL	Uniform Resource Locator

# CHAPTER 1

## INTRODUCTION

### **1.1 PROJECT DETAILS**

- **Web of Things** is a combination of Web Application and Internet of Things.
- Smart Home Central Control System is **Web of Things**. Using this system, devices of subscriber's home can be controlled using subscriber's and Super Admin's (Service provider) phone or laptop.
- Subscribers are provided with a user panel with the functionality of accessing devices, bill payments, purchasing plans, sending email to Customer-care and updating their profile.
- Service provider can monitor all the activities of the subscriber and shutdown the devices immediately when required.  
(For example: If bill is not paid on time, Security breach occurs, Wiring fault).
- This concept is robust and modular and can be implemented at industry level.

### **1.2 PURPOSE**

Automation is a major influence on the economy and will continue to be over the next decade. Primary benefits of automation include: **cost reduction, productivity, availability, reliability, and performance**. The sole purpose to come up with this idea is to integrate PHP and IOT is the cost associated with home automated appliances and the robustness of PHP. The system intends to provide a platform using which, one can make use of resources already present that are needed to automate appliances.

### **1.3 SCOPE**

Subscribers can access their devices from anywhere across the world through website provided that they have an internet connection. Similarly, service providers can control and change the access rights of the subscribers based on their requests and payment dues.

### **1.4 OBJECTIVE**

The objective of this project is to provide the users with an affordable home automation system by using already existing resources present at our homes. Using this idea, one can get a taste of smart home which is the future of automation.

### **1.5 TECHNOLOGY AND LITERATURE REVIEW**

#### **1.5.1 TECHNOLOGY USED**

For Automation, at any level, power or the energy which the device requires is provided through a hardware (Microcontroller). For giving commands to microcontroller in wireless fashion a WI-FI built in microcontroller is required. And to access that device from anywhere in the world through internet that WI-FI built in microcontroller must be connected to internet. So, this kind of scenario is known as “**INTERNET OF THINGS**”. And if any kind of web-application or web-service is created to control the devices then it is known as “**WEB OF THINGS**”.

##### **1.5.1.1 Internet of Things (IOT)**

For IOT, NodeMCU is used which is WI-FI built in microcontroller and is programmed in Arduino IDE. Arduino IDE uses C++ language to configure NodeMCU and make it work as per user’s requirement.

### 1.5.1.1.1 NodeMCU (IOT device)

**NodeMCU** is an open source IOT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "NodeMCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPIFFS.

- Wikipedia

### 1.5.1.1.2 Arduino IDE

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

-Wikipedia

## 1.5.2 PHP: Hypertext Pre-processor

To monitor, access and store the data of the user's activity an interaction with the database is required at the backend. So, for that any kind of powerful server-side scripting language is required to process the request and store the data. For this purpose, PHP is used in the system.

# CHAPTER 2

## PROJECT MANAGEMENT

### **2.1 FEASIBILITY STUDY**

The feasibility study of project can be tested in four dimensions:

**Technology** – The system is a web application that works on PHP and IOT, so there is no question of technical infeasibility.

**Finance** - Our project contains some hardware requirements which can depend upon the quality and quantity of hardware used (For instance, a subscriber might buy a plan for 4 devices which is cheaper as compared to the subscriber who bought a plan for 6 devices). Also, the cost of hosting the project on the internet will be considered. So, the financial feasibility will depend upon the hardware and hosting.

**Time** – Each phase is planned carefully and strategically, so no extra time cost will be added.

**Resources** - All the software and hardware required for building our project are easily available on the internet and hardware shops respectively.

There are four categories of feasibility tests: operational feasibility, technical feasibility, schedule feasibility and implementation feasibility.

#### **2.1.1 Technical Feasibility:**

Here the main concern are the software specifications required to make product possible and satisfy user requirements. The basic architecture of our project was developed in Web of Things which is an extended version of Internet of Things. Our project uses MySQL Database and the backend of our project can be inspected using phpmyadmin.

Here, PHP script is used on the server side along with Ajax on client side and HTML, JavaScript, jQuery and Bootstrap on the frontend. New

modules can be added later on the project if required in the future. So it can be concluded that the project is technically feasible.

### **2.1.2 Time Schedule feasibility:**

We have used a very simple approach for scheduling feasibility by dividing the work in 4 phases and allotted time to each phase accordingly keeping in mind the deadline. For the first phase, we worked on the project architecture with basic functionalities for 4 weeks, then we worked on front end which required another 4 weeks. We worked on advanced functionalities (like payment gateway, temperature sensor) for 4 weeks. In the last phase, we did testing and debugging along with the documentation and project representation for 3 weeks (it also included minor changes which were added to enhance the project).

### **2.1.3 Operational feasibility:**

The system is easy to use as user interface is quite simple. The user just needs basic knowledge of navigation in a website. The system will not require any prior training on usage of the product as it is made keeping its users in mind. So the project will be operationally feasible.

### **2.1.4 Implementation feasibility:**

With the use of advanced software, the implementation was not an issue at all. Interfacing all the software eventually lead to achieving the required task. Hence the project assures the implementation feasibility.

## 2.2 PROJECT PLANNING

### 2.2.1 Project Development Approach and Justification:

#### Prototype Model:

- In this model, a prototype of the end product is first developed, tested and refined as per customer feedback repeatedly till a final acceptable prototype is achieved which forms the basis for developing the final product.
- This model is used when the customers do not know the exact project requirements beforehand.
- In this process model, the system is partially implemented before or during the analysis phase thereby giving the customers an opportunity to see the product early in the life cycle.
- Once the customer figures out the problems, the prototype is further refined to eliminate them. The process continues till the user approves the prototype and finds the working model to be satisfactory. Fig. 2.2.3 illustrates the phases in prototype model.

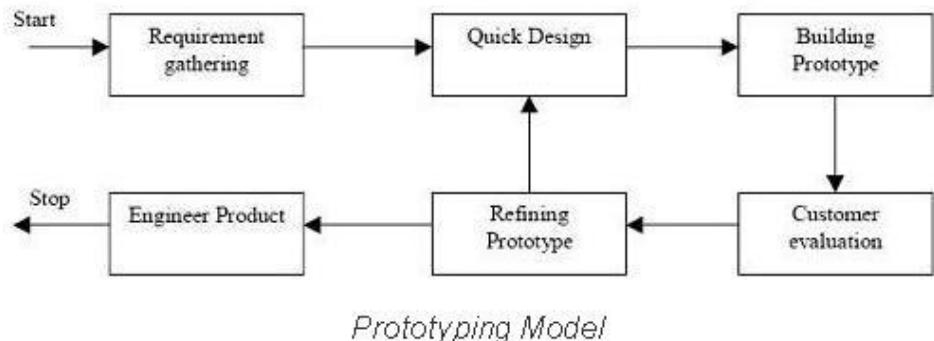


Fig. 2.2.3 Phases in prototype model

Prototype Model is used in this system for following reasons:

- It requires lot of interaction with the end users. Each and every prototype was presented in appropriate cycles. This helped the team to incorporate new features in each cycle which led to the betterment of the system as a whole.

- Each prototype contained a new feature which was not present in the previous prototypes. The final product was the result of the evolution of following prototypes:
  - Simple LED demonstration for the home automated device.
  - Temperature sensor addition to the LED to incorporate safety as a feature.
  - Camera Feed added to the Admin and User Panel so that they can view their devices any time they desire.
  - Finally, LED was replaced with Bulb for the real device interface.

### **2.2.2 Milestones and Deliverables**

During the first month after we chose our definition, we focused on the architecture part, along with basic GUI to work with. In the next month, we worked on perfecting the front-end part and finalizing it. In the next month we concentrated on advanced functionalities, some of which required third party agents. Lastly, we completed our project by testing and debugging and making a well-documented report to represent it.

#### **Milestone:**

- Milestone is an end-point of the software process activity.
- Milestone represents the end of the distinct, logical stage in the project.
- At each milestone there should be formal output, such as report, that can be represented to the management. The fortnightly report is submitted to our internal project guide, which include day to day work report.

#### **Deliverables:**

- Deliverables is a project report that is delivered to the administrator of the project.
- Deliverables are delivered to the administrators of our organization at the end of some major project phase such as specification, design, etc.
- Deliverables are usually milestone. Milestones may be internal project results that are used by the project manager to check progress but which are not delivered to the administrator.

- We worked according to the daily tasks provided by our external guide to ensure that we accomplish the desired deliverables on time.

### **2.2.3 Roles & Responsibilities**

Below table (Table 2.2.3) shows the roles and responsibilities carried out by each member of the group.

Table 2.2.3 Roles and responsibilities

Name	Role				
	Analysis	Designing	Coding	Testing	Documentation
Saloni Goyal	✓	✓	✓	✓	✓
Shiv Hansoti	✓	✓	✓	✓	✓

### **2.2.4 Group Dependencies**

The members of the project should be dedicated to the project and should in turn help each other in whatever problems concerning the project. They should report periodically concerned faculty of the project reporting.

We understand the need to work together as a team and achieve the milestone in time. This guided us to complete the project within the allotted period.

### **2.2.5 Project Scheduling**

Below table (Table 2.2.5) shows the scheduling carried out for the successful completion of the project.

Table 2.2.5 Project Scheduling Chart

No.	TASK	START	END	DURATION
1	Analysis	10/12/2018	23/12/2018	14 days
2	Design	24/12/2018	06/01/2019	14 days
3	Coding	07/01/2019	03/03/2019	56 days
4	Testing	04/03/2019	17/03/2019	14 days
5	Maintenance	18/03/2019	29/03/2019	14 days
6	Documentation	07/01/2019	29/03/2019	84 days

## CHAPTER 3

# SYSTEM REQUIREMENTS STUDY

### **3.1 STUDY OF CURRENT SYSTEM**

Home devices, when remotely observed and controlled through the Internet, are an essential constituent of the Internet of Things. In the recent years, IOT has emerged as a vital part in our day to day lives. Be it refrigerators, home security, computerized lights etc. IOT has proven to be effective in reducing human efforts whenever necessary. There are sensors for an extensive variety of uses, for example, measuring temperature, fluid, and gas and recognizing development or commotion. They all aim at mainly two things: security and environment preservation.

### **3.2 PROBLEMS AND WEAKNESSES OF CURRENT SYSTEM**

- The **cost** associated with home automation is high because it contains different types of hardware which accounts for installation charges.
- **System compatibility** is also an issue. The newly purchased home automated devices might not be compatible with the current system which can lead to chaos.
- **Learning** about home automation can be a daunting task for non tech-savvy people as it requires basic hardware and software knowledge.
- **Constant internet connection** can be a bottleneck sometimes.

### **3.3 USER CHARACTERISTICS**

1. **Service Providers:** They will use the system to perform CRUD operation on subscriber data and plans provided by them. They can revoke the access to devices of the subscribers if they don't pay the fee on a timely basis. They basically act as administrator of the system.

2. **Subscribers:** They can access their devices for the automation of their homes by subscribing to any one of the plans provided by the service provider. They can also change their information as and when required. They are given a user panel to execute the above mentioned functionalities.

## **3.4 HARDWARE & SOFTWARE REQUIREMENTS**

### **3.4.1 Hardware requirements:**

- Processor: intel(R) core(TM) i5 CPU @ 2.30ghz
- Installed Memory(RAM): 8.00 GB
- ROM: 1TB
- System type: 64-bit Operating System, x64 based processor
- NodeMcu-12E Wi-Fi Module with Micro USB
- 8 channel Relay Board
- Switch Board with 4 plug sockets and 3 pin coated wire.
- Connecting wires
- Real time devices (e.g. bulb, fan)
- 5v Adapter
- Temperature Sensor (LM-35)
- Mini Breadboards (2 Pieces)
- Screw Driver Kit
- Power Bank
- Electric Tape and Double Sided Tape

### **3.4.2. Software requirements:**

- Xampp v7.0.2
- Arduino IDE
- Sublime Text or Netbeans
- Blynk
- Cayenne

## 3.5 CONSTRAINTS

### 3.5.1 Regulatory Policies

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### 3.5.2 Hardware Limitations

The system is hardware dependent because it is part IOT. There are certain hardware limitations that can hinder the working of the system. Some of them are stated below:

- High power dissipation of microcontroller hardware design for getting the best performance out of real-time applications and devices.
- For ensuring a reliable product design, conducting in-depth testing, verification, and validation is another challenge for hardware.
- Since all the hardware components operate in a highly resource-constrained and in physically insecure situations, engineers often face problems in ensuring the security of these components.
- Problems in ensuring smooth integration of new services. Since user requirements can change from time to time, it is difficult to change the whole hardware in one go. The new requirement might not be compatible with the older one which can lead to conflicts.

### **3.5.3 Parallel Operations**

- Subscriber can access multiple devices simultaneously.
- Subscriber can do one of the following things while accessing the devices:
  1. Surf the website.
  2. Complain to the Service provider.
  3. Change its settings.
  4. Deactivate plan (it will revoke the device access from user).
  5. Request for plan extension.
  6. Look for another plan.
  7. View the notification panel.
  8. View its personal information.
- Service provider can perform many parallel operations while changing its profile information:
  1. CRUD on subscriber.
  2. CRUD on plans.
  3. View/Search in payment history panel.
  4. View general admin panel information.
  5. Manage settings of website.

### **3.5.4 Criticality of the Application:**

Criticality means any occurrence of malfunction of the system or any accidental event in software which can damage the resources of software.

- If the Wi-Fi is not working the system won't work properly.
- If the user is not well versed with the web application usage, operating the product will become difficult.
- Any hardware component short circuit may result into complete failure of the system.

## 3.6 ASSUMPTIONS AND DEPENDENCIES

### 3.6.1 Assumptions

- User friendly interface on server side so that any user can easily navigate through the system with or without logging in.
- Server used for data storing is always secured.
- User should have a basic knowledge of navigating in a website.
- The backend events (in phpmyadmin) will always be turned on.
- Hardware required in the system is always installed without any difficulty.
- A proper Wi-Fi connection 24\*7.

### 3.6.2 Dependencies

- New user needs to have a different login and password, Irrespective of whether it's a service provider or a subscriber.
- Subscriber should always pay the subscription fee before device installation for home automation.

## CHAPTER 4

## SYSTEM ANALYSIS

### **4.1 REQUIREMENTS OF NEW SYSTEM**

#### **4.1.1 USER REQUIREMENTS**

User requirements do not include many things, but most importantly user must be aware that system works properly with full availability, reliability, security and safety. A user must know how to use a website and should adhere to the guidelines and prescribed standards.

#### **4.1.2 SYSTEM REQUIREMENTS**

System requirement include the software and hardware that are to be made available to build up the device and also to put it in to the operation.

##### **Functional Requirements:**

Functional requirements define the internal working of the website.

The functional requirements of the application are mentioned as follows:

#### **R1.1 Login**

**Description:** Once the user types the URL of the portal in the browser the login page is displayed in it, from where the user can login into the website. The user's Email-ID and password both are mandatory. Upon successful login the user will be directed to the main home page of the application.

**Pre-process:** The login page is opened in the browser.

**Input:** Enter Email-ID and Password.

**Output:** Login successful or not successful.

**Post process:** If id and password is validated successfully then it will login the user else it will show error message to enter user id and password in correct format.

## R2.1 Registration

**Description:** New admin will be added manually. Subscribers can register through the site.

**Pre-process:** The user types the URL of web-site.

**Input:** Email, password, profile image, name, age, mobile number, country, and state for Subscriber.

**Output:** Home page of respective entity.

## R3.1 Logout

**Description:** Used to close the session.

**Pre-process:** Viewed details.

**Input:** Click on logout option.

**Output:** User is logged out.

**Post process:** The user is directed to login page again.

## R4.1 User Profile

### R4.1.1 Update User Profile information

Input: User information that need to be updated

Output: Information will be updated in the User's account.

Precondition: User must be logged in and must be a primary user.

### R4.1.2 Update User Account Profile information

Input: User Account information that need to be updated

Output: Information will be updated in the User's account.

Precondition: User must be logged in and must be a primary user.

## R5.1 Forgot Password

**Description:** When Admin or subscriber forgets the password, they can reset it using this feature.

**Input:** Valid Email Id

**Output:** Temporary password with reset password link will be sent to registered email

**R6.1 Reset Password**

**Description:** Admin has the facility to reset their password whenever they feel like.

**Input:** New Valid Password and Email.

**Output:** Password will be reset.

**R7.1 Device Access**

**Description:** Service provider can grant or revoke access to operate device to the respective user for a given time slot.

**Input:** Turn ON/OFF User's service.

**Output:** Access granted or denied.

**R8.1 Subscribe Plan**

**Description:** Users are given an option to subscribe plan, Cancel plan, or to update plan.

**Input:** Request for Subscribe/Cancel/Update plan

**Output:** Do the possible action for user.

**R9.1 Add/Update/Delete User**

**Description:** Admin can perform CRUD on user.

**Input:** Details of user.

**Output:** Add/Update/Delete User.

**R10.1 Add/Update/Delete Plan**

**Description:** Admin can perform CRUD on Plan.

**Input:** Details of Plan.

**Output:** Add/Update/Delete Plan.

## R11.1 Notifications

**Description:** Subscriber can get notifications of the Service Providers regarding bill payment or unexpected behaviour of devices.

**Input:** Username and user id of subscriber.

**Output:** Notifications or requests from Service Provider.

## R12.1 Camera feed

**Description:** Subscriber can view their devices if they have cameras installed as a part of the system.

**Input:** Username and user id of subscriber.

**Output:** Live Camera feed in the user panel.

### Non-Functional Requirements:

They specify how the system should behave. They cover all other requirements that are not covered by the functional requirements. Following are some non-functional requirements in our system:

- **Storage:** All the data regarding User, Service Providers, Device access will be stored securely in our MySQL database.
- **Internet:** This is a crucial part of the website because it will help in accessing device and all other transactions.
- **Security:** Online payment transactions should be safe and secure, to avoid frauds.
- **Usability:** Our software will help in improving the quality of life of all our users.

## 4.2 FEATURES OF NEW SYSTEM

- “Smart Home Central Control System” can be used where affordability is the primary concern in the organization.
- Easy to use.
- Reliable and accurate.
- Better GUI and more beneficial.

## 4.3 USE CASE DIAGRAM

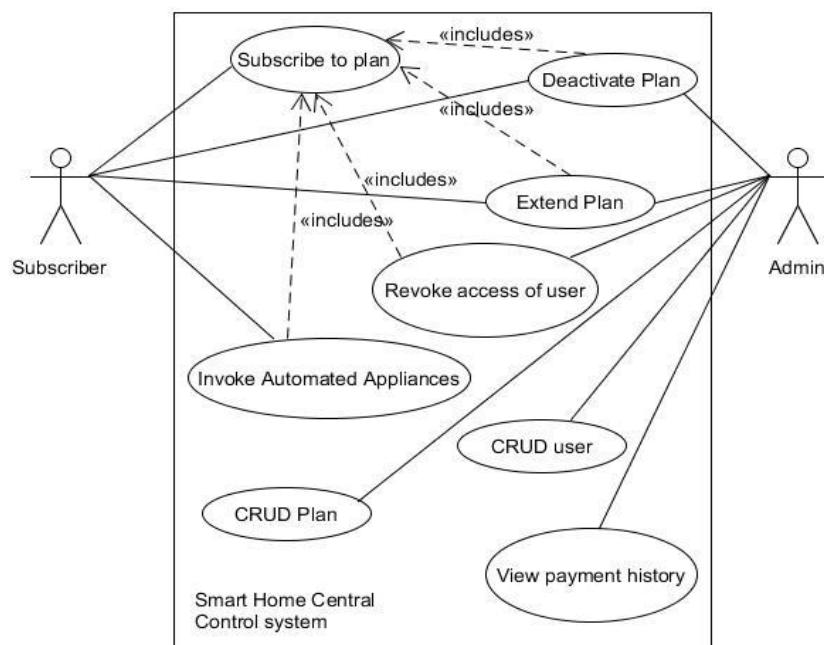


Fig. 4.3 Use Case Diagram for the system

# CHAPTER 5

## SYSTEM DESIGN

### 5.1 SYSTEM ARCHITECTURE DESIGN

#### 5.1.1 Class Diagram

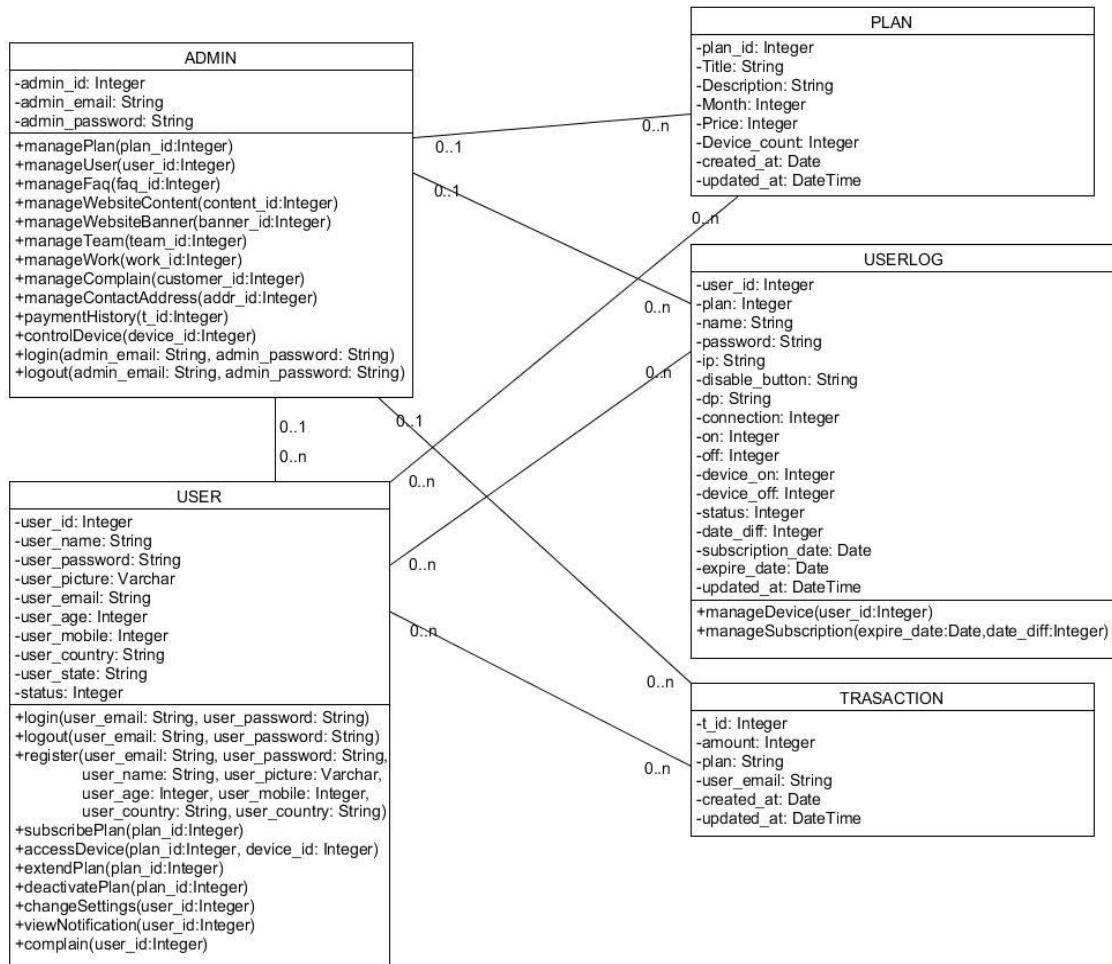
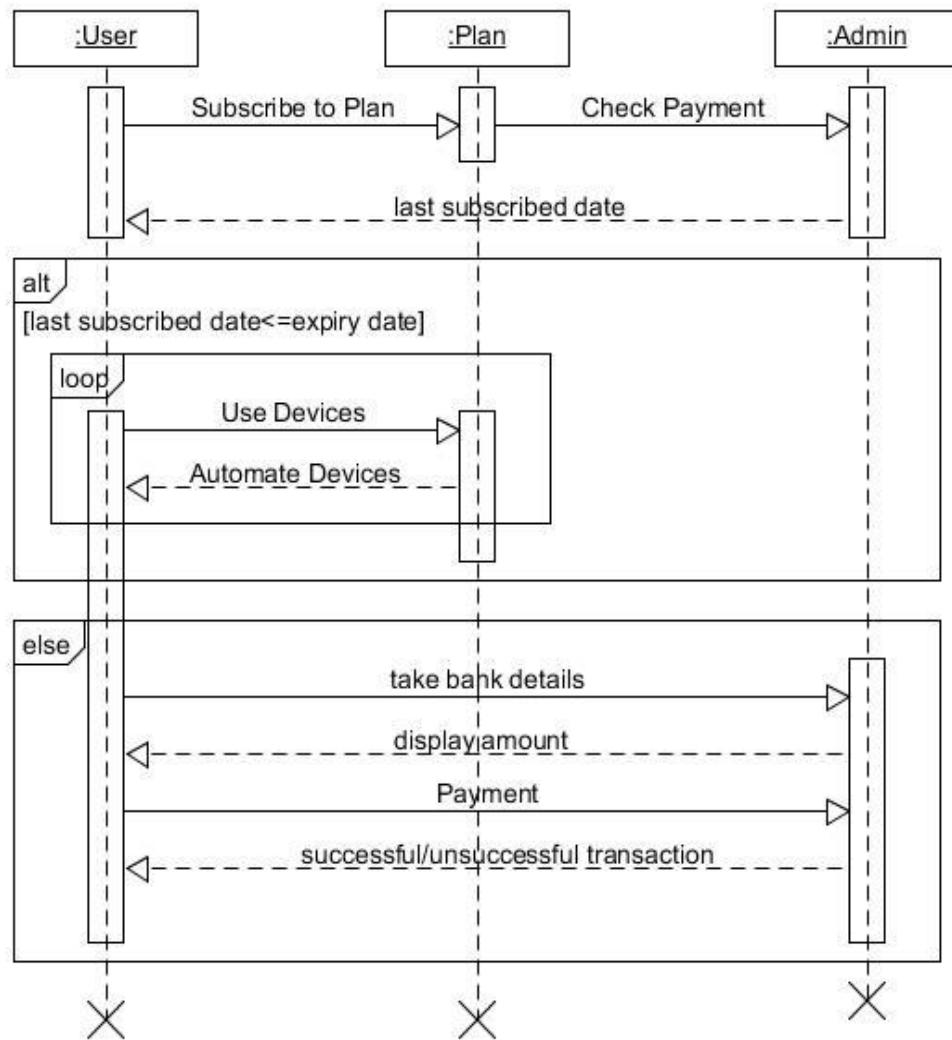


Fig 5.1.1 Class Diagram

## 5.1.2 Sequence Diagram

### 5.1.2.1 Sequence Diagram for plan subscription



5.1.2.1 Sequence Diagram for plan subscription

### 5.1.2.2 Sequence Diagram for User Login

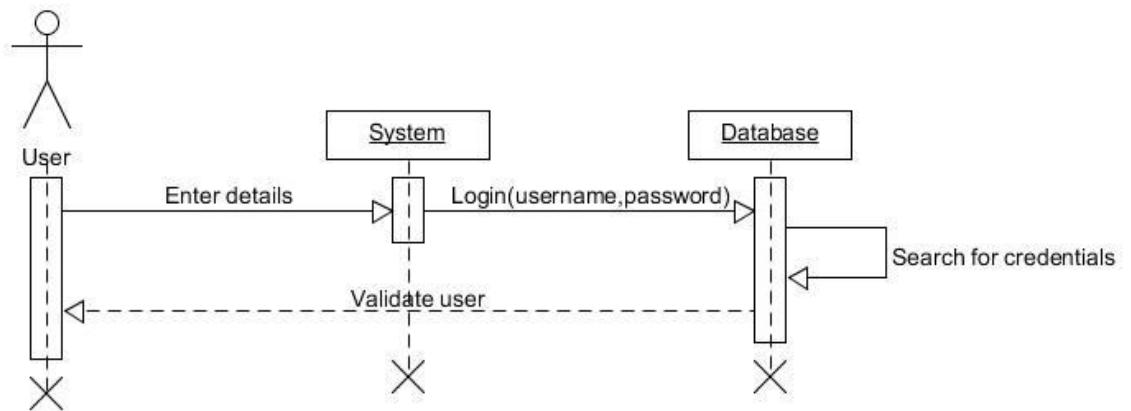


Fig. 5.1.2.2 Sequence Diagram for User Login

### 5.1.2.3 Sequence Diagram for User Registration

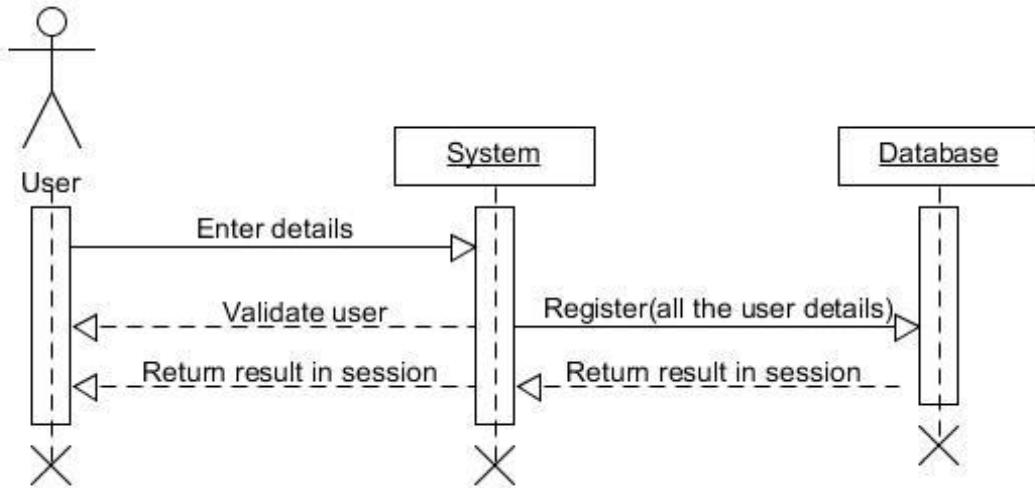


Fig. 5.1.2.3 Sequence Diagram for User Registration

#### 5.1.2.4 Sequence Diagram for Forget Password

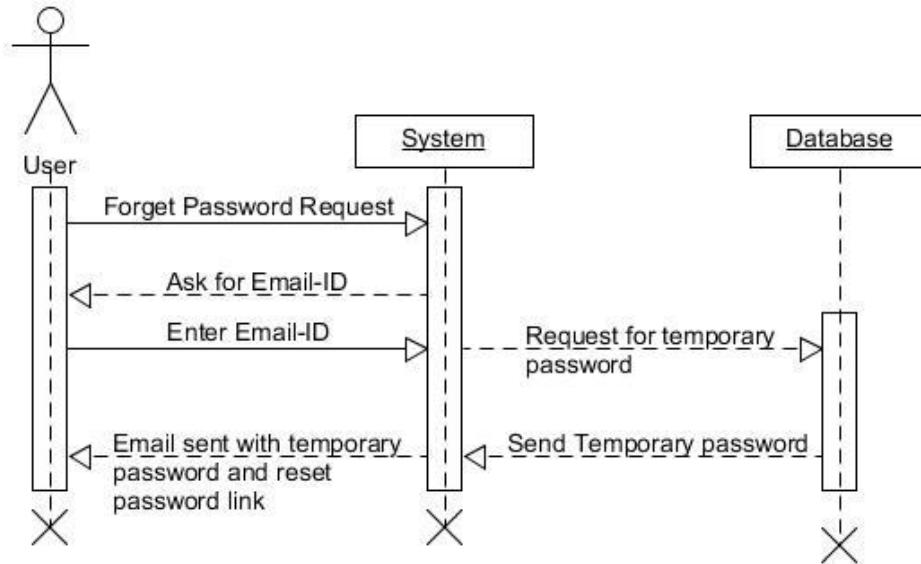


Fig. 5.1.2.4 Sequence Diagram for Forget Password

#### 5.1.3 Activity Diagram

##### 5.1.3.1 Activity diagram for payment

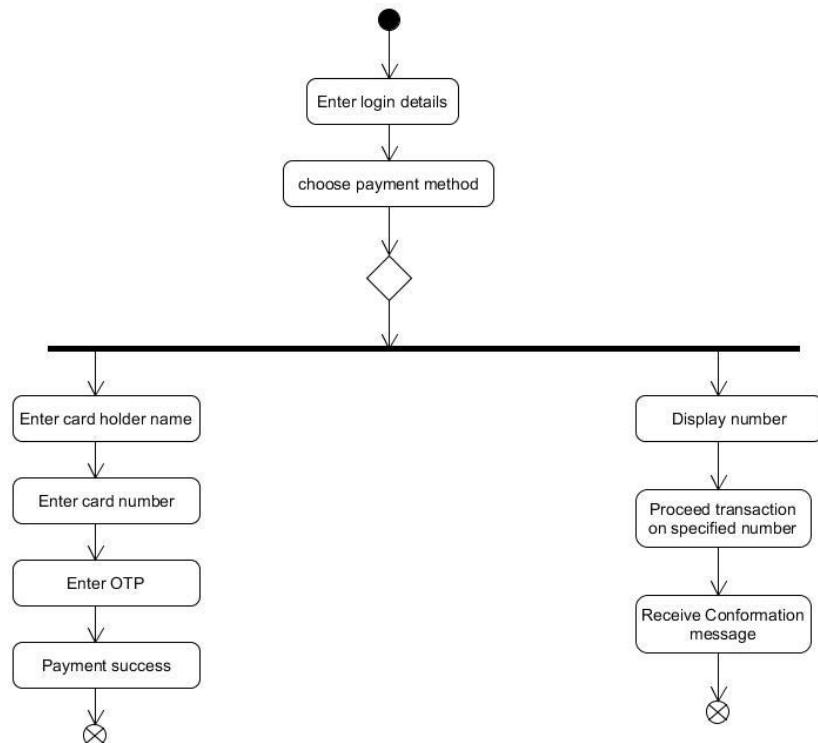


Fig. 5.1.3.1 Activity Diagram for payment

## 5.1.4 State Chart

### 5.1.4.1 State Chart for payment

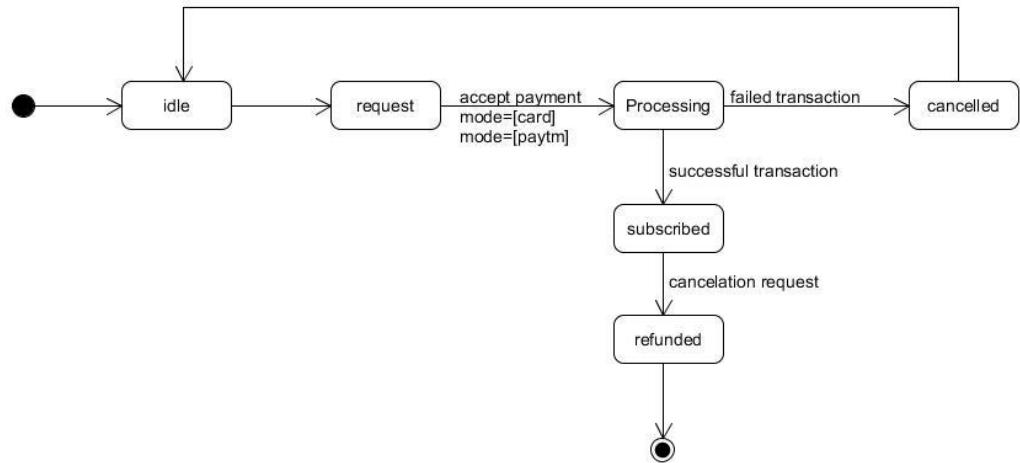


Fig. 5.1.4.1 State Chart for payment

## 5.1.5 Project Flow Diagram

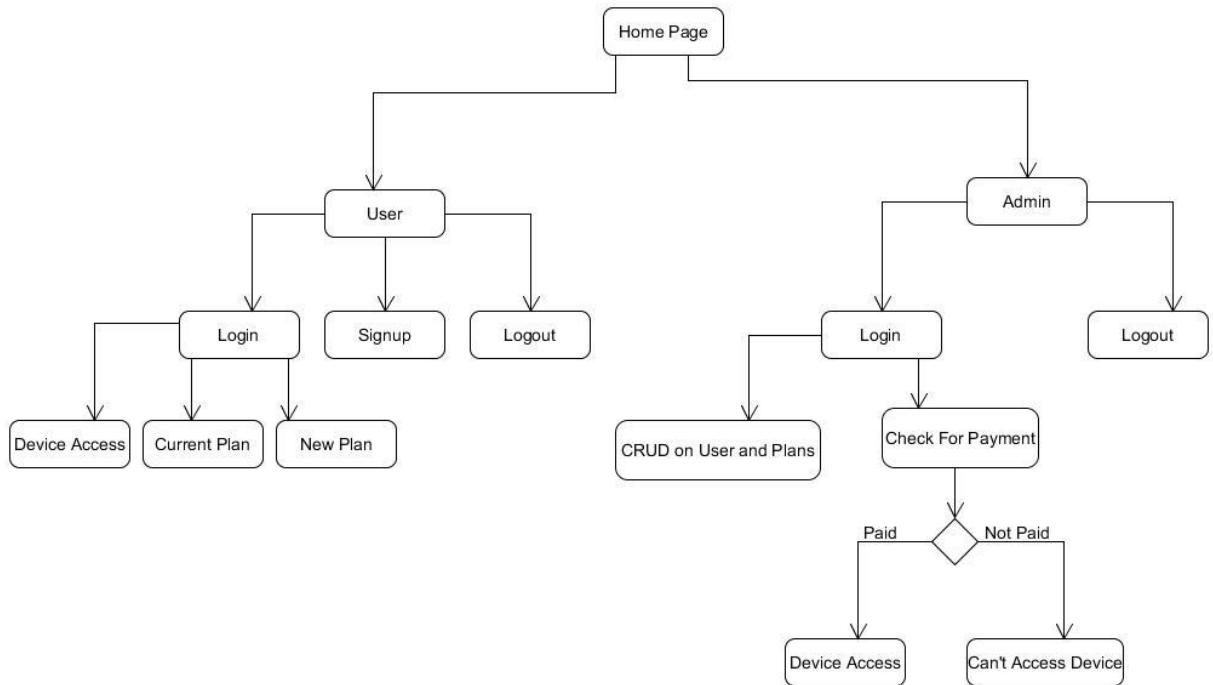


Fig. 5.1.5. Project Flow Diagram for the system

## 5.2 DATABASE DESIGN AND/OR DATA STRUCTURE DESIGN

### 5.2.1 Data dictionary

Many tables were used to make this web application dynamic. Tables 5.2.1.1, 5.2.1.2, 5.2.1.3, 5.2.1.4, 5.2.1.5 are the most important tables which make the system work. Following mentioned is the list of tables which are only used to store the content of the web application:

- about
- address
- contact\_us
- faq
- our\_work
- website\_banner
- website\_content

#### 5.2.1.1 user table

Below table (Table 5.2.1.1) is used to store the details about a subscriber. When a subscriber registers, their data is stored in this table.

Table 5.2.1.1 User Details data dictionary

Sr. No.	Name	Data Type	Constraint
1	user_id	int	Primary key
2	user_name	text	Not null
3	user_email	text	Not null
4	user_password	text	Not null
5	user_picture	varchar	Not null
6	user_age	int	Not null
7	user_mobile	int	Not null
8	user_country	text	Not null
9	user_state	text	Not null

### **5.2.1.2 plan\_desc (table containing details of plan) table**

Below table (Table 5.2.1.2) is used to store the details about a plan. The subscriber can subscribe to a plan and service provider can perform CRUD on plans through admin panel.

Table 5.2.1.2 Plan Details data dictionary

Sr. No.	Name	Data Type	Constraint
1	plan_id	int	Primary key
2	Title	text	Not null
3	Description	text	Not null
4	Month	int	Not null
5	Price	decimal	Not null
7	Device_count	int	Not null
8	created_at	Date	Not null
9	updated_at	DateTime	Not null

### **5.2.1.3 transaction table**

Below table (Table 5.2.1.3) is used to store the transaction history of the subscriber. Service Provider can view or search the history in the admin panel.

Table 5.2.1.3 Transaction Details data dictionary

Sr. No.	Name	Data Type	Constraint
1	t_id	int	Primary key
2	user_email	text	Not null
3	plan	text	Not null
4	amount	decimal	Not null
5	created_at	Date	Not null
6	updated_at	DateTime	Not null

#### **5.2.1.4 admin table**

Below table (Table 5.2.1.4) shows the admin details. New administrator of the system will be added manually.

Table 5.2.1.4 Admin Details data dictionary

Sr. No.	Name	Data Type	Constraint
1	admin_id	int	Primary key
2	admin_email	text	Not null
3	admin_password	text	Not null
4	admin_picture	varchar	Not null
5	created_at	Date	Not null
6	updated_at	DateTime	Not null

### 5.2.1.5 userlog table

Below table (Table 5.2.1.5) depicts the information about a particular user. It connects the table 5.2.1.1 and table 5.2.1.2.

Table 5.2.1.5 Userlog Details data dictionary

Sr. No.	Name	Data Type	Constraint
1	id	int	Primary key
2	user_id	int	Foreign key
3	plan	int	Foreign key
4	name	text	Not null
5	password	text	Not null
6	ip	text	Not null
7	connection	int	Not null
8	on	int	Not null
9	off	int	Not null
10	disable_button	text	Not null
11	dp	varchar	Not null
12	status	int	Not null
13	status1	int	Not null
14	device1_on	varchar	Not null
15	device1_off	varchar	Not null
16	status2	int	Not null
17	device2_on	varchar	Not null
18	device2_off	varchar	Not null
19	subscription_date	Date	Not null
20	expire_date	Date	Not null
21	date_diff	int	Not null
22	updated_at	DateTime	Not null

# CHAPTER 6

## IMPLEMENTATION AND PLANNING

### 6.1 IMPLEMENTATION ENVIRONMENT

For implementation of the system, following technologies are required:

- **PHP CodeIgniter Framework:**

CodeIgniter is an Application Development Framework - a toolkit - for people who build web sites using PHP. Its goal is to enable one to develop projects much faster by providing a rich set of libraries for commonly needed tasks, as well as a simple interface and logical structure to access these libraries. CodeIgniter uses the Model-View-Controller approach, which allows great separation between logic and presentation.

- **Arduino IDE:**

The Arduino integrated development environment is a cross-platform application that is written in the programming language Java. We used this to burn our C++ code in NodeMCU.

- **MySQL:**

MySQL is an Oracle-backed open source relational database management system (RDBMS) based on Structured Query Language (SQL).

- **HTML, CSS, Bootstrap:**

Bootstrap is a free front-end framework for faster and easier web development. It includes HTML and CSS based design templates for typography, forms, buttons, tables, navigation, modals, image carousels and many other, as well as optional JavaScript plugins

- **Javascript, jQuery, ajax:**

Javascript, is a client-side (in the browser) scripting language.

jQuery is a library/framework built with Javascript. It is very popular because it (nearly universally) abstracts away cross-browser compatibility issues and it emphasises unobtrusive and callback-driven Javascript programming.

AJAX (Asynchronous Javascript XML) is a method to dynamically update parts of the UI without having to reload the page - to make the experience more similar to a desktop application.

- **Instamojo payment gateway:**

Briefly, Instamojo is a digital payments platform bundled with tons of e-commerce features to enable any business or individual to sell, manage & grow effortlessly, securely and cost-effectively.

## 6.2 MODULES SPECIFICATION

Following modules will be implemented:

- User Sign up and Login with session
- User Panel
- Admin Panel
- Device Control
- Website Design
- Payment Gateway

Brief explanation of the modules:

1. **User Sign up and Login with session:**

Here, the subscriber can register itself to the website. After registering, subscriber can login and the whole thing will be contained in a session.

2. **User Panel:**

After logging in, each subscriber can access the user panel provided to them. In the user panel, they have the facility to view their current information, current plan (they can deactivate, pay the bill etc.), messages from service provider. Moreover, they can access their devices and update their information.

### **3. Admin Panel**

Admin panel is for the service providers. Admin can perform following operations:

- CRUD on subscribers
- CRUD on plans
- View/Search payment history
- Manage website content
- Change its profile
- View website status
- Access devices of all subscribers

### **4. Device Control**

Here, the device control is based on the subscription plan that subscriber subscribes to. If they fail to pay the subscription fee to the service provider then the service provider can revoke the access of subscriber from the devices. If they pay the fee on time, devices can be automated wirelessly from both panels: user as well as admin. Also, devices can be viewed from subscriber's home if cameras are equipped with the system.

### **5. Website Design**

The website is designed dynamically. Admin can change the content whenever it is necessary. Website navigation is kept simple for the subscriber and one can easily access the website if they have an internet connection.

### **6. Payment Gateway**

Third party agent is used for the payment from subscriber. Subscriber can surf the website and subscribe to a plan or login and pay through the user panel. Instamojo payment gateway is used to accomplish the same. The credentials of the developer testing mode were provided by the company.

### 6.3 CODING STANDARDS

Coding standards contribute to an improved comprehension of source code. A name should tell "what" rather than "how." By avoiding names that expose the underlying implementation, which can change, we preserve a layer of abstraction that simplifies the complexity. We have used proper naming conventions as they make programs more understandable and easier to read. They can also give information about the function of the identifier.

Reasons for using the coding standards are:

- Uniform distribution
- Sound understanding
- Encourages good programming skills.

Code should be well commented. We have used comments in our code to explain what the function/procedure performs.

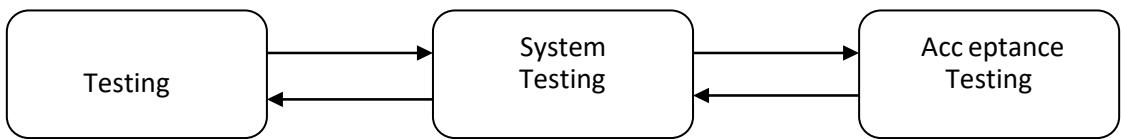
- Good and meaningful comments make code more maintainable.
- We have not used comments for every line of code and every variable defined.

# CHAPTER 7

## TESTING

### 7.1 TESTING STRATEGY

Once source code has been generated, software must be tested to uncover as many errors as possible before delivery to customer. Goal is to design a series of test cases that have a high likelihood of finding errors. Software testing techniques provide systematic guidance for designing tests that (1) exercise the internal logic of software components, and (2) exercise the inputs and outputs domains of the program to uncover errors in program function, behaviour and performance. Fig 7.1 shows the process of testing while Fig 7.1.1 shows the types of testing.

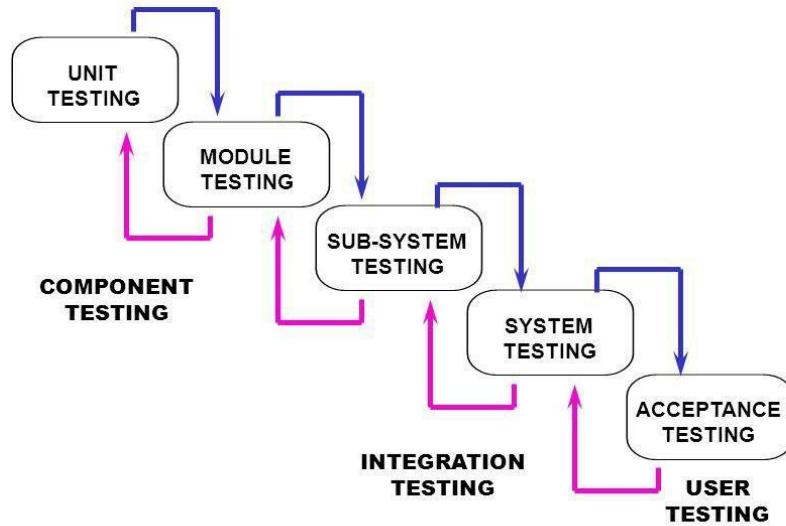


**Fig 7.1 The Testing Process**

#### 7.1.1 Unit Testing

Unit testing is a software development process in which the smallest testable part of an application, called units, are individually scrutinized for proper operation. Unit testing is often automated but it can also be done manually.

For every module, Unit testing was conducted while coding and before submitting the demo. So, most of the errors have been removed.

**Fig 7.1.1 Types of Testing**

## 7.1.2 System Testing

After testing all the sub-system, it was time to test the whole system. System testing of software is testing conducted on a complete, integrated system to evaluate the system's compliance with its specified requirements.

While testing the whole system, few errors were present. They were resolved by making appropriate changes. Individual attention to each and every error or exception was given and most of them were removed and corrected.

## 7.2 TESTING METHODS

Dynamic testing involves working with the software giving input values and checking if the output is as expected. These are the validation activities. Unit test, integration test, System and acceptance tests are few of the dynamic testing methodologies.

### 7.2.1 White box testing

Here, white box testing is used which is also known as glass box, structural, clear box and open box testing. It is a software testing technique where by explicit knowledge of the internal workings of the item being tested are used to select the test data. Unlike black box testing, white box testing uses specific knowledge of programming code to examine outputs. This testing technique was used because here test is accurate only if the tester knows what the program is supposed to do.

### 7.3 TEST CASES

Below table (Table 7.3.1) depicts the test cases designed for the system.

Table 7.3.1 Test cases for System

Test Case ID	Test Scenario	Test Steps	Test Data	Expected Results	Actual Results	Result
T01	Database Connectivity	Test Connection via Connection String	Connection String	Connection Successful	As per Expected	Pass
T02	Register	>Open Website >Go to Register Page >Enter Details	User information	Registration Successful	As per Expected	Pass
T03	Login	>Open Website >Go to Login Page >Enter login credentials	User data	Login successful	As per Expected	Pass
T04	Forgot Password	>Open Website and login >Forgot Password >Get the reset password link along with temporary password on your email >Reset the password	Password and reset password url on user's email ID	Forgot password successful	As per Expected	Pass
T05	Reset Password in admin panel	>Open Admin Panel >Click on reset password >Enter previous credentials along with new password >Reset the password	Email ID, old password and new password	Reset password Successful	As per Expected	Pass

<b>Test Case ID</b>	<b>Test Scenario</b>	<b>Test Steps</b>	<b>Test Data</b>	<b>Expected Results</b>	<b>Actual Results</b>	<b>Result</b>
T06	Pay Bill Or Select New Plan	>Go to Current Plan >Click On Pay Bill Now. >For new plan click on new plan.	Click on pay bill now	Bill payment success	As per Expected	Pass
T07	Admin Panel	>Open admin panel >Enter Login credentials	Authorized username and password	Login successful	As per Expected	Pass
T07-1	Turn ON/OFF devices	>Go in devices tab and click to turn ON/OFF devices	Click on button	Response successful	As per Expected	Pass
T07-2	User Complain	>Go to Complain Tab	Details of user with complain	Response successful	As per Expected	Pass
T07-3	Control User's Device centrally	>Go to users tab. >Select User's Device	Turn ON/OFF user's device.	Response successful	As per Expected	Pass
T07-4	Deactivate Service	>Go to Users tab. >Click on Deactivate Service	Click on Deactivate Service	Response successful	As per Expected	Pass
T07-5	Activate Service	>Go to Users tab. >Click on Activate Service	Click on Activate Service	Response successful	As per Expected	Pass

<b>Test Case ID</b>	<b>Test Scenario</b>	<b>Test Steps</b>	<b>Test Data</b>	<b>Expected Results</b>	<b>Actual Results</b>	<b>Result</b>
T07-6	Reactivate Plan	>Go to Users tab. >Click on Reactivate Service	Click on Reactivate button	Response successful	As per Expected	Pass
T07-7	Deactivate user's device Temporary	>Go to Users tab. >Click on User's Device >Click On Deactivate temporary	Click on Deactivate Device temporary button	Response successful	As per Expected	Pass
T07-8	CRUD operation for users	>Go to users tab.	click on corresponding button for CRUD operation	Response successful	As per Expected	Pass
T07-9	CRUD operation for plans	>Go to Plan tab.	click on corresponding button for CRUD operation	Response successful	As per Expected	Pass
T07-10	Manage Website content dynamically	>Click on manage tab >Select the item from the menu which you want to change in the website	Change the content of that item in the website	Response successful	As per Expected	Pass
T07-11	View and Search Payment History	>Click on payment history tab >view or search the transactions	Search the transaction by adding any payment detail	Response successful	As per Expected	Pass

# CHAPTER 8

## USER MANUAL

### 8.1 SCREENSHOTS

#### 8.1.1 Website screenshots

##### 8.1.1.1 Website Banner

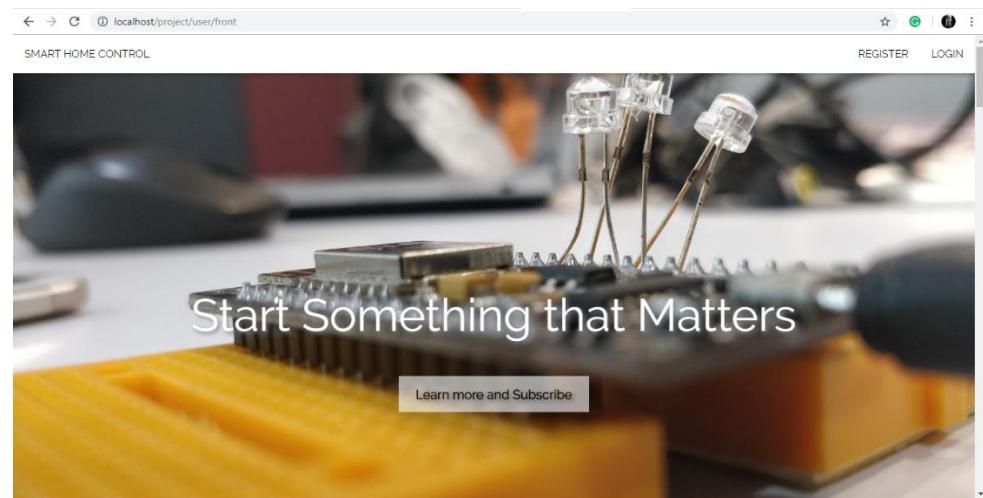


Fig 8.1.1.1 Website Banner

##### 8.1.1.2 User Registration

A screenshot of a user registration form titled "Registration". The form is set against a background of a blurred computer keyboard. It contains fields for Name, E-mail, Password, Age, and Mobile No. Below these are dropdown menus for Select Country (set to India) and State. There is also a file upload field for Upload profile Picture, which currently shows "No file chosen". A placeholder image "Image Display Here" is shown. A checkbox for "I Agree to the Terms and Conditions" is present, followed by a "Register" button. Below the button, links for "Already registered ?" and "Login here" are provided.

Fig 8.1.1.2 User registration

### 8.1.1.3 User Login

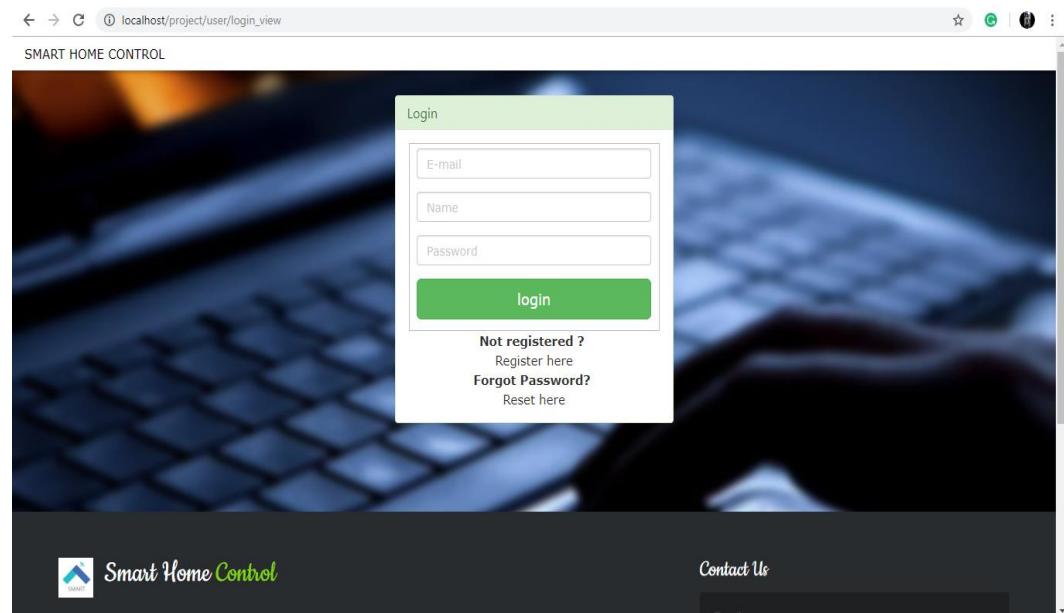


Fig 8.1.1.3 User Login

### 8.1.1.4 Website About us section

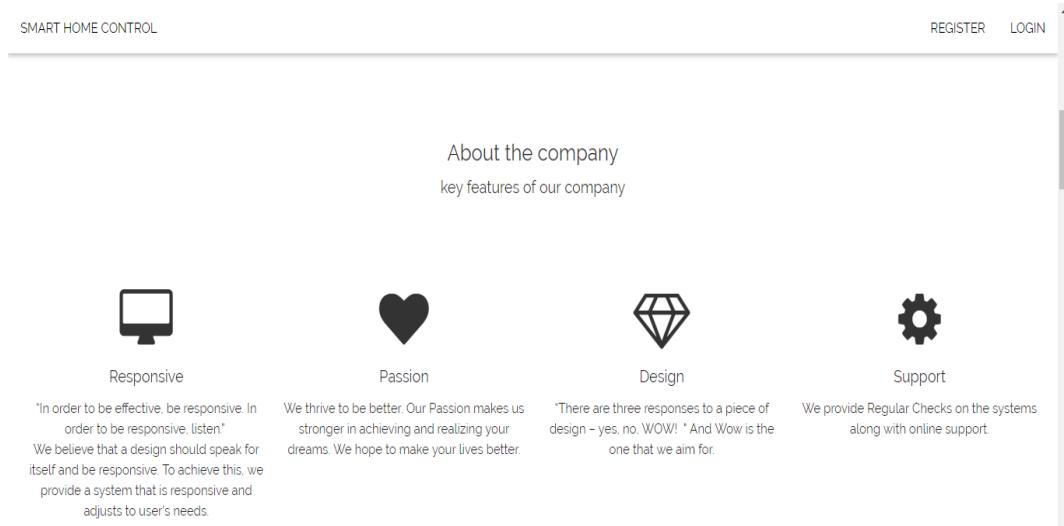


Fig 8.1.1.4 About us

### 8.1.1.5 Website Team section

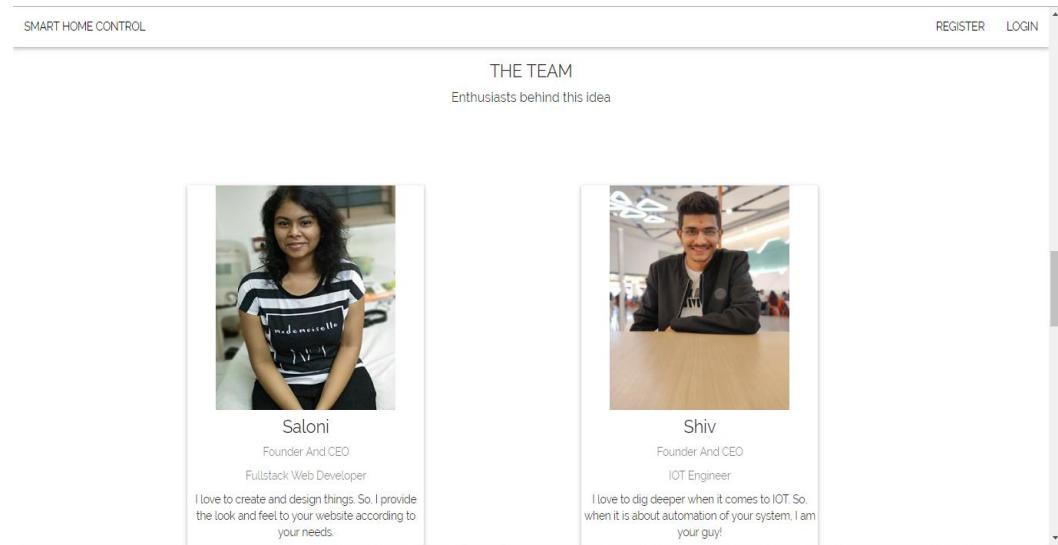


Fig 8.1.1.5 The Team

### 8.1.1.6 Website Our Work section

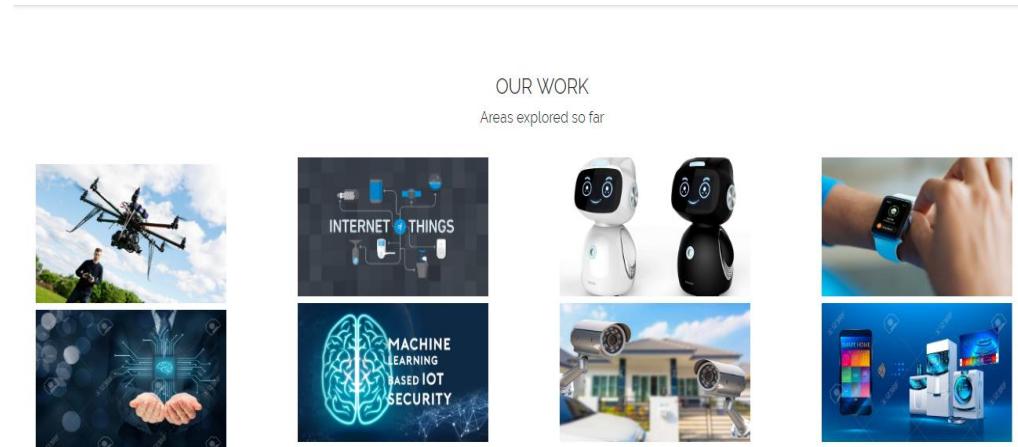


Fig 8.1.1.6 Our Work

### 8.1.1.7 Plan Display

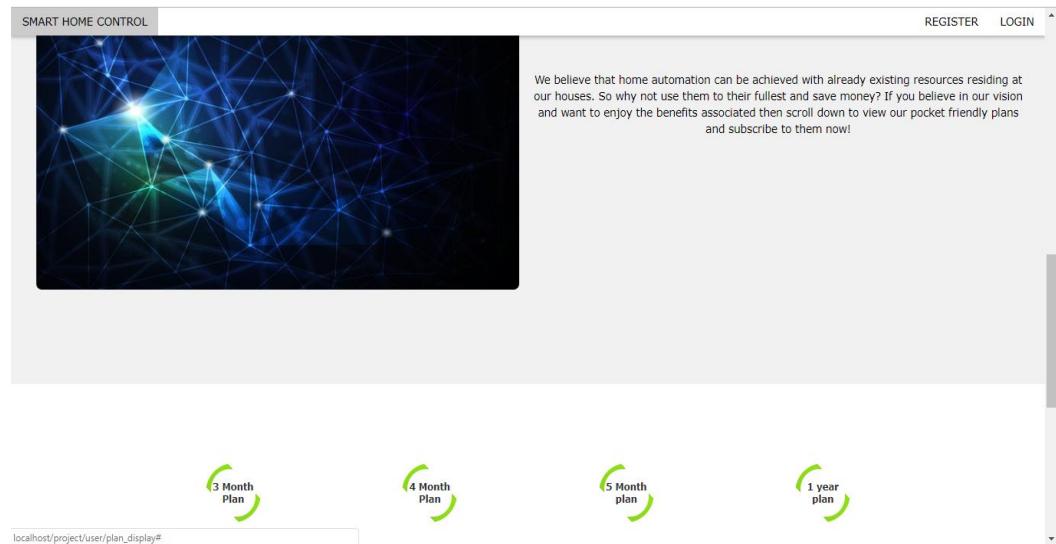


Fig 8.1.1.7 Plan display

### 8.1.1.8 Subscribe to a plan

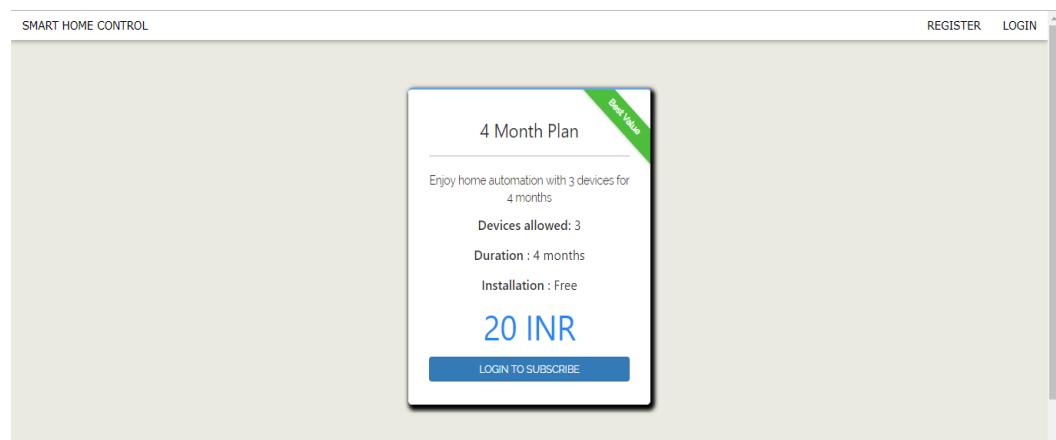


Fig 8.1.1.8 Subscribe to a plan

### 8.1.1.9 Website Footer



Fig 8.1.1.9 Website Footer

### 8.1.1.10 Website Contact

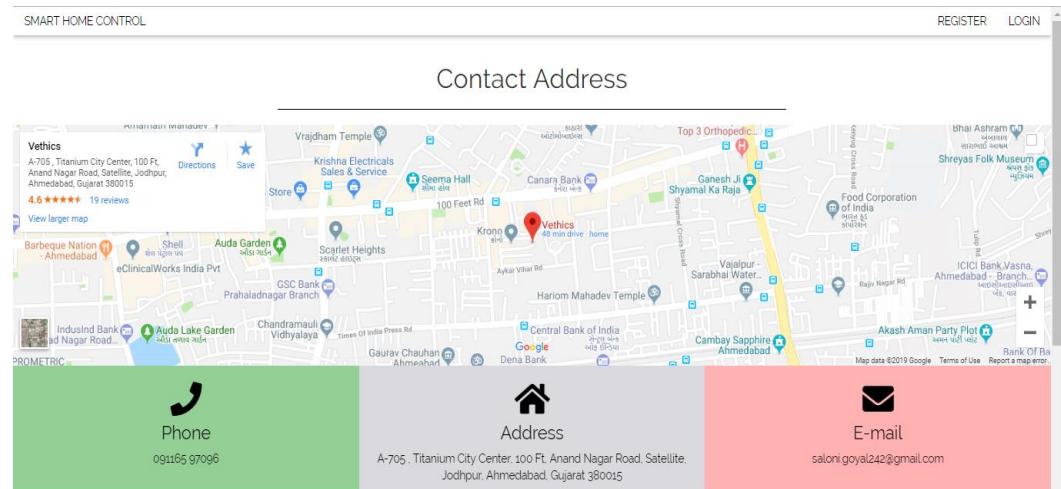


Fig 8.1.1.10 Website Contact

### 8.1.1.11 Website FAQ

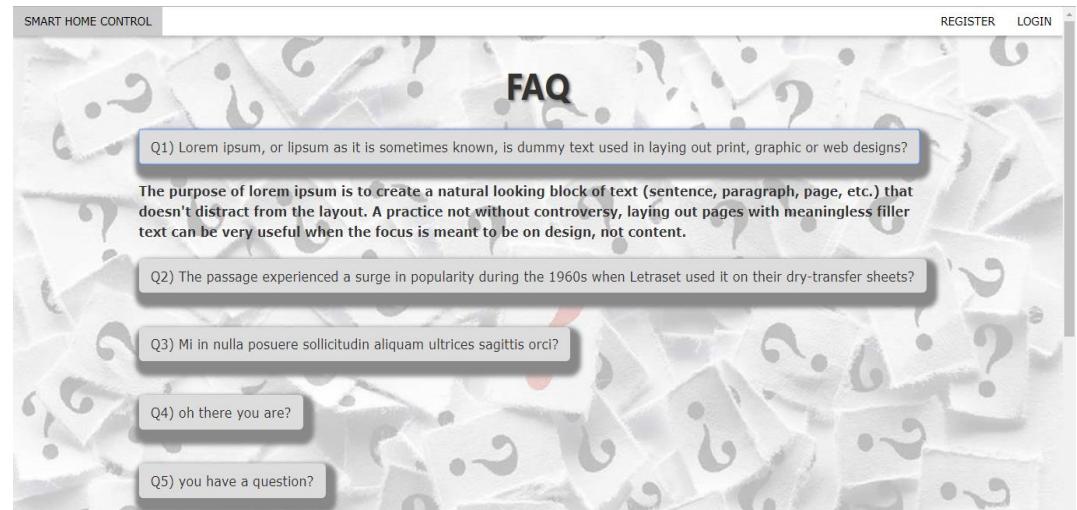


Fig 8.1.1.11 Website FAQ

## 8.1.2 Admin Panel screenshots

### 8.1.2.1 Dashboard

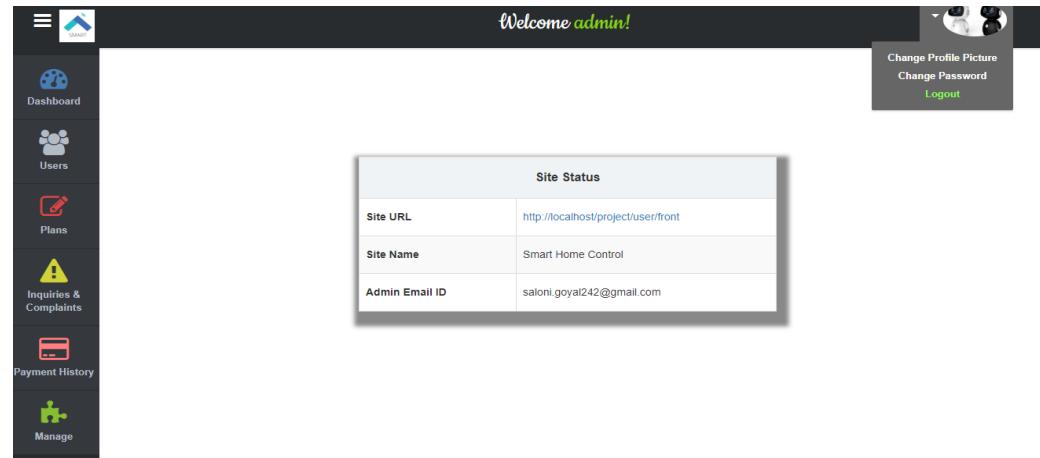


Fig 8.1.2.1 Dashboard

#### 8.1.2.1.1 Change profile picture

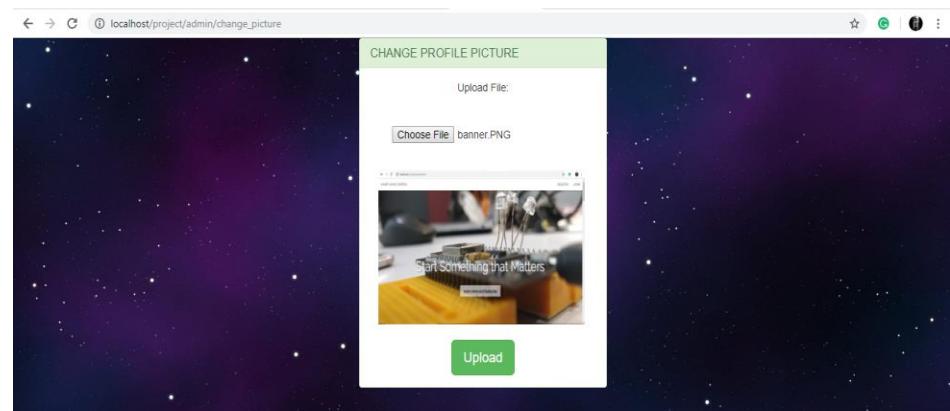


Fig 8.1.2.1.1 Admin change profile picture

#### 8.1.2.1.2 Change password

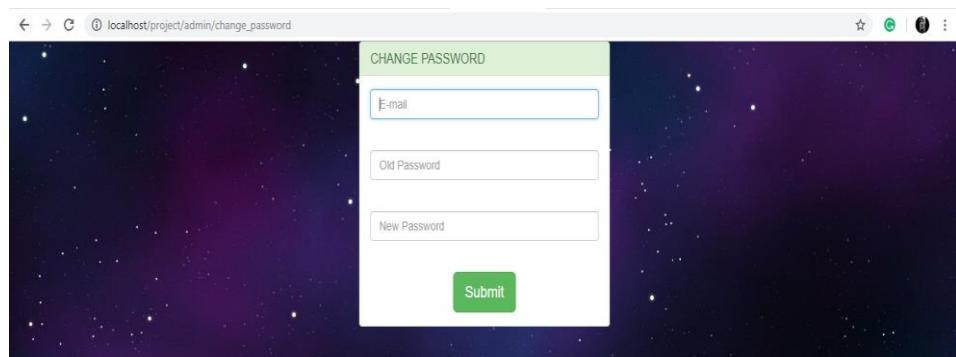


Fig 8.1.2.1.1 Admin change password

### 8.1.2.2 Payment History

The screenshot shows a user interface for managing payment history. At the top, a banner says "Welcome admin!" with a profile picture. On the left is a vertical sidebar with icons for Dashboard, Users, Plans, Inquiries & Complaints (highlighted in yellow), and Payment History. The main area is titled "Trasaction history" and contains a search bar with the placeholder "sh|". Below is a table with columns: Transaction ID, User Email, Plan, Amount, Paid On, and Transaction Updated at. One row is visible:

Transaction ID	User Email	Plan	Amount	Paid On	Transaction Updated at
5	shivhansot18@gmail.com	6 month plan	50 INR	2019-03-04	2019-03-05 11:59:24

Fig 8.1.2.2 Payment history

### 8.1.2.3 Inquiries and Complaints

The screenshot shows a list of inquiries and complaints. At the top, a banner says "Welcome admin!" with a profile picture. On the left is a vertical sidebar with icons for Dashboard, Users, Plans, Inquiries & Complaints (highlighted in yellow), and Payment History. A red button at the top left says "Delete All Selected". The main area has a table with columns: Select Multiple, Customer Id, Email Id, Subject, Message, and To be Done. Four rows are listed, each with a checkbox in the first column and a green "Solved" button in the last column.

Select Multiple	Customer Id	Email Id	Subject	Message	To be Done
<input type="checkbox"/>	2	shivhansot18@gmail.com	system failure	Please check the system at my house	<span style="background-color: green; color: white; padding: 2px;">Solved</span>
<input type="checkbox"/>	3	saloni24298@gmail.com	sdjaodja	dklmnikadmksmdkslmkm	<span style="background-color: green; color: white; padding: 2px;">Solved</span>
<input type="checkbox"/>	4	saloni24298@gmail.com	dajwidji`	jwloflwfjewoflw	<span style="background-color: green; color: white; padding: 2px;">Solved</span>

Fig 8.1.2.3 Inquiries and complaints

### 8.1.2.4 Manage panel

The screenshot shows a manage panel. At the top, a banner says "Welcome admin!" with a profile picture. On the left is a vertical sidebar with icons for Dashboard, Users, Plans, Inquiries & Complaints, Payment History, and Manage (highlighted in yellow). The main area is titled "Manage" and lists several items in green buttons: FAQ, Contact Page, About Us, Website Banner, Content, Second Page Content, and Team.

Fig 8.1.2.4 Admin manage panel

#### 8.1.2.4.1 Manage website FAQ

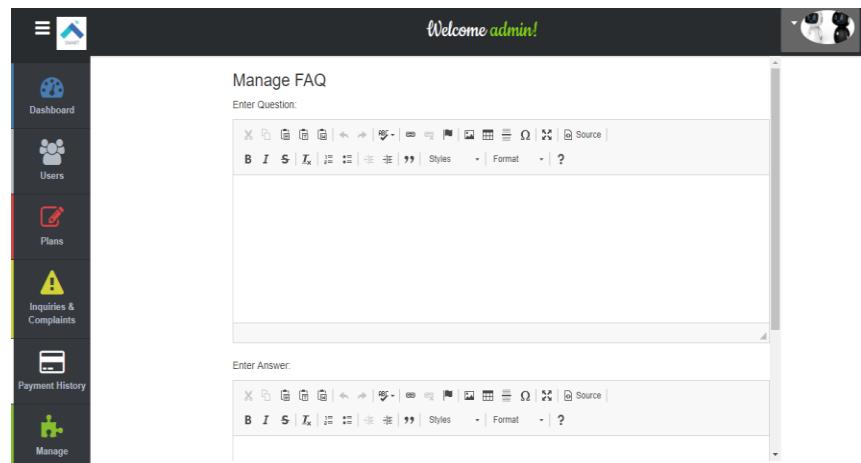


Fig 8.1.2.4.1 Admin manage website FAQ

#### 8.1.2.4.2 Manage website content

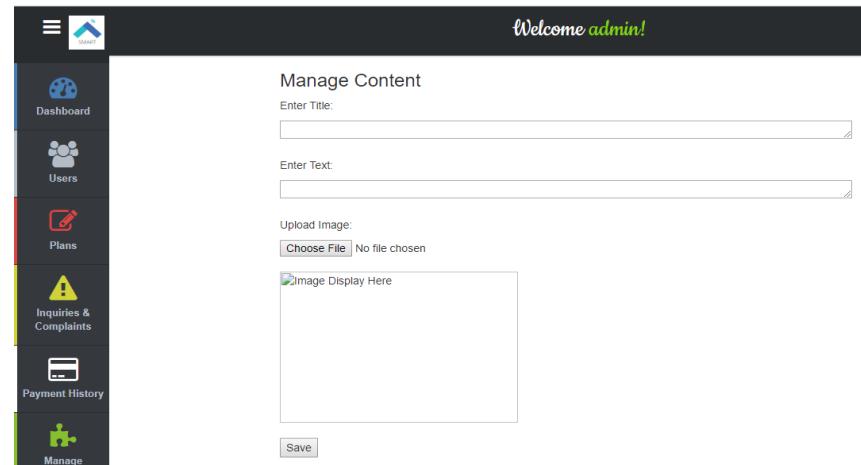


Fig 8.1.2.4.2 Admin manage website content

#### 8.1.2.4.3 Manage website address

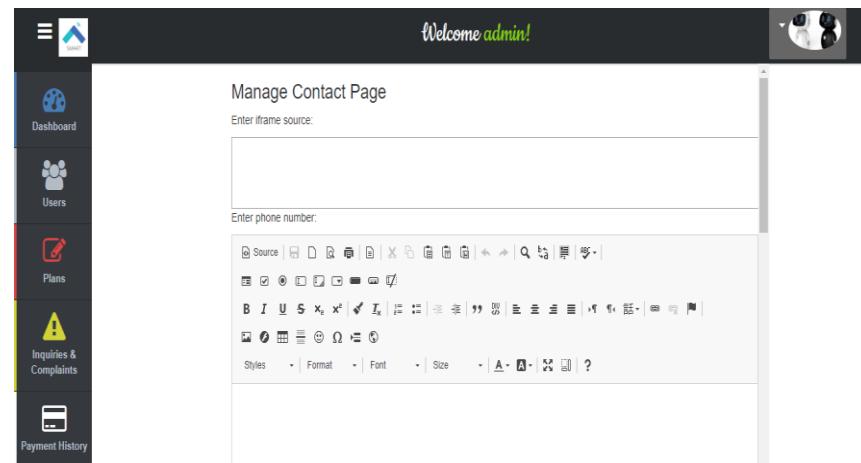
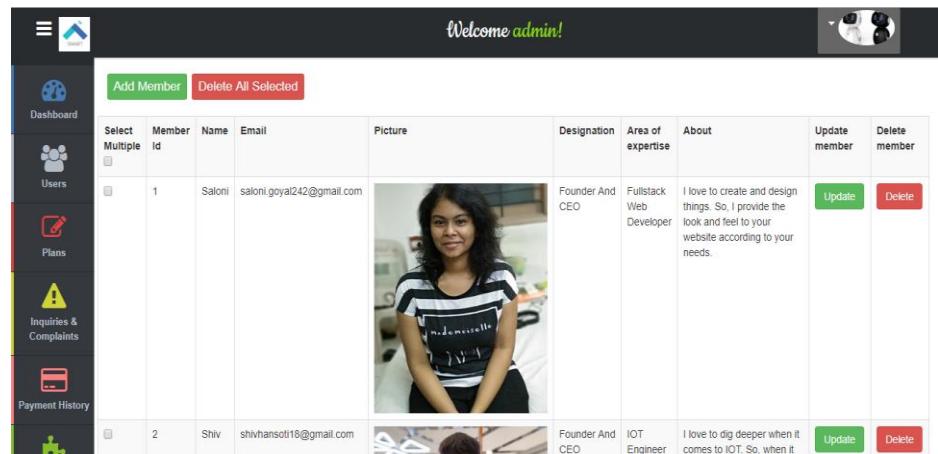


Fig 8.1.2.4.3 Admin manage website address

#### 8.1.2.4.4 Manage website team

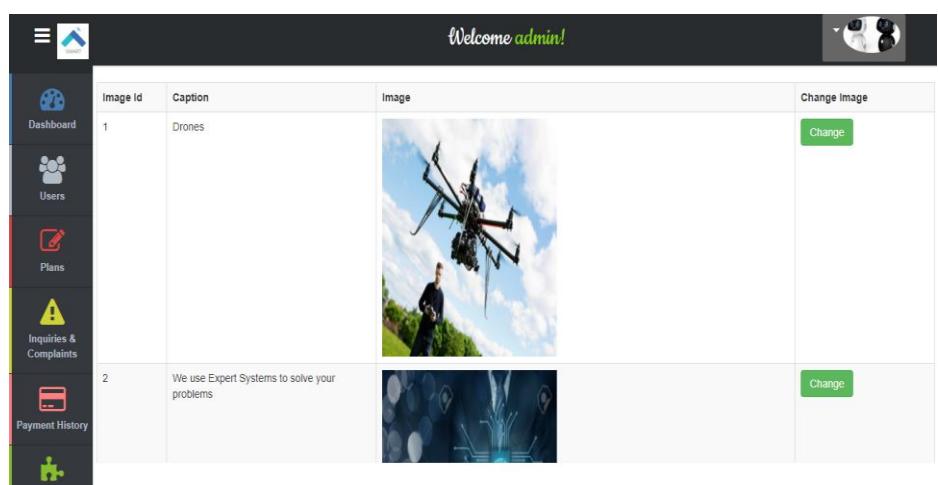


The screenshot shows a table with columns: Select Multiple, Member Id, Name, Email, Picture, Designation, Area of expertise, About, Update member, and Delete member. There are two rows of data:

Select Multiple	Member Id	Name	Email	Picture	Designation	Area of expertise	About	Update member	Delete member
<input type="checkbox"/>	1	Saloni	saloni.goyal242@gmail.com		Founder And CEO	Fullstack Web Developer	I love to create and design things. So, I provide the look and feel to your website according to your needs.	<button>Update</button>	<button>Delete</button>
<input type="checkbox"/>	2	Shiv	shilvansot18@gmail.com		Founder And CEO	IOT Engineer	I love to dig deeper when it comes to IOT. So, when it	<button>Update</button>	<button>Delete</button>

Fig 8.1.2.4.4 Admin manage teams

#### 8.1.2.4.5 Manage website work

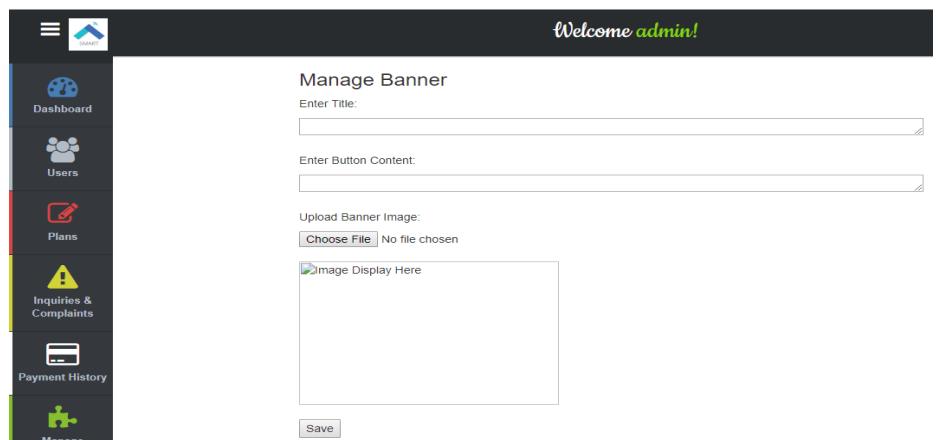


The screenshot shows a table with columns: Image Id, Caption, Image, and Change Image. There are two rows of data:

Image Id	Caption	Image	Change Image
1	Drones		<button>Change</button>
2	We use Expert Systems to solve your problems		<button>Change</button>

Fig 8.1.2.4.5 Admin manage work

#### 8.1.2.4.6 Manage website banner



The screenshot shows a form titled "Manage Banner" with fields for "Enter Title:" (with a text input field), "Enter Button Content:" (with a text input field), "Upload Banner Image:" (with a file input field showing "Choose File No file chosen"), and a preview area "Image Display Here". A "Save" button is at the bottom.

Fig 8.1.2.4.6 Admin manage website banner

### 8.1.2.5 Users

Select	User Id	Name	Profile Picture	Email	Password	Age	Mobile Number	Country	State	Status	Devices
<input type="checkbox"/>	2	sagar		salonig88@rocketmail.com	63a9f0ea7bb98050796b649e85481845	33	9999999999	IN	DA	0	sagar Devices
<input type="checkbox"/>	5	saloni		saloni24298@gmail.com	5e36c9f741aac0be6250faecf38e9c7a	21	9426634597	IN	CH	1	saloni Devices

Fig 8.1.2.5 Admin panel users

Password	Age	Mobile Number	Country	State	Status	Devices	Activate Plan	Deactivate Plan	Update User	Delete User
88@rocketmail.com	33	9999999999	IN	DA	0	sagar Devices	Activate	Deactivate	Update	Delete
4298@gmail.com	21	9426634597	IN	CH	1	saloni Devices	Activate	Deactivate	Update	Delete

Fig 8.1.2.5 Admin panel users

### 8.1.2.5.1 User devices

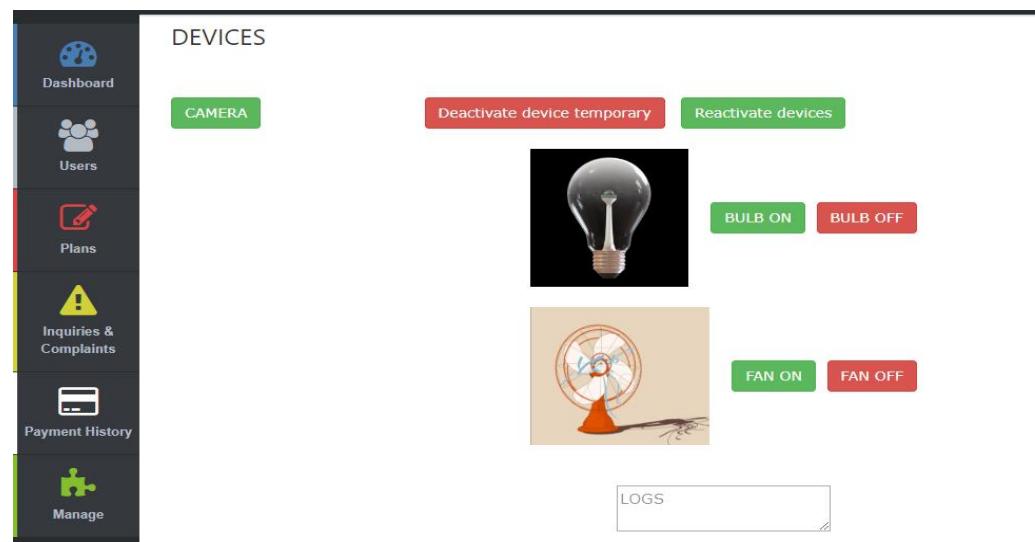


Fig 8.1.2.5.1 Admin panel user device access

### 8.1.2.5.2 Add User

Welcome admin!

Name:

E-mail:

Password:

Age:

Mobile No:

Select Country:

State:

Upload profile Picture:  Choose File | No file chosen

**Add**

Fig 8.1.2.5.2 Admin panel to add user

### 8.1.2.5.3 Update User

Welcome admin!

ID: 2

Name: sagar

E-mail: saloni88@rocketmail.com

Password:

Age: 33

Mobile Number: 9999999999

Select Country:

Fig 8.1.2.5.3 Admin panel to update existing user

### 8.1.2.6 Plans

Welcome admin!

Select Multiple	Plan Id	Title	Description	Month	Price	Device count	Update Plan	Delete Plan
<input type="checkbox"/>	1	3 Month Plan	Enjoy home automation with 3 devices for 3 months	3	15 INR	2	<b>Update</b>	<b>Delete</b>
<input type="checkbox"/>	2	4 Month Plan	Enjoy home automation with 3 devices for 4 months	4	20 INR	3	<b>Update</b>	<b>Delete</b>
<input type="checkbox"/>	3	5 Month plan	Enjoy home automation with 4 devices for 5 months	5	9 INR	4	<b>Update</b>	<b>Delete</b>
<input type="checkbox"/>	4	1 year plan	Enjoy home automation with 6 devices for 1 year	12	12 INR	6	<b>Update</b>	<b>Delete</b>

Fig 8.1.2.6 Admin panel to view plans

### 8.1.2.6.1 Add Plan

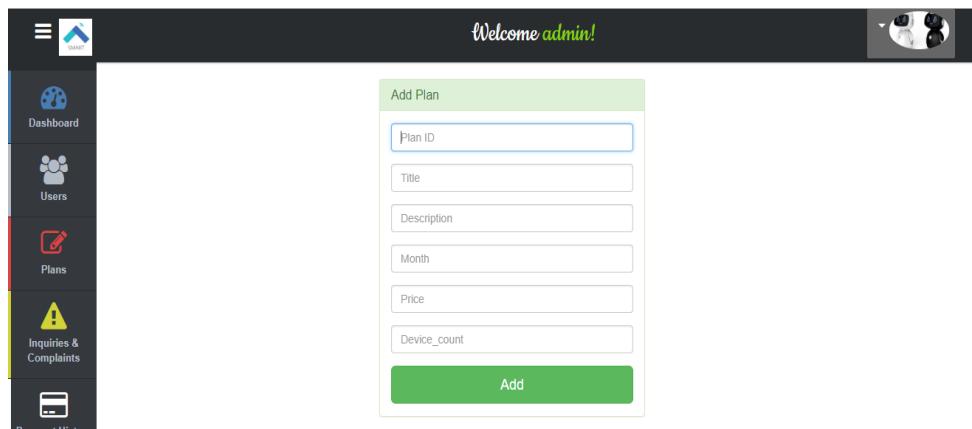


Fig 8.1.2.6.1 Admin panel to add new plan

### 8.1.2.6.2 Update Plan

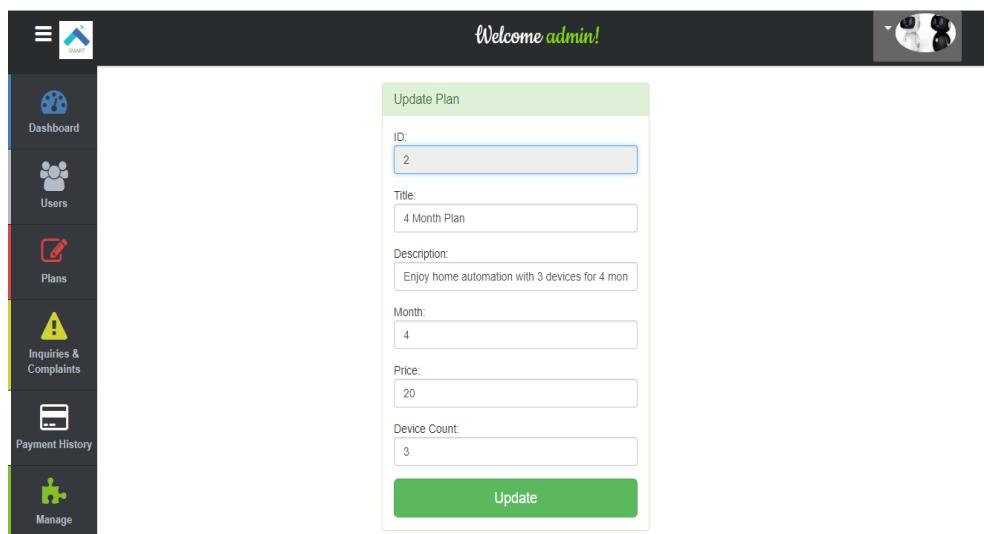


Fig 8.1.2.6.2 Admin panel to update existing plan

### 8.1.3 Payment gateway screenshots

#### 8.1.3.1 Payment portal

##### Instamojo Payment

**Product name :** 4 Month Plan  
**Price :** 20 INR  
**Bank Fee :** 3.91 INR (Rs: 3 + 2% of fee + 15% Service Tax)  
**Total :** 23.91 INR

##### Your Payment Details

Your Name

saloni

Your Phone

Enter your phone number

Your Email

Enter your email

**Click here to Pay 23.91 INR**

Fig 8.1.3.1 Instamojo payment portal

#### 8.1.3.2 Payment method

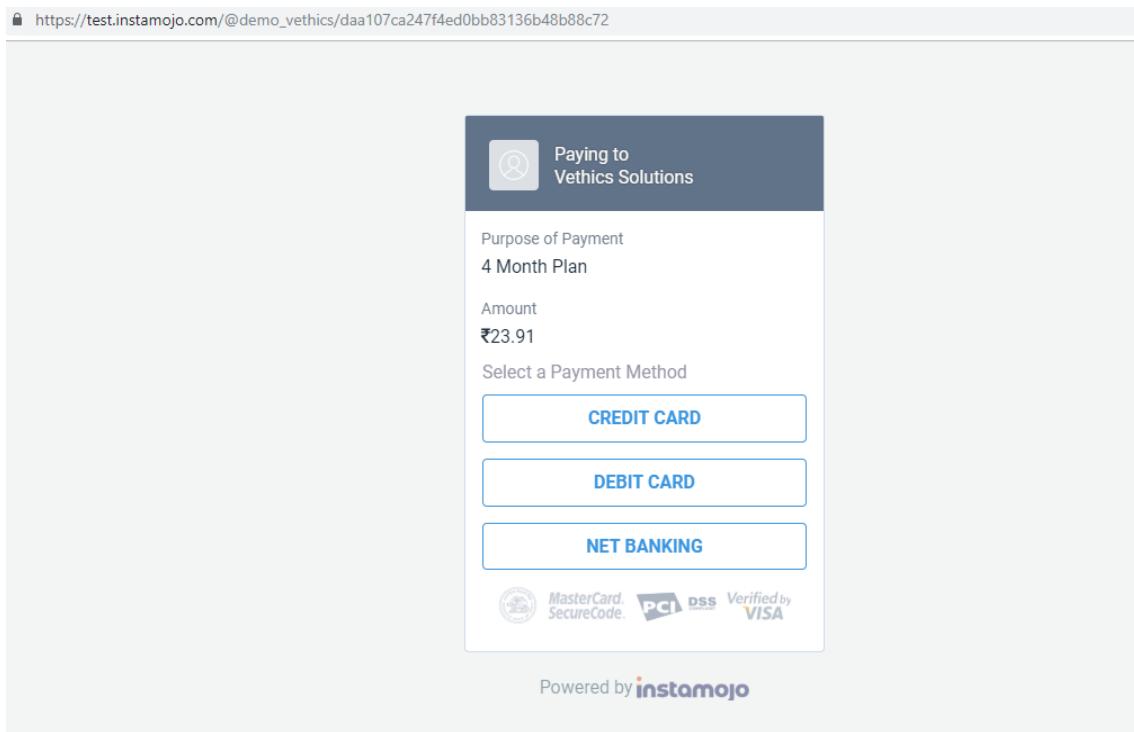
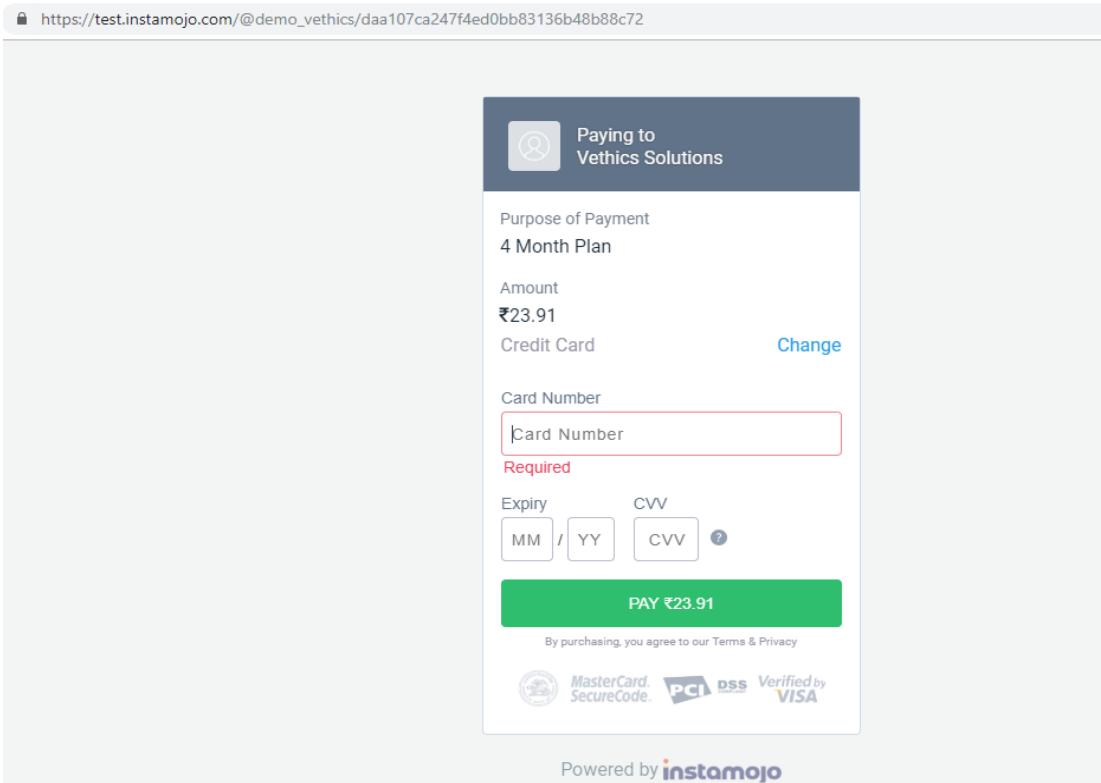


Fig 8.1.3.2 Instamojo payment method

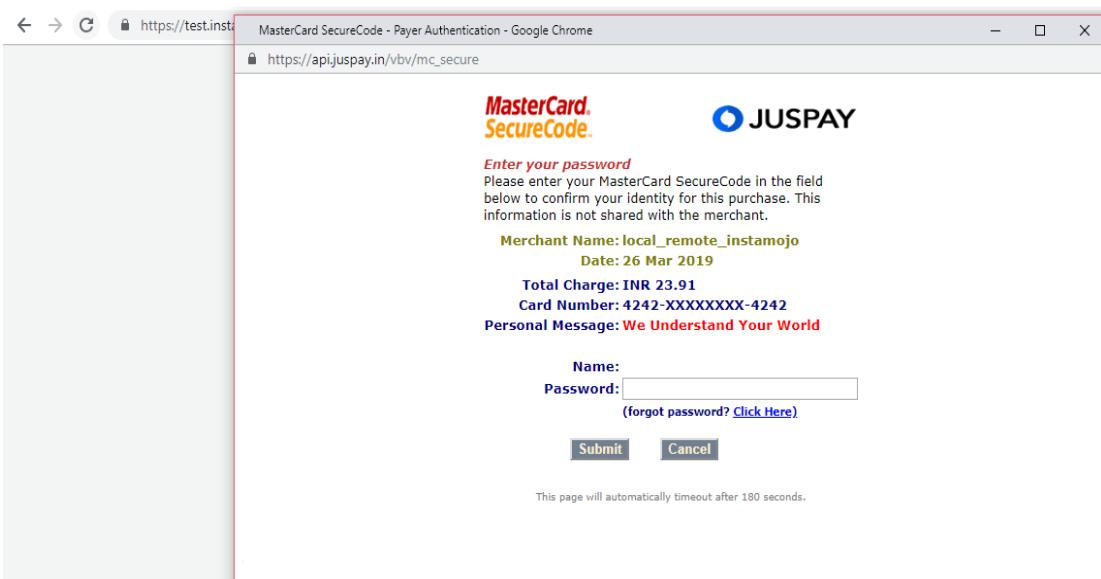
### 8.1.3.3 Payment information



The screenshot shows a payment form for 'Paying to Vethics Solutions'. The purpose of payment is '4 Month Plan' and the amount is ₹23.91. The card number field is highlighted with a red border, indicating it is required. Below the card number fields are dropdowns for 'Expiry MM / YY' and 'CVV'. A large green button at the bottom says 'PAY ₹23.91'. At the bottom of the page, there is a note about agreeing to Terms & Privacy, and logos for MasterCard SecureCode, PCI DSS, and Verified by VISA.

Fig 8.1.3.3 Instamojo payment credit card information

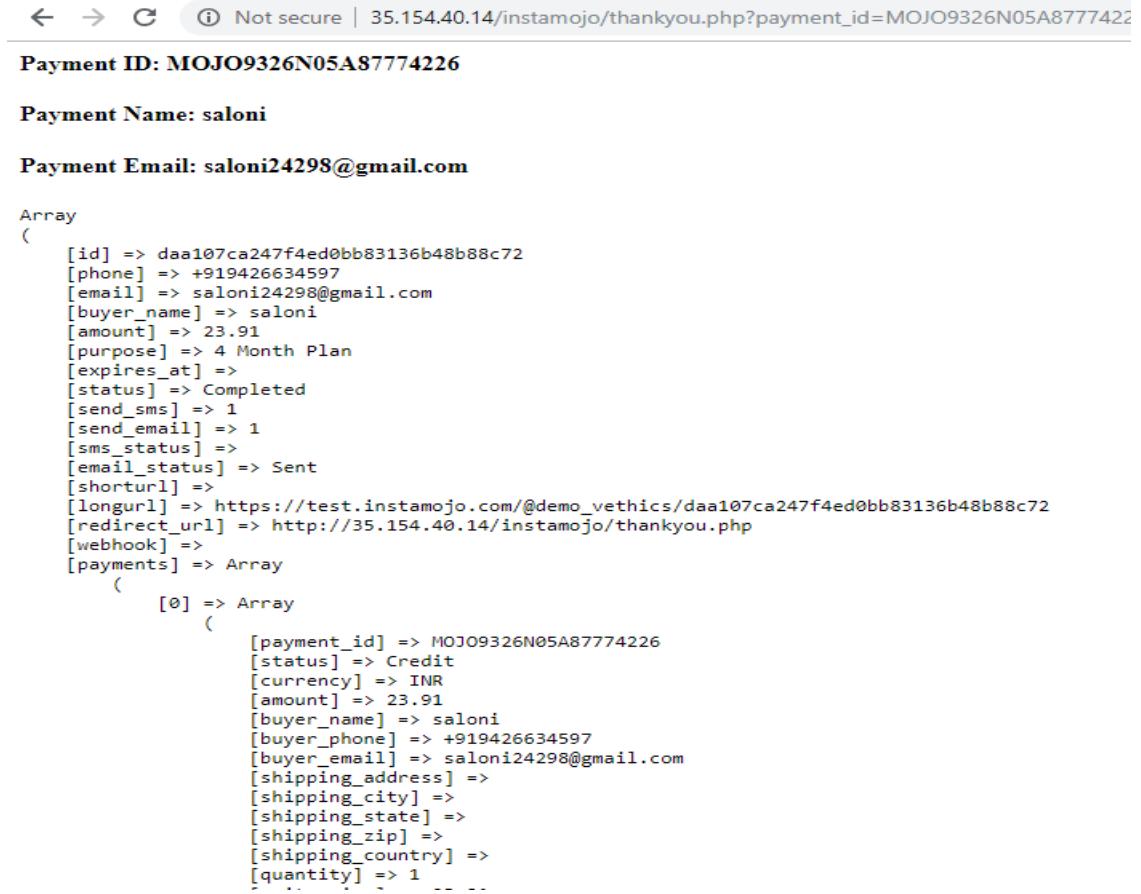
### 8.1.3.4 Payment authentication



The screenshot shows a payment authentication page for 'MasterCard SecureCode - Payer Authentication'. It displays the total charge as INR 23.91, the card number as 4242-XXXXXX-4242, and a personal message: 'We Understand Your World'. There are fields for 'Name:' and 'Password:' with a 'Forgot password?' link. At the bottom are 'Submit' and 'Cancel' buttons. A note at the bottom states: 'This page will automatically timeout after 180 seconds.'

Fig 8.1.3.4 Instamojo payment authentication

### 8.1.3.5 Payment success redirection



The screenshot shows a browser window with the URL [35.154.40.14/instamojo/thankyou.php?payment\\_id=MOJO9326N05A87774226](https://35.154.40.14/instamojo/thankyou.php?payment_id=MOJO9326N05A87774226). The page displays payment details:

**Payment ID:** MOJO9326N05A87774226

**Payment Name:** saloni

**Payment Email:** saloni24298@gmail.com

```

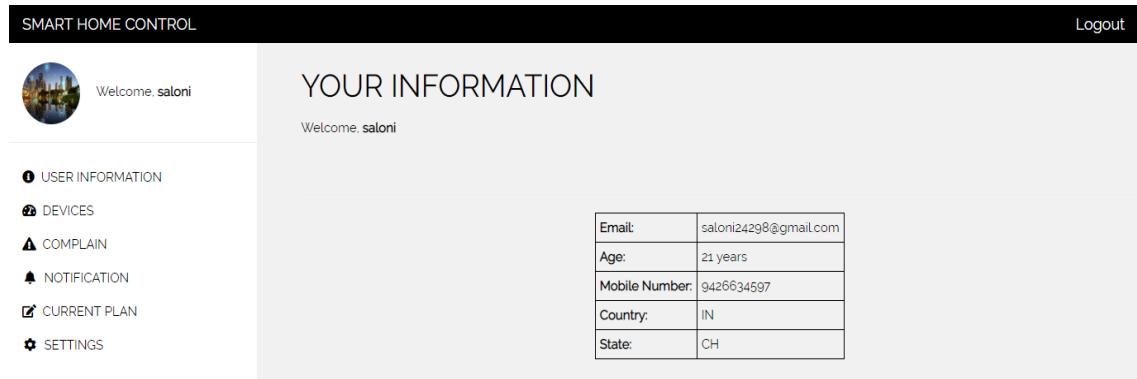
Array
(
    [id] => daa107ca247f4ed0bb83136b48b88c72
    [phone] => +919426634597
    [email] => saloni24298@gmail.com
    [buyer_name] => saloni
    [amount] => 23.91
    [purpose] => 4 Month Plan
    [expires_at] =>
    [status] => Completed
    [send_sms] => 1
    [send_email] => 1
    [sms_status] =>
    [email_status] => Sent
    [shorturl] =>
    [longurl] => https://test.instamojo.com/@demo_vethics/daa107ca247f4ed0bb83136b48b88c72
    [redirect_url] => http://35.154.40.14/instamojo/thankyou.php
    [webhook] =>
    [payments] => Array
        (
            [0] => Array
                (
                    [payment_id] => MOJO9326N05A87774226
                    [status] => Credit
                    [currency] => INR
                    [amount] => 23.91
                    [buyer_name] => saloni
                    [buyer_phone] => +919426634597
                    [buyer_email] => saloni24298@gmail.com
                    [shipping_address] =>
                    [shipping_city] =>
                    [shipping_state] =>
                    [shipping_zip] =>
                    [shipping_country] =>
                    [quantity] => 1
                    ...
                )
            ...
        )
    ...
)

```

Fig 8.1.3.5 Instamojo payment success

### 8.1.4 User Panel screenshots

#### 8.1.4.1 User information



The screenshot shows the User Panel interface. The left sidebar includes links for User Information, Devices, Complain, Notification, Current Plan, and Settings. The main area displays "YOUR INFORMATION" with a table of user details:

Email:	saloni24298@gmail.com
Age:	21 years
Mobile Number:	9426634597
Country:	IN
State:	CH

Fig 8.1.4.1 User information in User Panel

### 8.1.4.2 User Devices

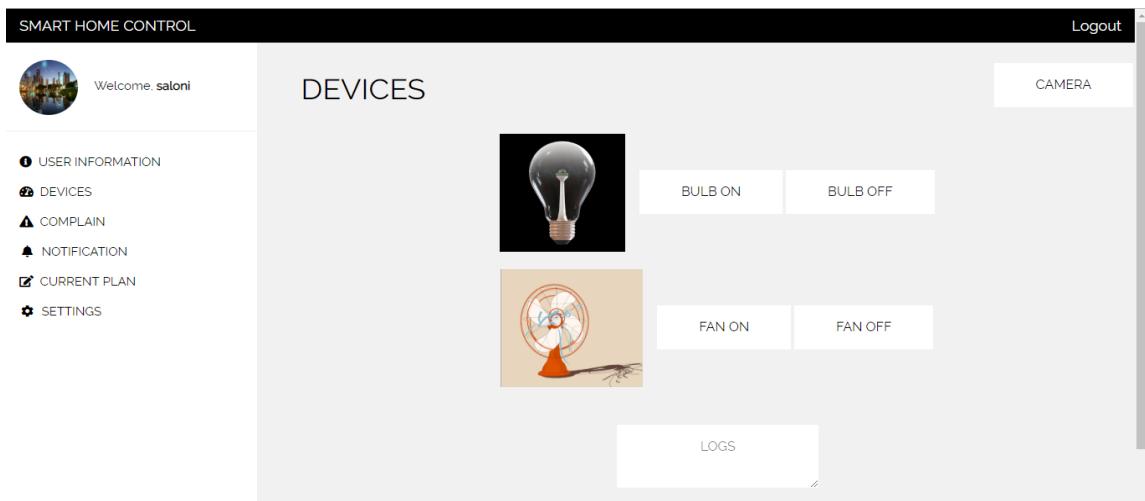


Fig 8.1.4.2 User devices in User Panel

### 8.1.4.3 User Complain portal

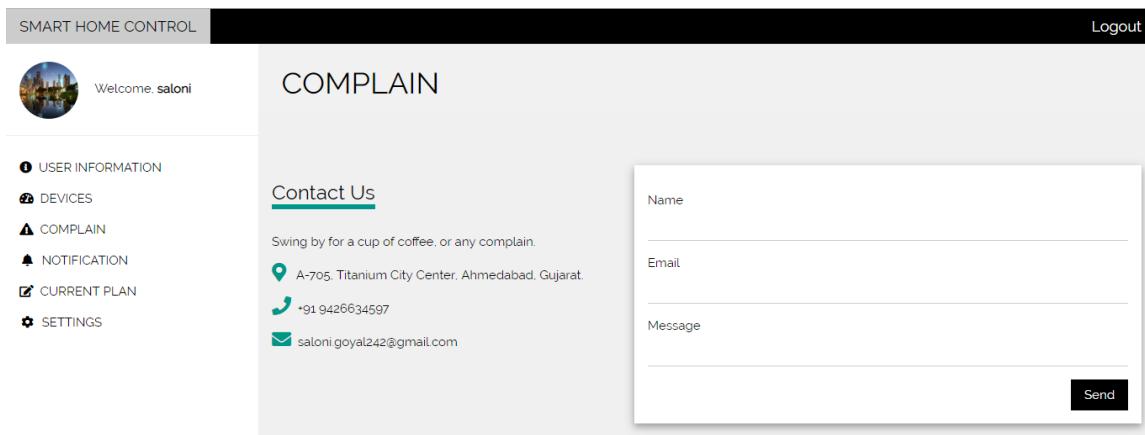


Fig 8.1.4.3 User complain portal in User Panel

### 8.1.4.4 User notifications

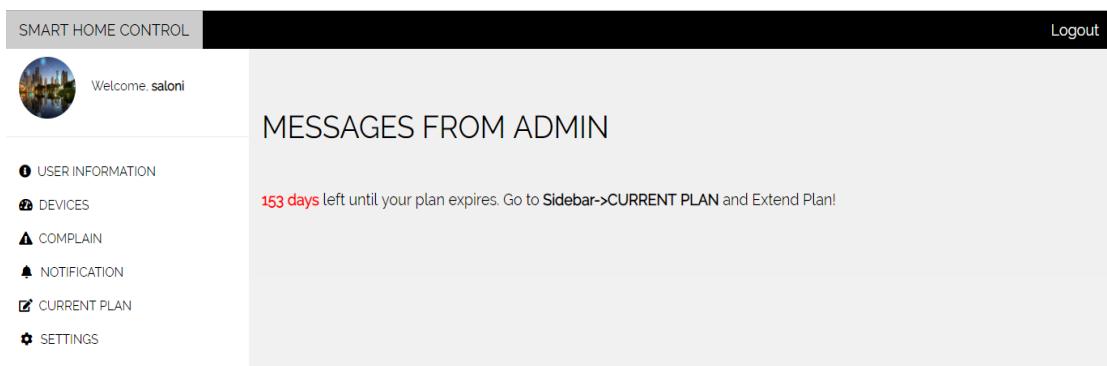


Fig 8.1.4.4 User notifications from admin in User Panel

### 8.1.4.5 User current plan

Name:	4 Month Plan
Devices:	3 devices allowed
Subscription date:	2019-03-26
Cost:	20 INR

Deactivate plan

Request Plan Reactivation

LOOK FOR ANOTHER PLAN

Request Plan Extension

Fig 8.1.4.5 User's currently subscribe plan details in User Panel

### 8.1.4.6 User update information

CHANGE PROFILE PICTURE

UPDATE INFORMATION

Name

E-mail

Password

Age

Mobile No

UPLOAD

Request to Update Address

Fig 8.1.4.6 User information update in User Panel

### 8.1.4.7 IPCam feature

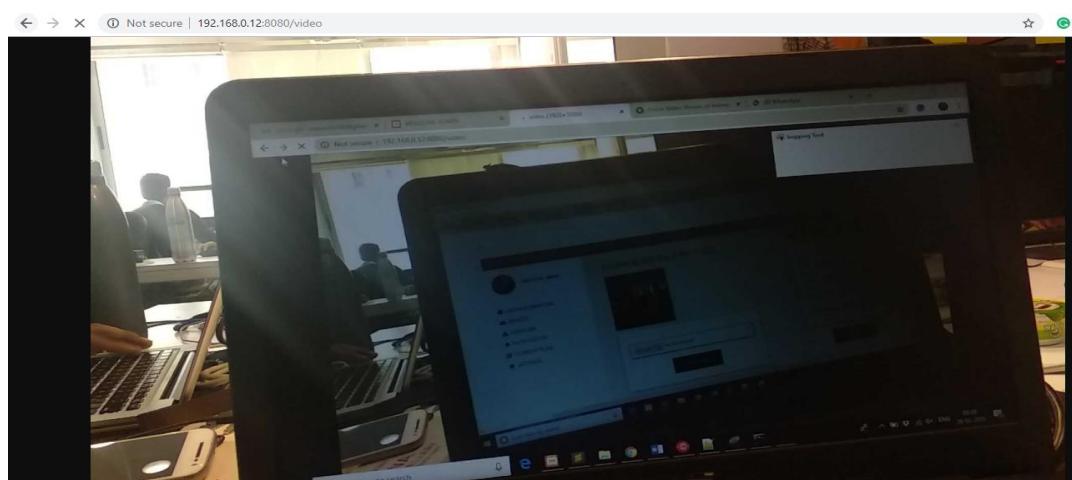


Fig 8.1.4.7 Camera feature in User Panel

## CHAPTER 9

# LIMITATIONS AND FUTURE ENHANCEMENTS

### **9.1 LIMITATIONS**

Some of the limitations of the system are:

- Ability to work only in online environment.
- Users from rural areas will find it difficult to access or even operate our system.
- Complex hardware requirements of the system may be difficult to grasp.
- Router is a mandatory component for the system to work successfully.
- As the router is used, number of devices supported for automation will be limited.
- Manual entries for new subscribers are required in the database.
- Manual code for every device is required.

### **9.2 FUTURE ENHANCEMENT**

These are some problems in our system which can be catered in the future with implementation of advanced and far more reachable technology. This will help more and more users to enjoy the perks of this system.

- Solve internet availability issues.
- Prevent the manual entries in code.
- Subscriber can add a new device or delete the existing device whenever they want.
- SMS functionality; wherein subscriber can get a notification of the device's behaviour and can access the device from their smart phones.

# CHAPTER 10

## CONCLUSION AND DISCUSSION

### 10.1 CONCLUSION

This project is an initiative to blend into the era of home automation using affordable means. The financial aspect of this system was contained by using minimum hardware. This system is designed to automate basic appliances and is effective with small number of devices.

To complete our project, we first understood the need for such a system, then we gathered relevant data and built a basic architecture to work upon it. After that, we started the designing and coding phase for the actual implementation of the system. Furthermore, we integrated all the modules and performed unit testing on each module separately.

### 10.2 DISCUSSION

#### 10.2.1 SELF ANALYSIS AND PROJECT VIABILITY

To make this project viable, we added as numerous functionalities to improve the reach and working. Some of these functionalities are granting and revoking access of devices to the subscriber, viewing notifications from service provider, subscribing to plans, CRUD on subscribers and plans by service providers etc.

#### 10.2.2 SUMMARY OF PROJECT WORK

Our project is made to enhance the reach of home automation by making it affordable. A subscriber can request a service provider to automate their home by subscribing to a plan. The subscriber can then enjoy the perks of home automation after the hardware installation and connection. They can also complain or enquire, view messages from service provider by the user panel provided to them.

The service provider can revoke or grant the access of devices to the subscriber according to the payment status. They can also perform CRUD operations on subscribers and plan. Moreover, they can view or filter the transaction history of all the subscribers using the system and manage the website content dynamically.

This system is a demonstration of future homes wherein home automation will become a necessity. So, to be a part of the new era of emerging technology, one must be able to experience it beforehand. We have used all the already existing resources present so as to minimize the cost associated with the project. Still, there are few hardware requirements which are needed to be met for the successful completion of the system. So, this system intends to make everyone's lives easier at affordable rates.

## REFERENCES

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<https://www.hackerrahul.com/2017/10/integrate-instamojo-payment-gateway-php-mysql/>

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<https://www.geeksforgeeks.org/>

## EXPERIENCE

This training was successful on all the fronts; technical, social and professional. We were able to accomplish the milestones designed for us by the external guide. He was helpful and guided us throughout the tenure of our training by always tending to our doubts. The internal guide kept us in track by supervising our work and suggesting improvements wherever required.

We learnt to work in an industrial environment and it helped us to gain an insight into the corporate world. In sum, this training was a good experience and we look forward to work with the company again in future.