A Major Final Report on

Accommodation Partner

Submitted in Partial Fulfillment of the Requirements for

The Degree of **Computer and Software Engineering**

Under Pokhara University

Submitted by:

Paras Poudel, 15770

Sachet Moktan, 15327

Shankar Ghimire, 15332

Under the supervision of

Er. Rabina Chaudhary

Date:

23 Nov, 2019

Department of Computer Engineering

NEPAL COLLEGE OF

INFORMATION TECHNOLOGY

Balkumari, Lalitpur, Nepal

Acknowledgement:

This project would not have been possible without the joint efforts of many individuals. It has been a pleasure for us to acknowledge the assistance and contributions that were very important and supportive throughout the project .We would like to express our deepest appreciation to all those who provided us the possibility to complete this project.

A special gratitude to our project supervisor **Er.Rabina Chaudhary**, whose contribution in stimulating suggestions and encouragement, helped us to coordinate our project. We express our profound gratitude to our project coordinator **Dr.Roshan Chitrakar** for inspiring and supporting us during the entire project. Last but not least, many thanks goes to **Er.Resha Deo**, HOD, Department of Computer Engineering and **Er.Birendra Bista**, HOD, Department of Software Engineering, for their continuous encouragement and support throughout the project. We express our deepest appreciation to all other supervisors, faculty teachers who help and guide to complete our project and many thanks to our classmates for helping and correcting us in our mistakes, thanks to their comments and advices that have helped to improve our skills.

Furthermore, we wish to express our heartfelt gratitude to our families, parents and friends, who have always served as the strongest source of inspiration in all our ventures we have undertaken.

Shankar Ghimire-15332
Paras Poudel-15770
Sachet Moktan-15327

Nepal College of Information Technology,

Balkumari, Lalitpur, Nepal

Abstract:

Accommodation Partner is a website whose primary focus is to provide landlords to host their housing properties for vacations rentals and homestay as well as its secondary focus is to provide hotel owners to host their rooms. This website will keep the record of housing properties available for HHV and publish them in the website for customers or tourists for booking. Accommodation Partner publishes the properties available with their specifications like title, name, Description, city, street, rate per day, location, and landlord info. Accommodation partner builds a communicational channel for customers and the property owners to communicate each other in an easy online way .Due to this, there is no need to visit various places in search of desired vacation rentals and homestay. Accommodation Partner is beneficial to both the party's i.e. landlord and the customers, which will eventually save time and effort which will be spent on searching desired HHV. Landlords can host their housing properties in a few clicks and the customers can easily search the suitable HHV. The main purpose of this project is to give a platform where landlords and hotel owners can host their housing properties and hotel rooms respectively which will help landlords and hotel owners to publish their properties and have a big market opportunity and uplift economy, as well as provides the platform to customers where they can pick the desired HHV via online from their home which saves time and effort.

Keywords: host, Accommodation Partner, landlord, vacation rentals, homestay, HHV

Table of Contents

List of Figures

List of Tables

List of abbreviations:

HHV	Hotel, Homestay and Vacational Rental
JS	JavaScript
CSS	Cascading Style Sheets
SCSS	Sassy Cascading Style Sheets
HTML	Hyper Text Markup Language
DFD	Data Flow Diagram
ER	Entity Relationship
SQL	Structured Query Language
NoSQL	Not Only SQL
SRS	System Requirement Specification

1. Introduction:

Accommodation Partner is a website which provides landlords to host their housing properties for vacation rentals and homestay as well as provides hotel owners to host their available rooms. Accommodation Partner publishes the properties host by their landlords and make them available for the customers or tourists with their specifications like title, name, Description, city, street, rate per day, location, and landlord info. Accommodation partner builds a communicational channel for customers and the property owners to communicate each other in an easy online way. Landlord offers the services such as lodging, fooding and homestays as mentioned in the specification in their post. Landlord always gets to pick their price.

No matter what kind of HHV you have to share, Accommodation Partner makes it simple to host and make them available for travelers and tourists. This website does not own any of the real estate listings, nor does it host homestays, it only acts as a broker or bridge between the landlord and customers. Customers are in full control of landlord's house rules, pricing and services in vacations rentals and homestay. The specifications of various rooms, house, vacations rentals and homestay can be found with their locations. Thus, with the help of Accommodation Partner, there is no need to visit various places in search of HHV. If you have an extra room, many rooms or entire home, you can earn money by sharing it with anyone in the world.

Searching HHV is the most tedious work which results in loss of energy, valuable time and still people don't get the desired HHV they are dreaming of. Thus, Accommodation Partner is beneficial to both the party's i.e. providing a communication channel between landlord and the customers, which will eventually save time and effort for customers and land owners and hotel owners are benefited by the mass market opportunity and publicity.Customers can experience the holiday with our vacation rentals and homestay plans. Landlords and hotel owners publishes their house as a package like vacation rentals and homestay. Every fooding and lodging facility is given by the Owners if they have mentioned it in specification and description of the HHV.

1.1 Problem Statement:

Most of people want the perfect HHV in perfect location to stay and spend time which suits for their lifestyle. But in context of Nepal, especially inside Kathmandu valley, it's hard to search the desired HHV that are around us. There are so many outstanding hotels which are providing extraordinary service and landlords which are hosting their properties for vacational rental and homestays. Thus, Accommodation partner helps them to publish their services in an online platform where there are more customers and opens a big market opportunity and grow their business as well as a means for publicity.

Searching the room is the most tedious work which results in loss of energy, time and still people don't get their desired HHV they are dreaming of. Thus, Accommodation Partner, builds a communicational channel for customers and the property owners to communicate each other in an easy online way .Due to this, there is no need to visit various places in search of HHV. Customers can directly book the desired HVV in their desired date and the period they want to stay.

It can be used to uplift the Tourism. Some of the travelers or tourists who are visiting don't want to live in hotel and they prefer homestay or vacation rentals for certain period of time. Thus, Accommodation partner is an online web platform where landlords and hotel owners can host their housing properties and hotel rooms respectively which will help landlords and hotel owners to publish their properties, as well as provides the platform for customers where they can pick the desired HHV host by landlords or hotel owners via online from their home which saves time and effort.

1.2 Project Objective:

The major objective of our project includes:

- To promote online based HHV booking system.
- To provide both the parties, a simple online way of searching and hosting the HHV.
- To provide the bridge between the landlord and the customers.
- To provide landlords to host their housing properties no matter what kind of HVV they have.
- To minimize the tedious effort, for searching desired HHV as well as loss of energy and time by customers.
- To promote homestay and vacation rentals.
- To uplift the tourism by providing homestay and vacation rentals.
- To increase the annual income of the rural area by providing homestay and vacation rentals.

1.3 Significance of the study:

As we all know that searching the desired HHV and finding them are not easy and way more tedious task. There is a large gap between the property owner who can provide HHV and the customers which are willing to have HHV. Thus, to reduce these problems, Accommodation Partner acts as a bridge between the property owner and customers where landlords and hotel owners can host their housing properties and hotel rooms with their specification respectively which will help landlords and hotel owners to publish their properties, as well as provides the platform for customers where they can pick the desired HHV host by landlords or hotel owners via online in a few clicks from their home which saves time and effort.

Nowadays online booking system is the growing sector. When compared to traditional way of searching HHV, it was done walking door by door, thus, the idea of online booking is much more efficient and easy. The customer won't have to search HHV wasting their time and energy by walking door to door. They can just book the desired HHV they want by sitting in a corner of a room with an internet connection within a few clicks. The specification like title, name, Description, city, street, rate per day, location, and landlord info of the published HHV can be viewed so that it will be easy for customers to select and book desired HHV.

1.4 Project Scope and Limitations:

The scopes of our project are:

- Accommodation Partner involves building an online based platform for booking HHV.
- Accommodation Partner will deliver the detailed specifications of HHV available in the market for the customers which are hosted by landlords and hotel owners.
- Accommodation Partner project is developed for the shake of both parties, landlord and customers which will get benefit from this project.
- Accommodation Partner helps for landlord and hotel owners to host any HVV, no matter what kind of HVV they have.

The limitations of our project are:

- Not integrated any Nepali online payment system.
- No any means of verification to check the originality of the hosted HHV.

2. Literature Review:

In context of Nepal, there are many online rental websites but they seems to lack behind in terms of what customers actually needs. Some websites only sells or rents houses, rooms, flats and apartments etc. Some of them only deals with real states. There are few websites that sells used products and items as well. The provision of online rental is popular in foreign countries but in context of Nepal it is still in exploring verse.

2.1 Existing Sites:

We study the existing sites that has been used for providing rental services and facilitating owner and customers hand to hand.Some of the sites have been listed below with their features and lacking features.

1. Hamrobazaar [1]

Hamrobazaar is an online store and shopping site that is already prevailed in Nepal. It enables individuals as well as companies to list wide variety of new or used product online for free. It provides communication channel for connecting buyers and sellers. It provides all services such as buying and selling Automobiles, Books, Computer and Peripherals, Mobile and Accessories, Electronics, Furnishing and Kitchen appliances. This site has following features:

- It has a list of predefined List of Categories which is helpful for customers.
- It not only sells used products it has been providing brand new products.
- It has been providing rooms, flats and houses for rent as well as entered in real estate by selling houses and land.

While we were checking this site, we found that, it have some of the following limitations:

- Doesn’t work for specific market.
- Cash payment.

- Verify the product only on meeting Owner.
- Doesn't have a good UI.
- No any map is included to show the location of the product where it is available.

2. Rental Nepal [4]

Rental Nepal is a complete Real Estate Solutions. It offers communication channel for both the landowners and property owners. This site has following features:

- It lists the houses, flats, apartments and land for buying and selling.
- Offers shutters, shops, room for rent and space for lease.
- Provides news.

This website is good but this website is lacking some of features as listed below:

- Map integration.
- Cash Payment.

3. Airbnb [5]

Airbnb connects people with places to stay and things to do around the world. If you have an extra room, entire home, or expertise, you can earn money by sharing it with anyone in the world. You can host your home, activity, or do both.

. This sites has following features:

- Manage listing of their properties.
- Hosting as a team.
- Map integration.
- On demand performance data.

4. OYO Rooms:

OYO Rooms is a hotel aggregation based model that helps customers book a room with good facilities at low fares. It provide customers the most value for money, standardized budget hotel experience they can ever get. No headache of doing a thesis like research on which hotel to stay at the next time you travel. Just go to OYO Rooms and book a room.

This sites has following features:

- Provides customers the most value for money hotel experience.
- All Oyo rooms have same standardized rooms with clean AC rooms with comfortable beds, clean washrooms, Free WIFI and complimentary breakfast.

2.2 Comparison with the existing system:

Realizing the fact that, online rental websites which are already in existence, we came up with a new idea of "Accommodation Partner" to give more supreme facility of providing HHV to the users. We are extremely inspired by the architecture of Airbnb and Oyo rooms. We are somehow trying to extract some of their features in Nepalese hospitality industry. It is the combo of both Airbnb and Oyo. In context of Nepal, while comparing, we found that, it is the best decision we have made to deploy the concept because it offers some unique features like hosting HHV by landlords and hotel owners and new features like map integration, online payment system, manage bookings and renting.

3. Team and Role:

Name	Role	Responsibilities
Shankar Ghimire	Project Manager	Review and approve all project deliverables.
	Backend Developer	Coding according to the design specifications and deliver a final working system.
	Testing	Testing final deployment.
	Documentation	Develop Documentation.
Paras Poudel	System Design	Develop Conceptual diagram of the system and develop a user friendly interface of the project.
	Testing	Overall System Test.
	Documentation	Develop Documentation.
Sachet Moktan	Database Administrator	Ensure the security and integrity of the corporate database.
	UI design	Develop a User-friendly interface.
	Testing	Testing final deployment.
	Documentation	Develop Documentation.

Table 1: Team members and divided roles

4. Methodology:

Accommodation partner builds a communicational channel for customers and the property owners to communicate each other in an easy online way. This section presents detailed information about the software development process, project approach and the tool that we used for our project. Although various development models fit for this project but incremental model is best fits.

4.1 Software development process:

The framework we propose in development of this software is "Incremental Model", i.e. a method for software development where the product is designed, implemented, and tested incrementally. This model combines the elements of waterfall model with iterative philosophy of prototyping i.e. multiple development cycles take place here, making the life cycle a multi waterfall cycle. In Incremental model the whole requirement is divided into various builds. When an incremental model is used, the first increment is often a core product. That is, Basic requirements are addressed, but many supplementary features (some known, others unknown) remain undelivered. As a result of use and/or evaluation, a plan is developed for the next increment. The plan addresses the modification of the core product to better meet the needs of the customer and the delivery of additional features and functionality. This process is repeated following the delivery of each increment, until the complete product is produced. The block diagram of incremental model is as shown in Fig below.

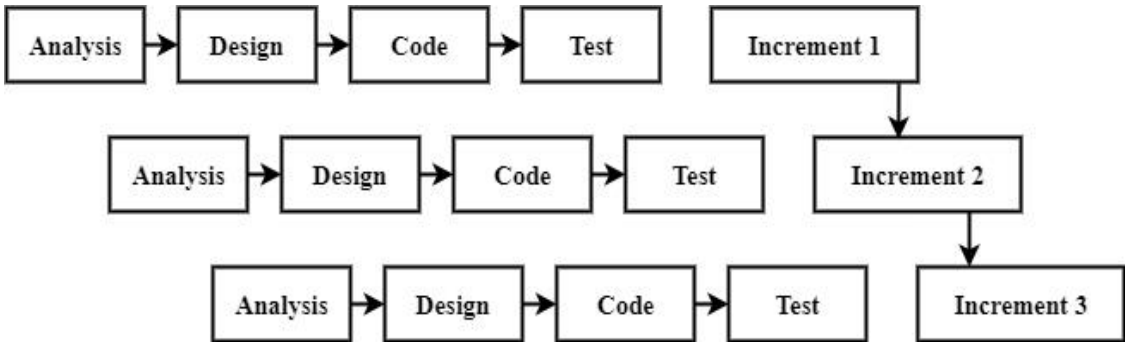

Figure 1: Incremental Model

The various phases of incremental model are as follows:

4.1.1 Analysis Phase

In this phase, analysis was performed in order to find out the requirements of the system. The outcome of this phase would be a SRS which is an acronym for "System Requirement Specification".

4.1.2 Design Phase

In this phase the SRS would be translated into the system's design. Context Diagram, DFD, ER-Diagram, Use Case Diagram and Class Diagram will be developed.

4.1.3 Coding Phase

In this phase, coding would be done according to the design and a working system is achieved/ developed by the end of this process.

4.1.4 Testing Phase

In This phase, the system would be tested. With each testing a list of changes to the system developed, is suggested and the changes will be applied to the software and the software would be delivered as a successive increment until a satisfying system is achieved.

4.2 Managing increments:

Each stage of incremental model adds some functionality to the product and passes it on to next stage. The first increment (generally known as a core product) was used for a detailed evaluation. This process resulted in creation of plan for the next increment. The iteration process, which includes the delivery of the increments to the user, continues until the software is completely developed, i.e. iteratively enhance the requirements until the final software is implemented.

Our project which implements the Increment Model, comprise of three increments which are discussed as below:

Increment 1

In this phase we will focus on analysis and design of our system with the help of the objectives of our project. This will helps us to figure out every aspects of the project and take them into consideration. A full-fledged website will be developed in this phase. We will developed initial project plan to help us in future increments. The system architecture which is an essential part will be developed during the initial iteration. The artifacts to be produced in this phase are:

- Initial system architecture (Project Blue print)
- System Modules
- Use-case diagram
- ER diagram
- Data-flow diagram
- Activity diagram
- Feasibility study
- Schedule Estimates

Work division In this phase we will work to design and development of the system interface and small server-side code. We design a interface as we like or which will be easy for us to manage the data and access of the data as we need. At this phase our system will be able to follow the following function.

- User Registration
- Login
- Integration of Database
- Design Home page
- Apply encryption for security

Increment 2

In this phase we will work on validating the system architecture with our backend. Some conclusions from the previous iteration are helpful in the future development of the system. We will seek the other features that we can include at the system. At this phase same process will be applied as the first increment. We will discuss more with the team at the time for the project and the validation for further development

The modules to be created in this phase are:

- Design and develop Rental detail page
- Integrate Google map for the location
- User can host/create their HHV
- Integrate AWS to upload image

Increment 3

In this, we will work on finalizing our deployment of the system for the initial part then we'll go through the entire system deployment which brings many challenges to the system. We will also make few changes to our system architecture as per the need. We have to make few other change to our artifacts. As considering this is the last phase for our project development we will work again for the other features if needed. We will validate all the system. We developed many things again.

The modules created and work done in this phase are:

- manage booking system
- Integrate stripe for online payment
- manage rental system
- overall system testing and debug
- finalize UI and server-side code

And finally we tested all the functionality of the system with its feature one by one. In this way we completed our project development.

Advantages of incremental model

- Generates working software quickly and early during the software life cycle.
- This model is more flexible-less costly to change scope and requirements.
- It is easier to test and debug during a smaller iteration.
- In this model customer can respond to each built.
- Lowers the initials delivery cost.
- Easier to manage risk because risky pieces are identified and handled during iteration.

Disadvantages of incremental model

- Needs good planning and design.
- Needs a clear and complete definition of the whole system before it can be broken down and built incrementally.
- Total cost is higher than waterfall.

When to use the Incremental model

- This model can be used if the requirements of the system are clearly defined and understood.
- Major requirements must be defined; however, some details can evolve with time.
- There is a need to get a product to the market early.
- Resources with needed skill set are not available.

5. Technical description of the Project:

For design and development of the system we used following tools and technologies. We have divided as below with the functionality.

5.1 Frontend:

Frontend is the first part of the project, it is the designing part of the project. For frontend we have following tools:

5.1.1 AngularJS:

Angular is a platform and framework for building client applications in HTML and Typescript. Angular is written in Typescript. It implements core and optional functionality as a set of Typescript libraries that you import into your apps. The basic building blocks of an Angular application are NgModules, which provide a compilation context for components. NgModules collect related code into functional sets. An app always has at least a root module that enables bootstrapping, and typically has many more feature modules.

5.1.2 HTML/HTML5:

Hypertext Markup Language (HTML) is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as SCSS (Sassy CSS) and Cascading Style Sheet (CSS) and scripting languages such as JavaScript. Latest version of the HTML is HTML5 so for this system we have used HTML5.

5.1.3 SCSS-Bootstrap:

SCSS (Sassy Cascading Style Sheet) is a preprocessor scripting language that is interpreted or compiled into Cascading Style Sheets (CSS) . It is an extension of CSS that enables you to use things like variables, nested rules, inline imports and more. It also helps to keep things organized and allows you to create style sheets faster.

Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first Frontend web development. It contains CSS and JavaScript based design templates for typography, forms, buttons, navigations, and other interface components.

5.1.4 JavaScript:

JavaScript often abbreviated as JS, is a high-level interpreted scripting language that conforms to the ECMAScript specification. Javascript has curly-braces syntax, dynamic typing, prototype-based object orientation, and first class functions.

5.2 Backend:

Backend development languages handle the behind-the-scenes functionality of web application. It is the code that connects the web to a database, manages user connections, and powers the web application itself. Backend development works in tandem with the frontend to deliver the final product to the end user. For development of the system we have used following tools:

5.2.1 Node.js-Express.js:

Node.js is an open source, cross-platform runtime environment for developing server-side and networking applications. Node is useful for developing applications that require a persistent connection from the browser to the server and is often used for real-time applications such as chat, news feeds and web push notifications. Node.js is intended to run on a dedicated HTTP server and to employ a single thread with one process at a time. Node.js applications are event-based and run asynchronously. Code built on the Node platform does not follow the traditional model of receive, process, send, wait, receive. Instead, Node processes incoming requests in a constant event stack and sends small requests one after the other without waiting for responses.

Express.js, or simply Express, is a web application framework for Node.js. It is designed for building web applications and APIs. It has been called the de facto

standard server framework for Node.js. It provides us the tools that are required to build our app. It is flexible as there are numerous modules available on npm (Node Package Manager), which can be directly plugged into Express.

5.3 Database Management System

A database management system (DBMS) is a software package designed to define, manipulate, retrieve, and manage data in a database. A DBMS generally manipulates the data itself, the data format, field names, and file structure. It also defines rules to validate and manipulate this data.

5.3.1 NoSQL-MongoDB:

NoSQL is a class of database management systems (DBMS) that do not follow all of the rules of a relational DBMS and cannot use traditional SQL to query data. The term is somewhat misleading when interpreted as "No SQL," and most translate it as "Not Only SQL," as this type of database is not generally a replacement but, rather, a complementary addition to RDBMSs and SQL particularly prone to performance problems caused by the limitations of SQL and the relational model of databases.

MongoDB is a NoSQL database which stores the data in form of key-value pairs. It is an Open Source, Document Database which provides high performance and scalability along with data modeling and data management of huge sets of data in an enterprise application.MongoDB also provides the feature of Auto-Scaling. Since, MongoDB is a cross platform database and can be installed across different platforms like Windows, Linux etc.

5.4 Packages and Module

5.4.1 NPM:

Node Package Manager (NPM) is a package manager for the JavaScript programming language. It is the default package manager for the JavaScript runtime environment Node.js. It consists of a command line client, also called npm, and an online database of public and paid-for private packages, called the NPM registry. The registry is accessed via the client, and the available packages can be browsed and searched via the npm website.

5.4.2 Google Map API:

Google Map API (application program interface)lets you customize maps with your own content and imagery for display on web pages and mobile devices. The Maps JavaScript API features four basic map types (roadmap, satellite, hybrid, and terrain) which you can modify using layers and styles, controls and events, and various services and libraries.

5.4.3 AWS:

Amazon Web Services (AWS) is the market leader in IaaS (Infrastructure-as-a-Service) and PaaS (Platform-as-a-Service) for cloud ecosystems, which can be combined to create a scalable cloud application without worrying about delays related to infrastructure provisioning (compute, storage, and network) and management. Amazon Web Services offers a broad set of global cloud-based products including compute, storage, databases, analytics, networking, mobile, developer tools, management tools, security, and enterprise applications: on-demand, available in seconds, with pay-as-you-go pricing. AWS has significantly more services, and more features within those services, than any other cloud provider.

5.4.4 Stripe:

Stripe Payments plugin allows you to accept credit card payments via Stripe payment gateway. The transaction info is also captured in the orders menu of the plugin. You can view all the payments you received from your Admin dashboard. In an e-commerce site, this an intermediary between the credit card companies and a *merchant account*. The payment gateway confirms that the charge can be made to the customer's credit card and passes that charge information to the merchant account. The payment gateway will report the results back to website too. The merchant account is what actually allows your business to accept credit card transactions. It coordinates the credit card transactions with your bank account.

5.5 Integrated Development Environment

is a software application that provides comprehensive facilities to computer programmers for software development. An IDE normally consists of: a source code editor, a compiler and/or an interpreter, build automation tools, and a debugger.

5.5.1 Visual Studio Code:

Visual Studio Code is a very powerful and easy-to-use code editor. It comes with broad programming language support, is highly customizable with various extensions and it is for free.

5.5.2 Git:

Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency. Git is easy to learn and has a tiny footprint with lightning fast performance.

5.5.3 GitHub:

GitHub is a code hosting platform for collaboration and version control. GitHub lets you (and others) work together on projects.

5.5.4 Postman:

Postman is an API(application programming interface) development tool which helps to build, test and modify APIs. Almost any functionality that could be needed by any developer is encapsulated in this tool. It has the ability to make various types of HTTP requests(GET, POST, PUT, PATCH), saving environments for later use, converting the API to code for various languages like JavaScript.

5.6 Documentation

5.6.1 Edraw Max:

Edraw Max is a 2D business technical diagramming software which helps to create diagrams, business charts, and engineering diagrams.

5.6.2 Draw.io:

Draw.io is an open source online diagram editor for building diagramming applications, and the world's most widely used browser-based end-user diagramming

5.6.3 Adobe Photoshop:

Adobe Photoshop is software that is extensively used for raster image editing, graphic design and digital art. It makes use of layering to allow for depth and flexibility in the design and editing process, as well as provide powerful editing tools, that when combined, are capable of just about anything.

5.6.4 Microsoft Office:

Microsoft Word allows us to create professional-quality documents and reports.

6. Requirement analysis

Requirement analysis, in software engineering encompasses those tasks that go into determining the need and conditions to meet for a new or altered product, taking account of possibly conflicting requirements of the various stakeholders, such as beneficiaries and users. It is the early stage activity of requirement engineering which encompasses all activities concerned with eliciting, analyzing, documenting, validating and managing system requirements.

6.1 System requirement specifications

6.1.1 Functional requirements

Id	Requirements	Priority
1	User is able to create new rental	high
2	User is able to manage its rentals and bookings	high
3	User is able to add data, edit, delete and access them from any place as they need	high
4	Owner is able to create/host HHV	high
5	User is able to book and make payment	high
6	Owner is able to manage booking i.e. accept booking or reject it	high
7	Owner is able to edit delete and upload the image in their HHV	high

Table 2: Functional requirements

6.1.2 Non-functional requirements:

The correct specification and adherence of non-functional requirements similarly plays at least an equal, if not a greater role in the success of the product. This is due to the following reasons:

Id	Requirements	Priority
1	The website works with normal speed	high
2	The system work properly on any browser	high
3	User is able to recovery the password and forget password	low

Table 3: Non-Functional requirements

6.2 Input requirements

6.2.1 Data Required

The data to be input are:-

User information

This contains user's username, email and password.

Rental information

This contains the rental details (Title, City, Street, category, image, bedroom, description, fooding facility, daily Rate) input by the owner.

Booking information

This contains the Booking details (Booking start At, Booking end at, Number of days, number of guest) which the user have to input.

Payment information

This contains the payment details Card details.

6.2.2 Source of data

The information will be given by the User themselves while registration, creating rental and at the time of booking and payment.

6.3 Input list and validation

The user inputs, for each, are categorized on the basis of entry by the user. User data is validated before they submit any details by the server-side. User data are tabulated below along with data description and validation which will be helpful in design phase.

User information

S.N	Input	Data type	Description
1	Username	Character	This will be user's username
2	Email	Character	This is the email of the user which will be used for login on the system
3	Password	Character	This is the password of the user which will be used for login on the system

Table 4: Input list and validation for user information

HHV information

S.N	Input	Data type	Description
1	Title	Character	This is the title of the HHV
2	City	Character	This is the name of city where HHV located
3	Street	Character	This is the name of street where HHV located
4	image	Character	This is the URL of image. URL is generated by AWS after uploading image
5	bedroom	Number	This is the total number of bedroom
6	description	Text	This is the full description of the HHV
7	fooding	Boolean	This is food facility that user can get or not in HHV
8	Daily rate	Number	This is the total daily Price of HHV

Table 5: Input list and validation for HHV information

Booking information

S.N	Input	Data type	Description
1	Start At	Date	This is the date from when HHV is reserved
2	End At	Date	This is the date from when HHV reservation end
3	Number of days	Number	Total number of days guest will stay in HHV
4	Number of guest	Number	Total number of guest who will be staying in HHV

Table 6: Input list and validation for booking information

6.4 Security requirements

Authentication

Authentication ensures that each entity involved in using a Web service-the requestor and the provider is what it actually claims to be. Authentication involves accepting credentials from the entity and validating them against an authority.

Authorization

Authorization determines whether the service provider has granted access to the Web service to the requestor. Basically, authorization confirms the service requestor's credentials. It determines if the service requestor is entitled to perform the operation, which can range from invoking the Web service to executing a certain part of its functionality.

Data protection

Data protection ensures that the Web service request and response have not been tampered with a route. It requires securing both data integrity and privacy. More about the data protection we have use encryption of data which make more secure in data protection.

7. System design and UML models:

A UML diagram is a diagram based on the UML (Unified Modeling Language) with the purpose of visually representing a system along with its main actore, roles, actions, artifacts or classes, in order to better understand, alter, maintain, or document information about the system. Most of common diagrams are:

7.1 Use case diagram:

A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved. The actors of our system are: User, System and administration. The simplified and graphical representation of what our system must actually do is represented. Use case diagram is as shown in figure below.

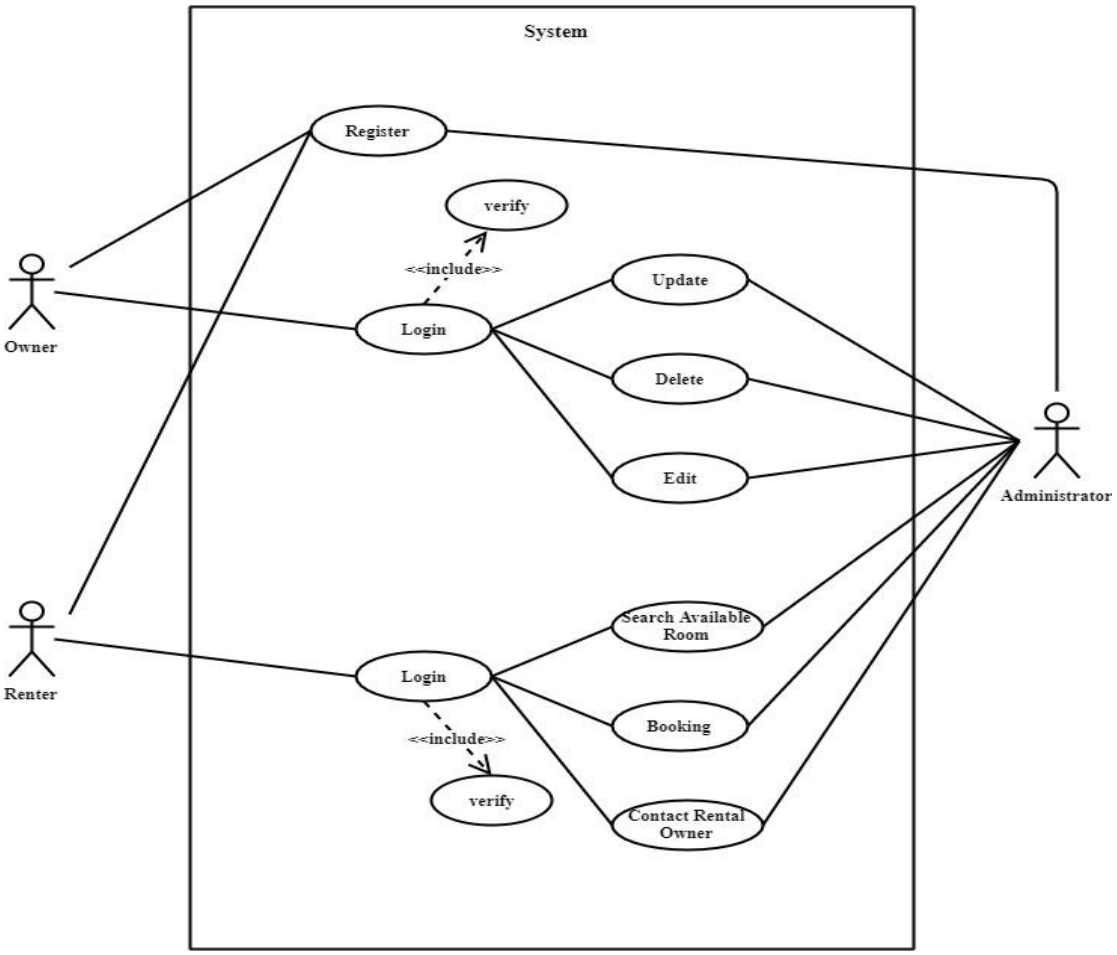

Figure 2: Use case diagram

7.2 ER-diagram

The ER diagram is a pictorial representation of the overall logical structure of the system's database. The ER diagram of our system is given below. It shows the relationship among the five entities of our system. The entities are represented in rectangle, their attributes are represented in the oval and the attributes that are underlined are the primary keys. ER diagram is shown below.

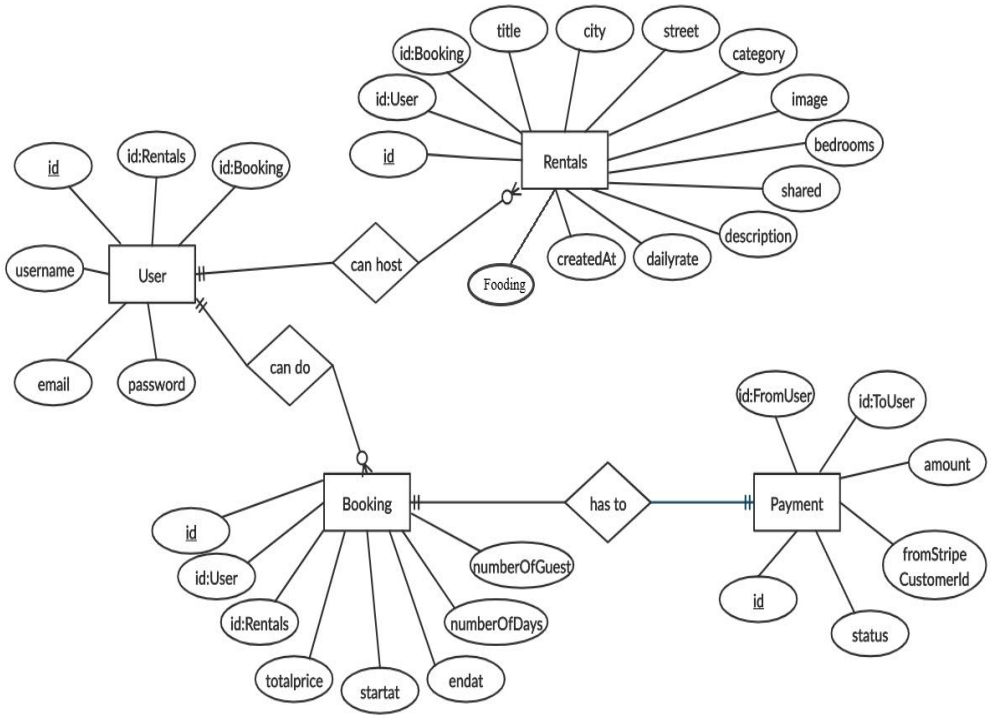

Figure 3: ER diagram

7.3 Activity diagram

An activity diagram shows the workflow from the start point to finish point. It is used to display the sequence of activities. The most significant activity diagrams are shown as following:

7.3.1 Activity diagram for creating HHV

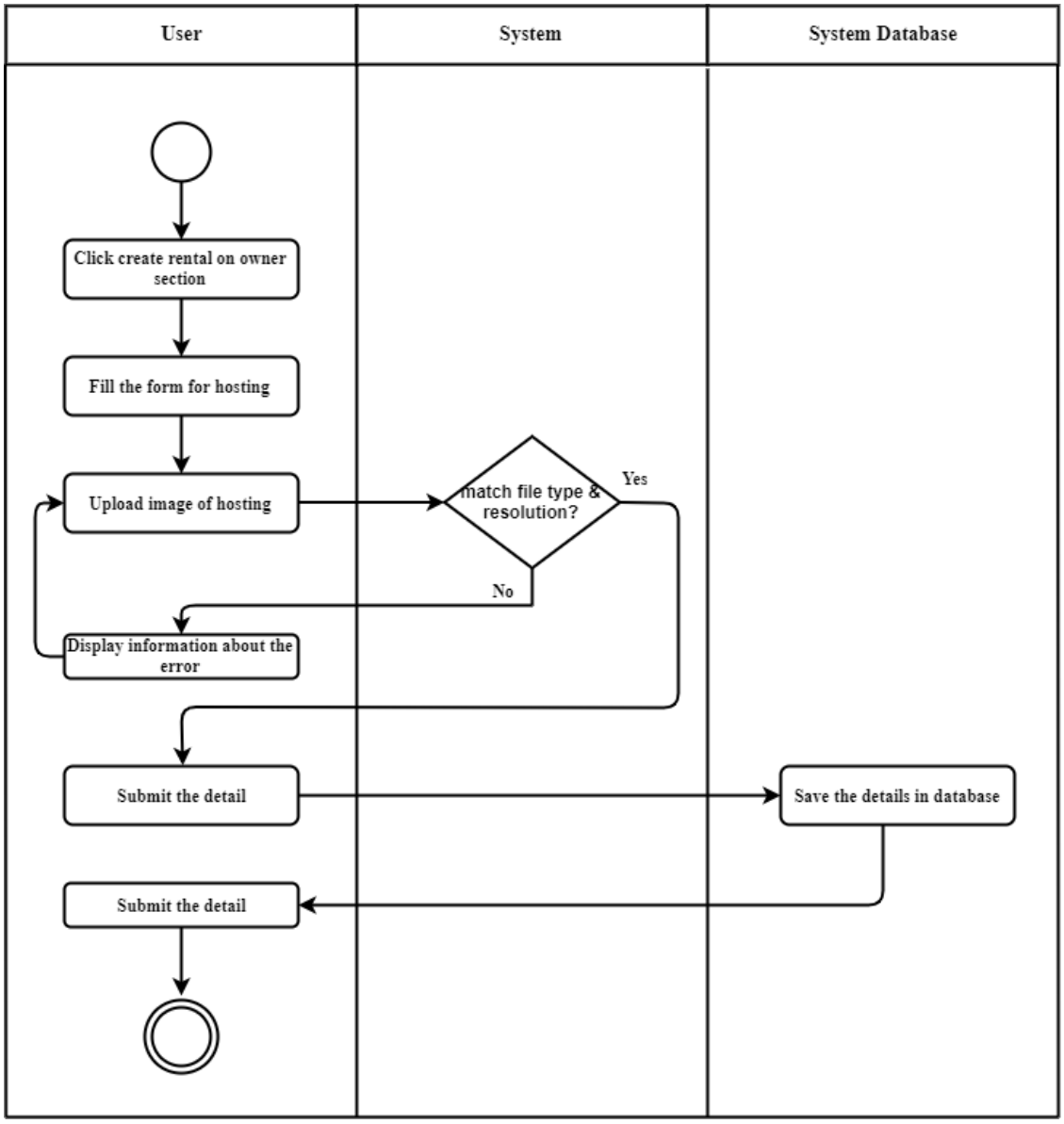

Figure 4: Activity diagram for creating HHV

7.3.2 Activity diagram for Booking System

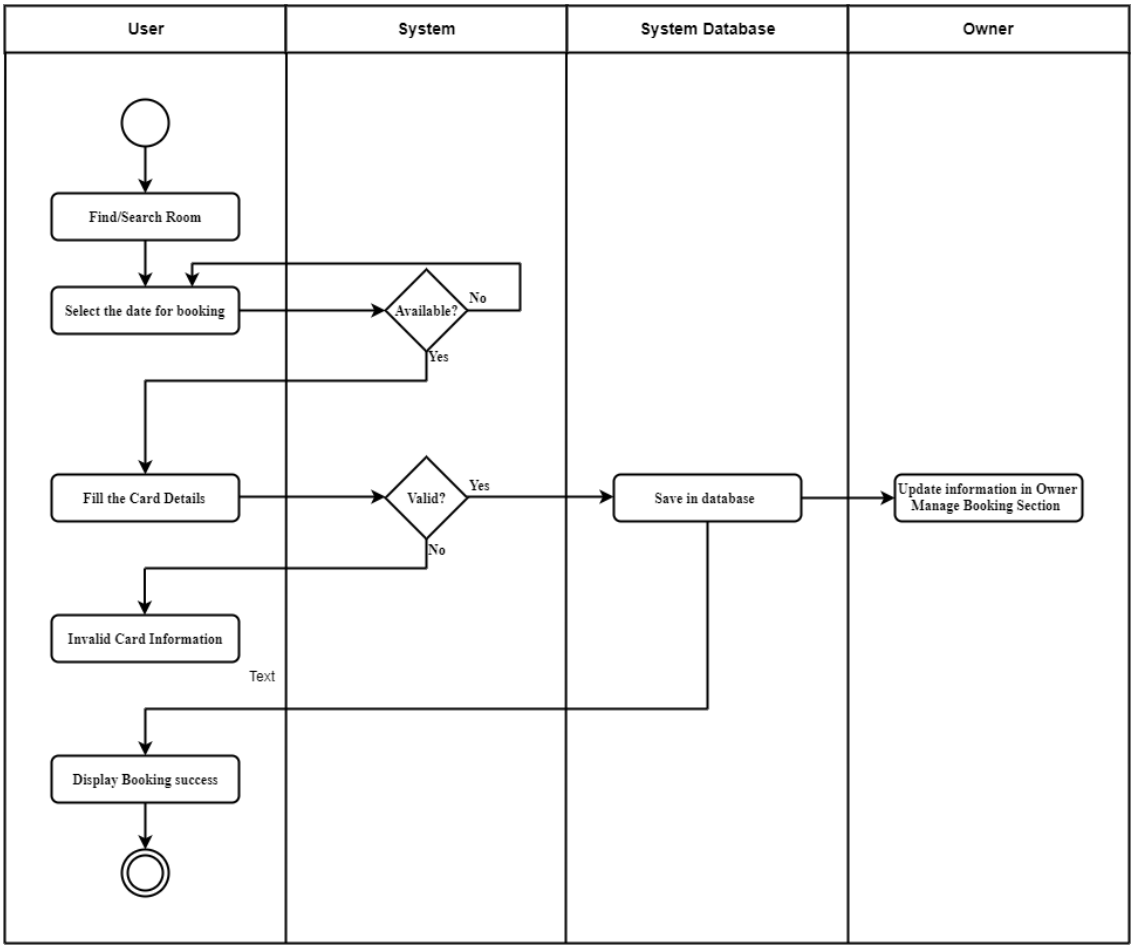

Figure 5: Activity diagram for booking system

7.4 Context diagram

A context diagram, sometimes called a level 0 data-flow diagram, is drawn in order to defined and clarify the boundaries of the software system. It identifies the flows of information between the system and external entities. The entire software system is shown as a single process.

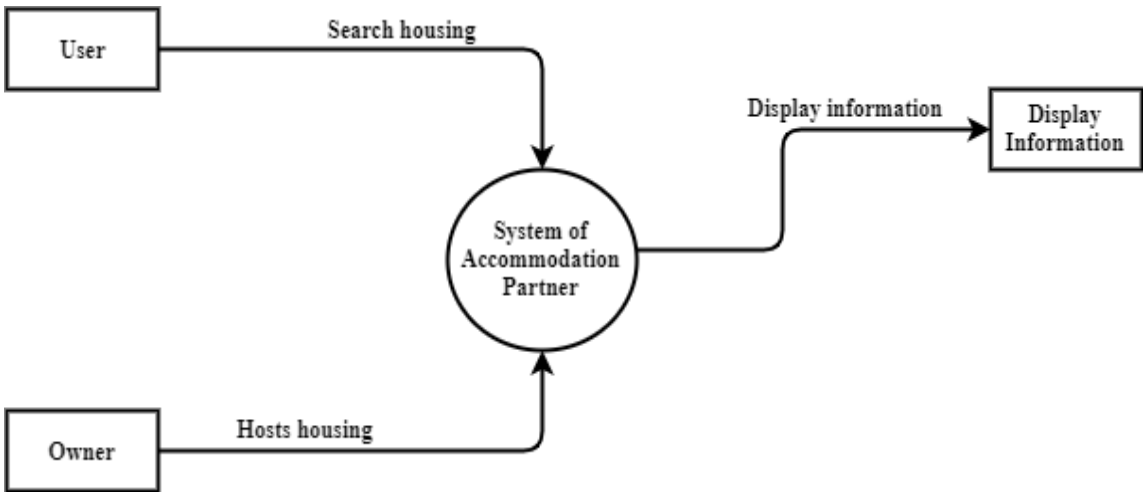

Figure 6: Context diagram

7.5 Dataflow diagram

A data flow diagram (DFD) is a graphical representation of the "flow" of the data through an information system, modelling its process aspects. We used DFD as a preliminary step to create an overview of the system, which can later be elaborated also be used for the visualization of data processing (structured design).

7.5.1 Dataflow diagram for HHV creation

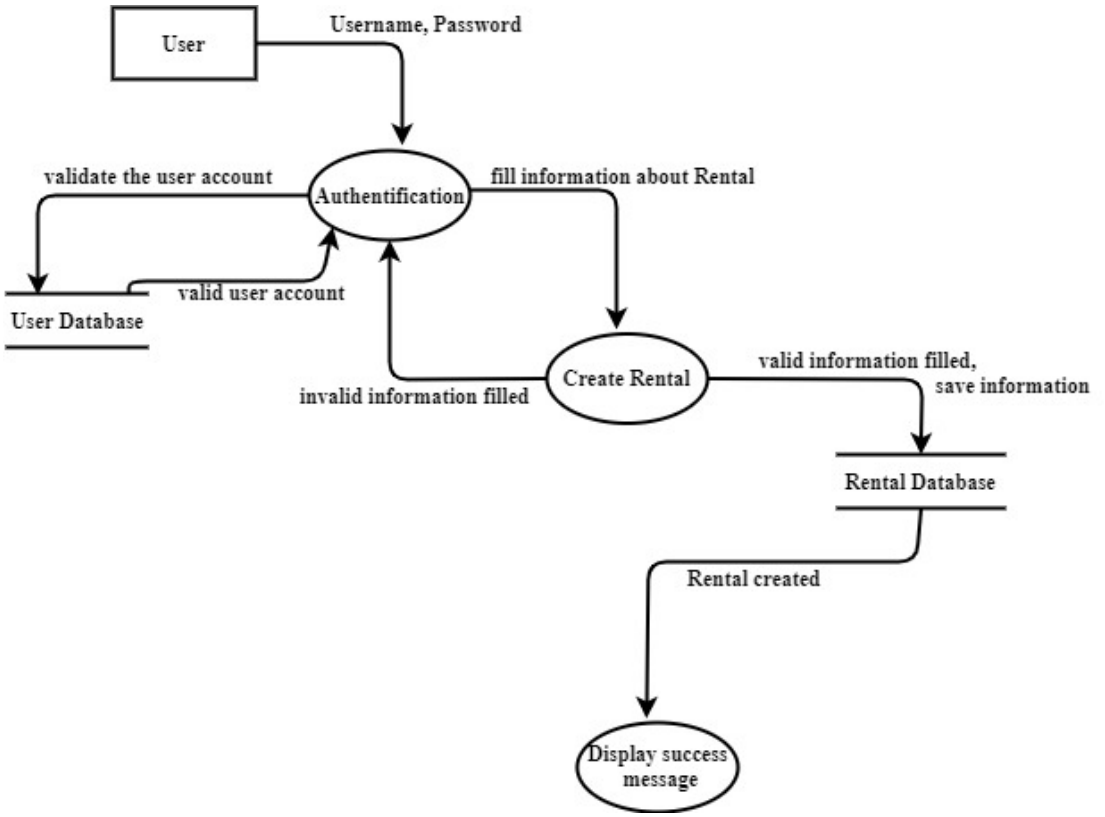

Figure 7: Dataflow diagram for HHV creation

7.5.2 Dataflow diagram for booking system

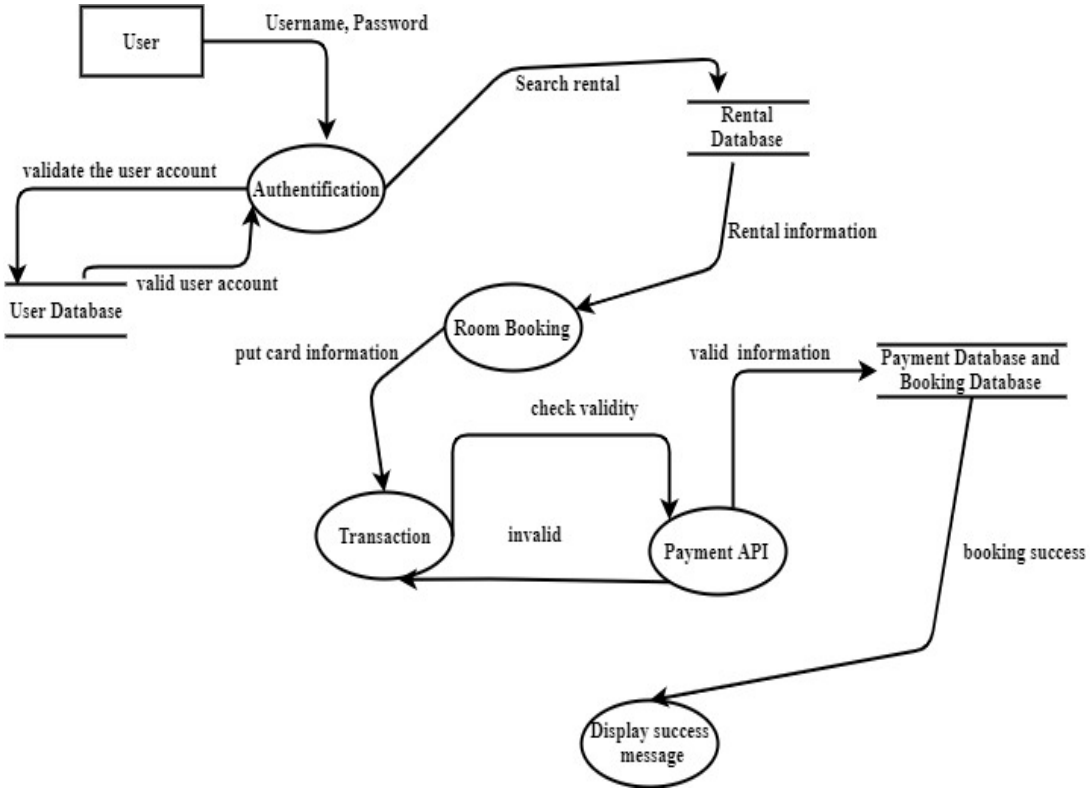

Figure 8: Dataflow diagram for booking system

7.6 Sequence diagrams

Sequence diagram is an interaction diagram. It shows how the events occur and in what order. For our system we have designed sequence diagrams for most critical and influential activities which are shown below.

7.6.1 Sequence diagram for login

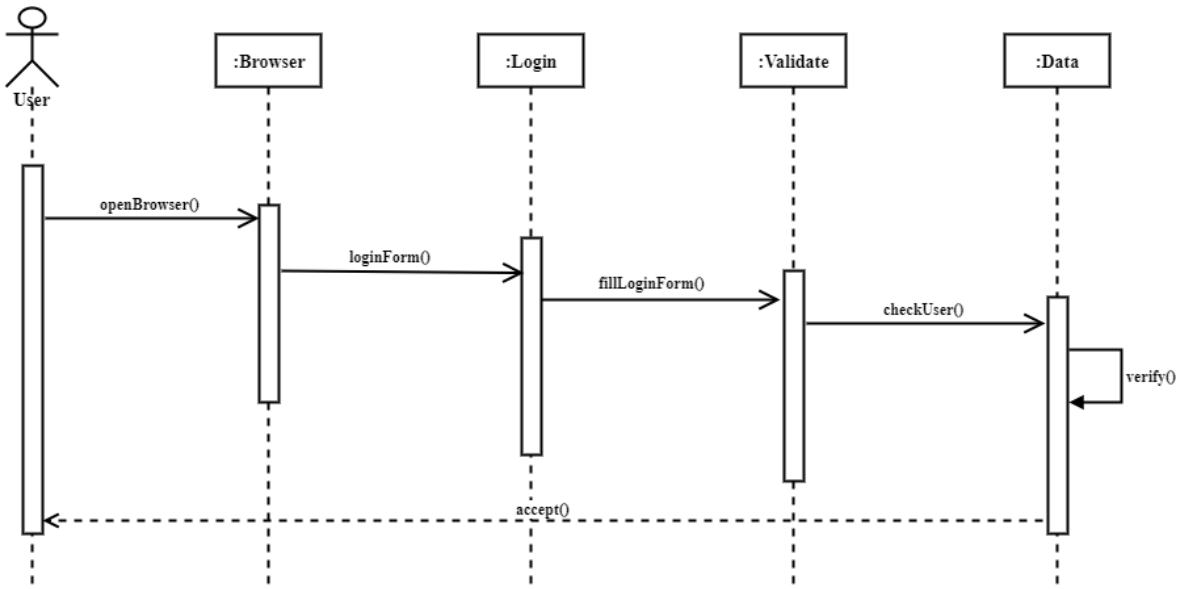

Figure 9: Sequence diagram for login

7.6.2 Sequence diagram for Creating HHV

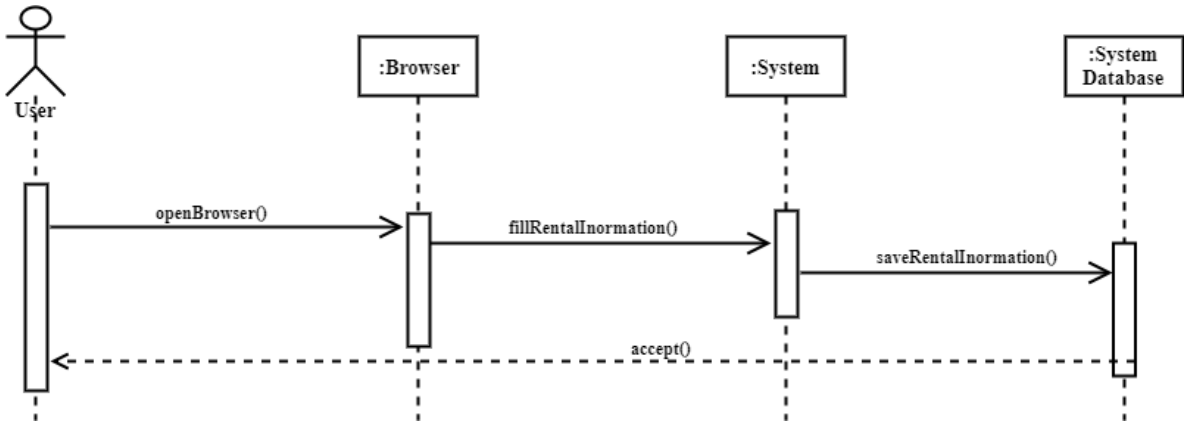

Figure 10: Sequence diagram for creating HHV

7.6.3 Sequence diagram for booking system

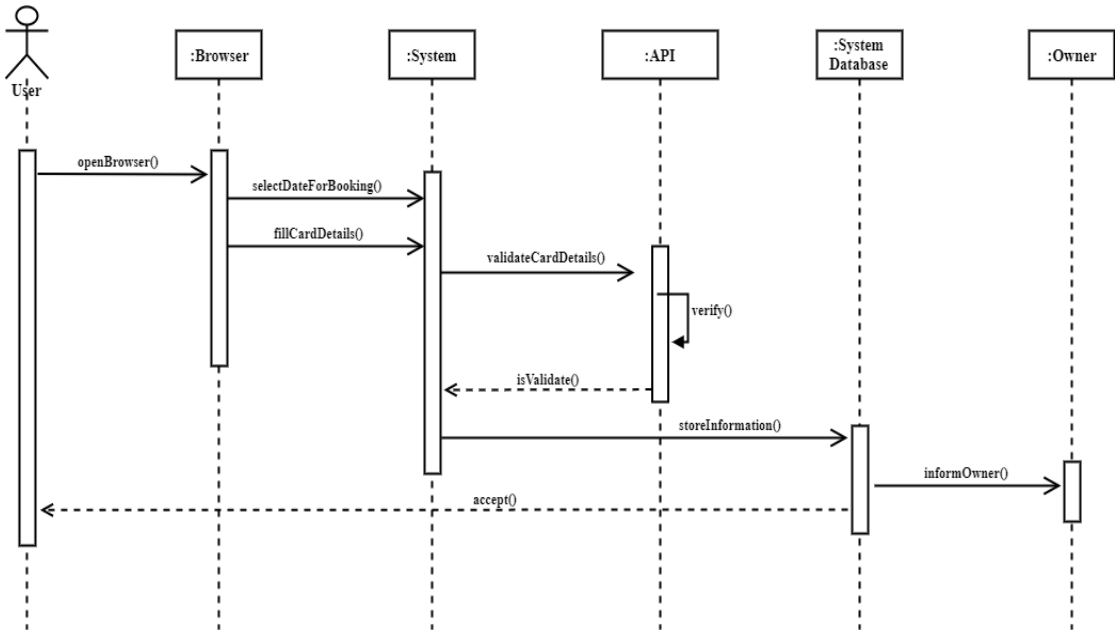

Figure 11: Sequence diagram for booking HHV

8. Testing

We wanted to make sure that all the elements of the developed worked functioned properly. For this, we created a test cases for our work, in which elements such as validation, reliability and user acceptance will be tested. The system will be tested for normal condition, primarily.

8.1 Testing table

Each unit of the system was tested for its correct and proper functionality. The unit testing of each components is illustrated in the table below:

No.	Unit	Test	Expected Result	Outcome	Evidence	Failure
1	Registration of user	Check whether a new account can be created on filling up required details.	User can successfully create their account	Successful	Test 1.1	
2	Registration of user with same email	Check whether a user can create new account using email which is already exist in the system	User cannot create their account	Successful	Test 2.1	
3	Login of existing user	Check whether an existing user can login to their account	User can successfully login their account	Successful	Test 3.1	

4	Encrypt the password	Check whether the password used by user is encrypted before saving in database	User password is successfully encrypted before saving in database	Successful	Test 4.1	
5	Creating HHV	Check whether the owner can create/host their HHV rental by filling up valid data	owner can successfully create/host their HHV	Successful	Test 5.1	
6	Payment	Check whether user can make payment from their credit/debit card	User can successfully make their payment through their card	Successful	Test 6.1	

Table 7: Testing table

8.2 Test evidences

Test 1.1: Registration of new user

Purpose: Check whether a new account can be created on filling up required details.

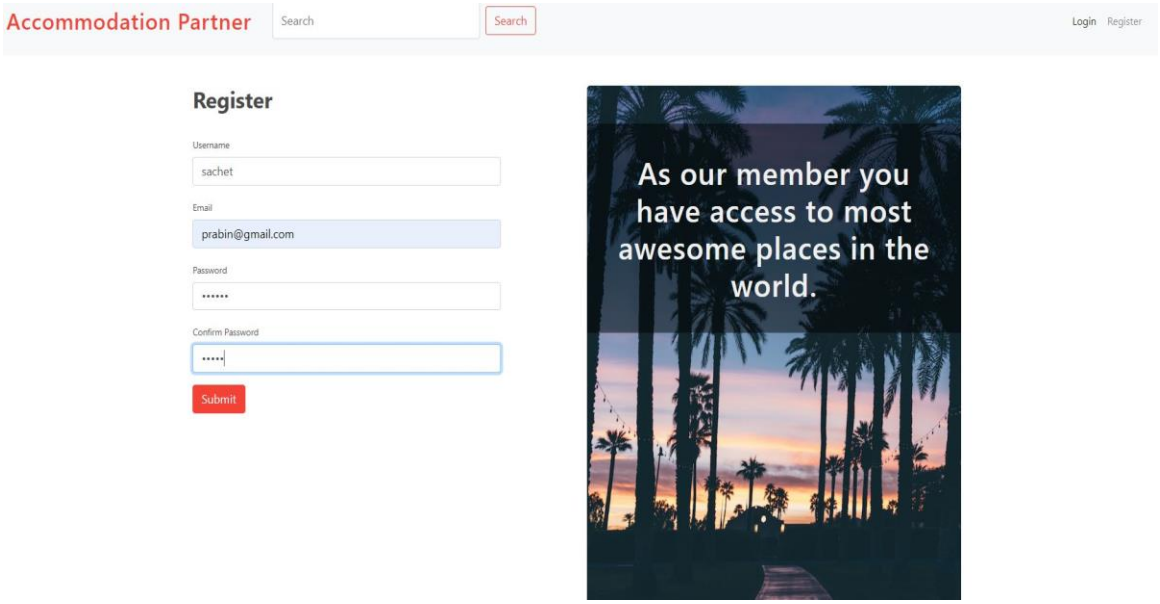

Figure 12: Registration form

Expected outcome: User can successfully create their account

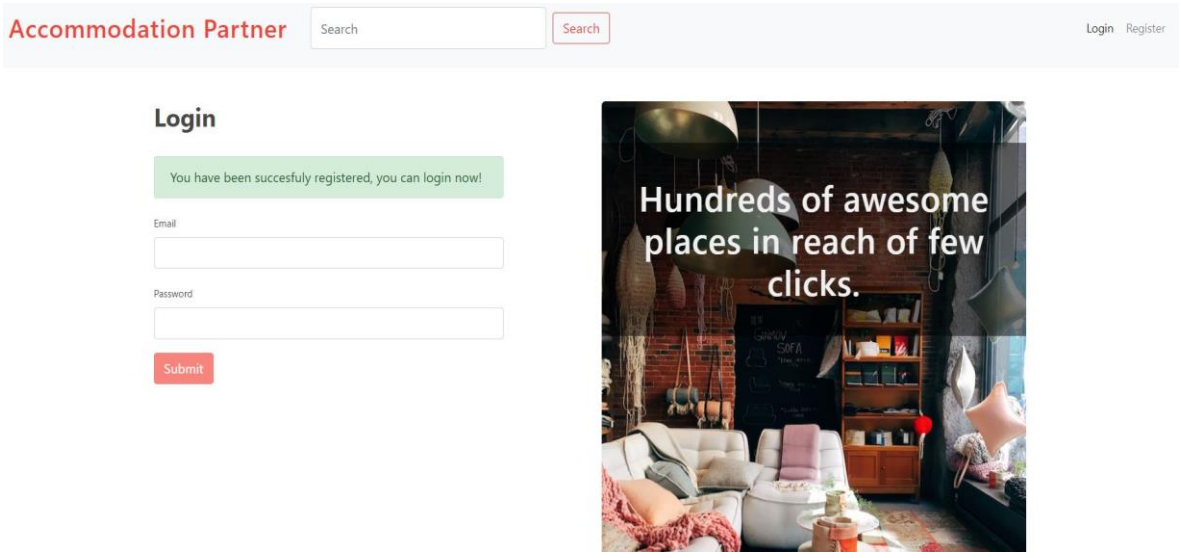

Figure 13: Registration Successful

Test 2.1 Registration of user with same email.

Purpose: Check whether a user can create new account using email which is already exist in the system

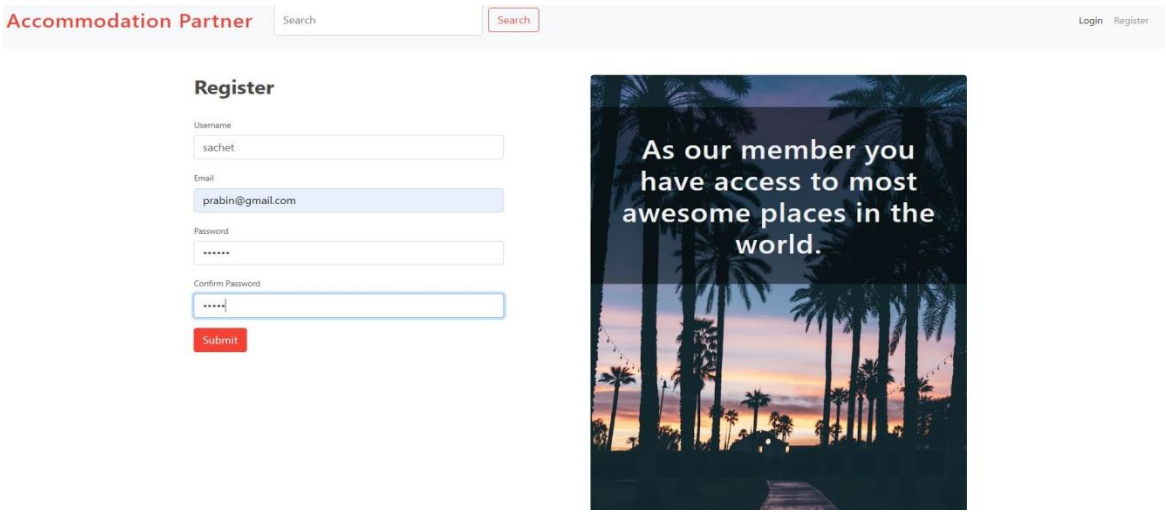

Figure 14: Registration with same email

Expected outcome: User cannot create their account

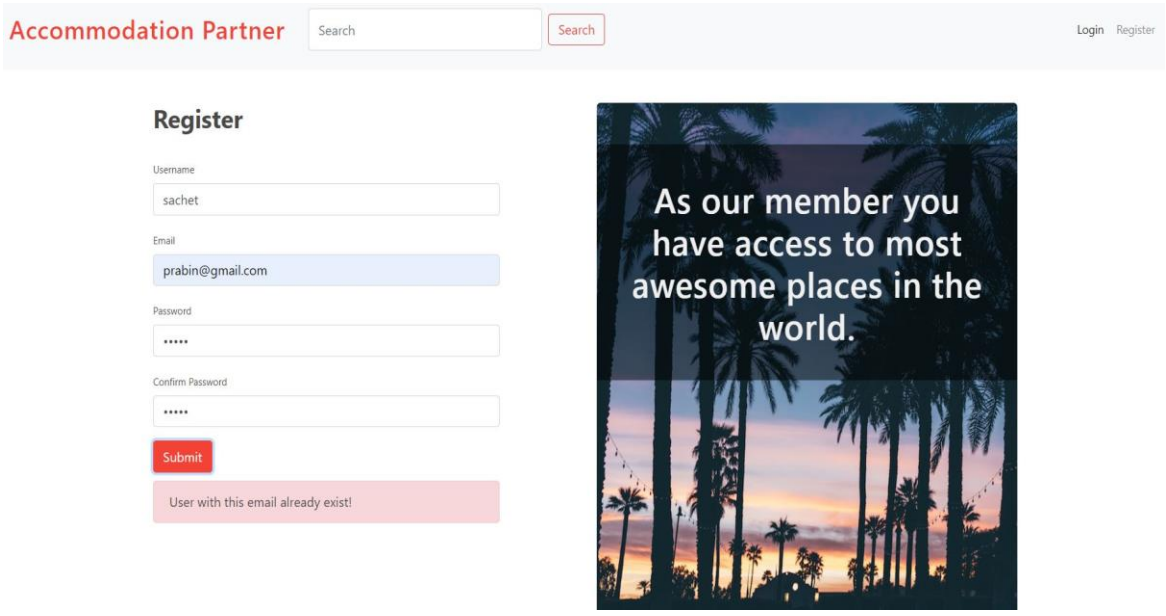

Figure 15: Unsuccessful to create account with same email

Test 3.1: Login of existing user

Purpose: Check whether an existing user can login to their account.

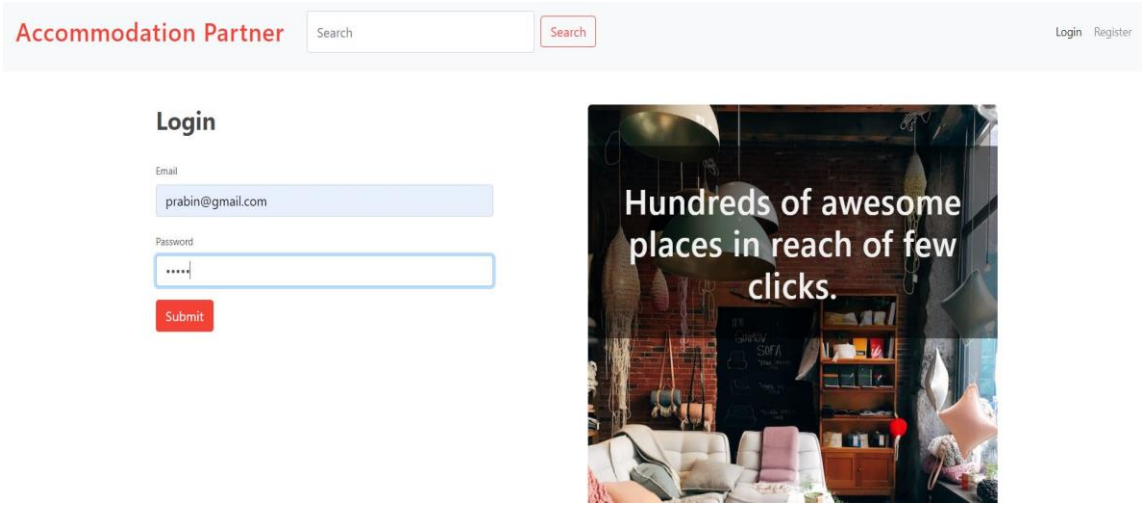

Figure 16: Login form to login

Expected outcome: User can successfully login their account

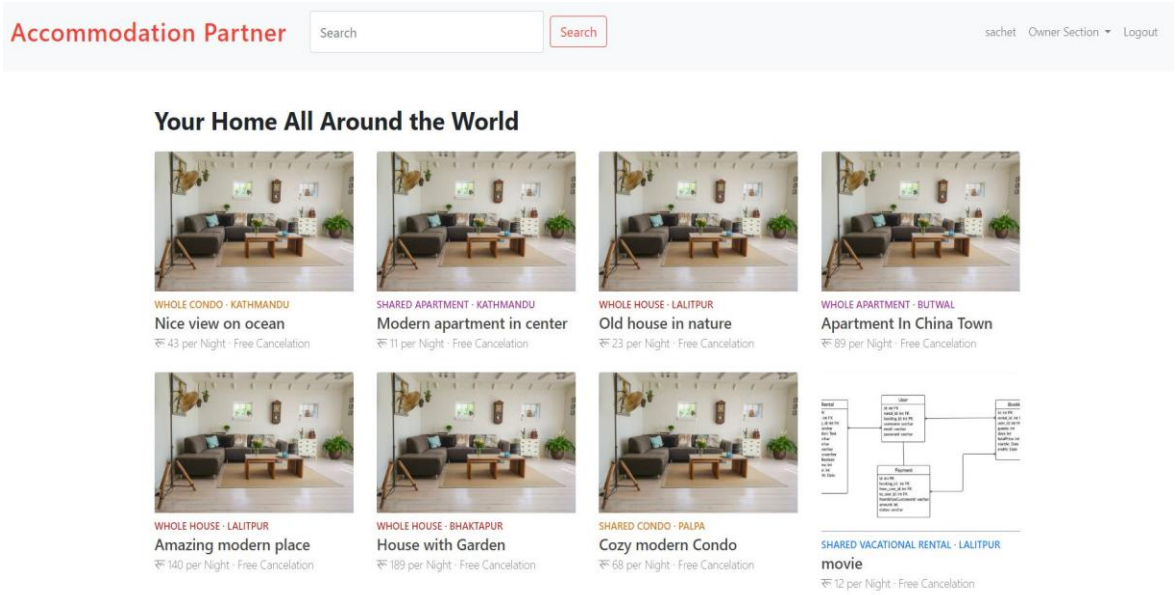

Figure 17: Home page after successful login

Test 4.1: Encrypt the password

Purpose: Check whether the password used by user is encrypted before saving in database

Expected outcome: User password is successfully encrypted before saving in database

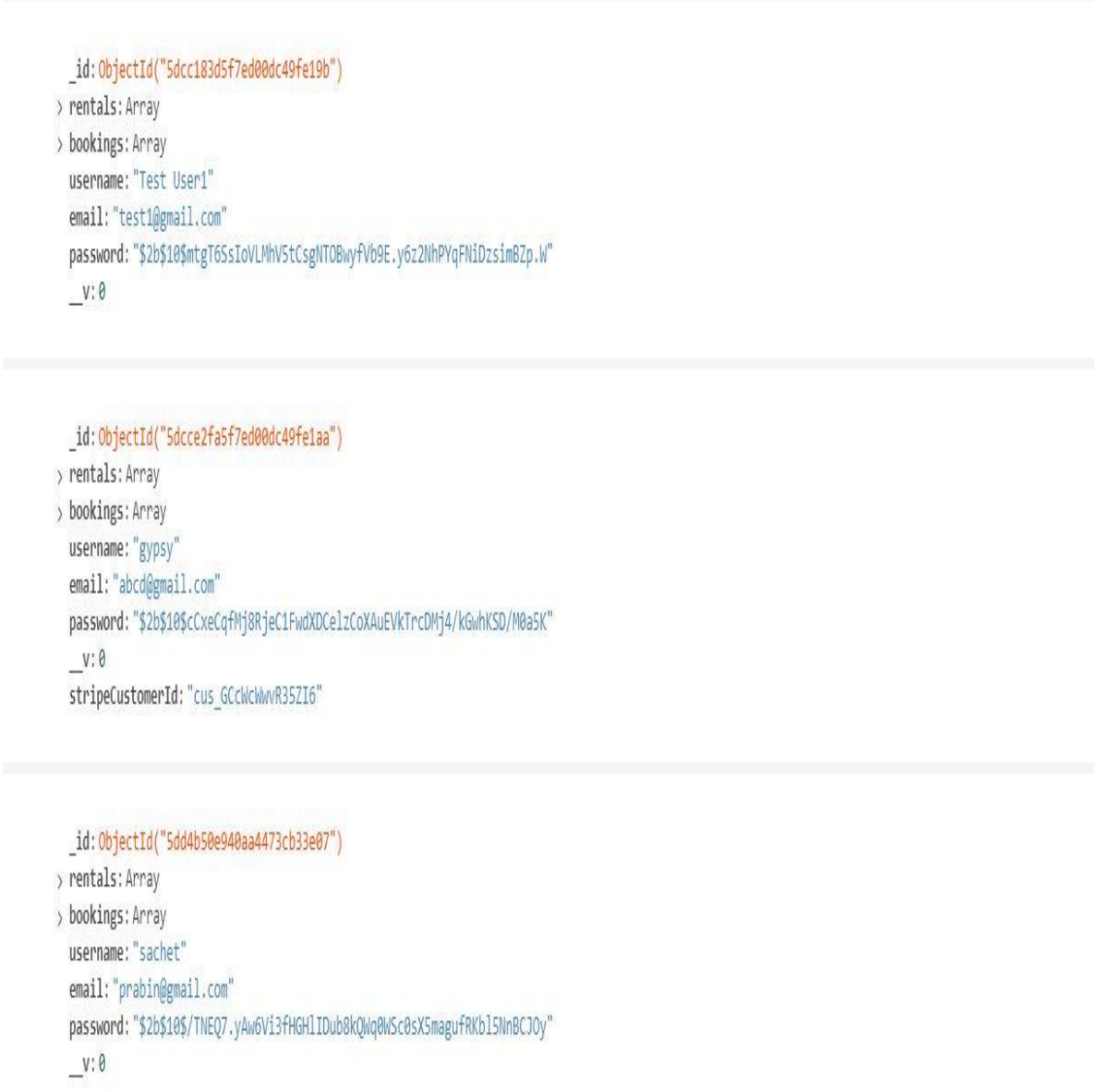

Figure 18: Database of user with encrypted password

Test 5.1: Creating HHV

Purpose: Check whether the owner can create/host their HHV rental by filling up valid data

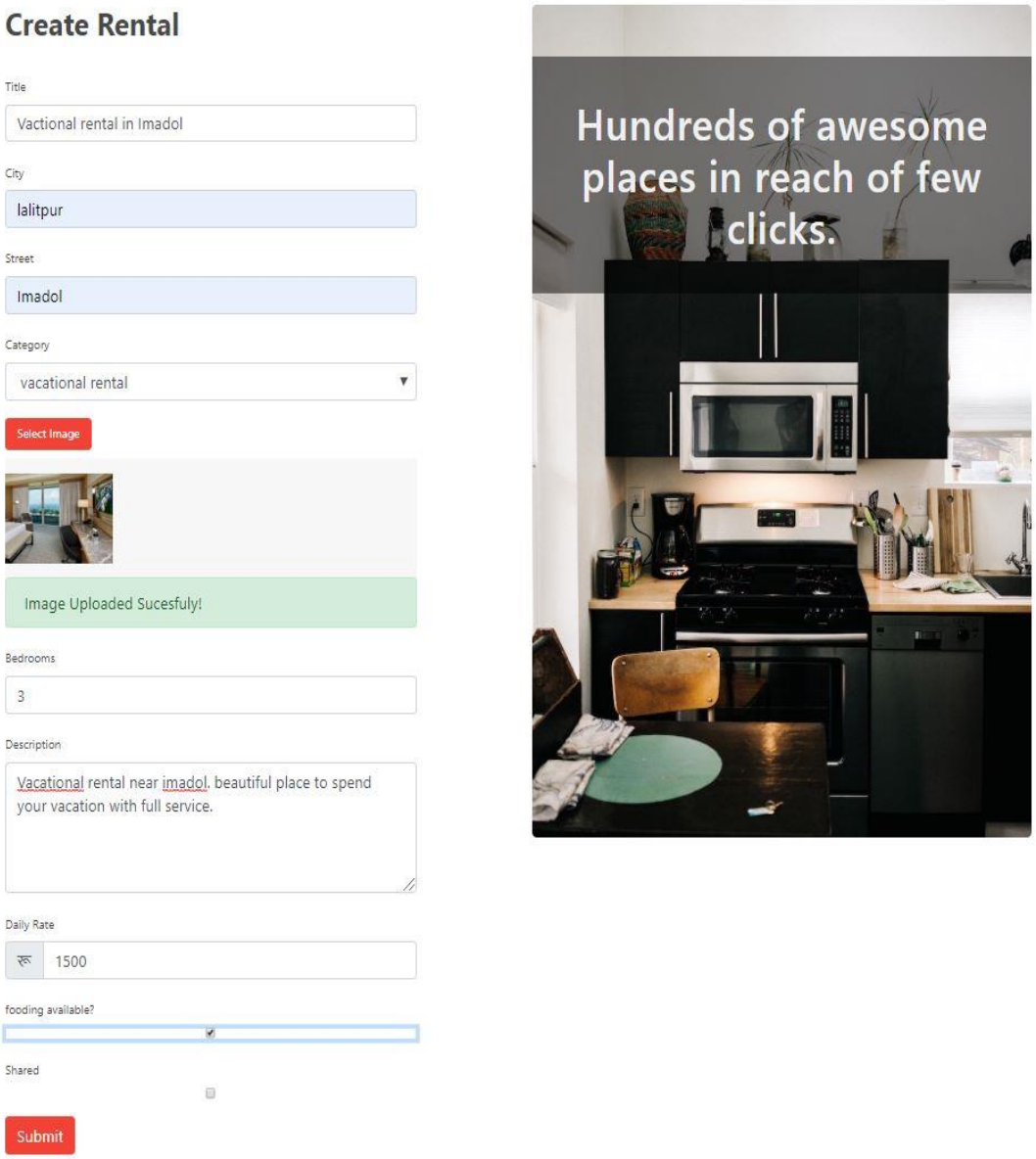

Figure 19: Form for creating/hosting HHV

Expected outcome: owner can successfully create/host their HHV

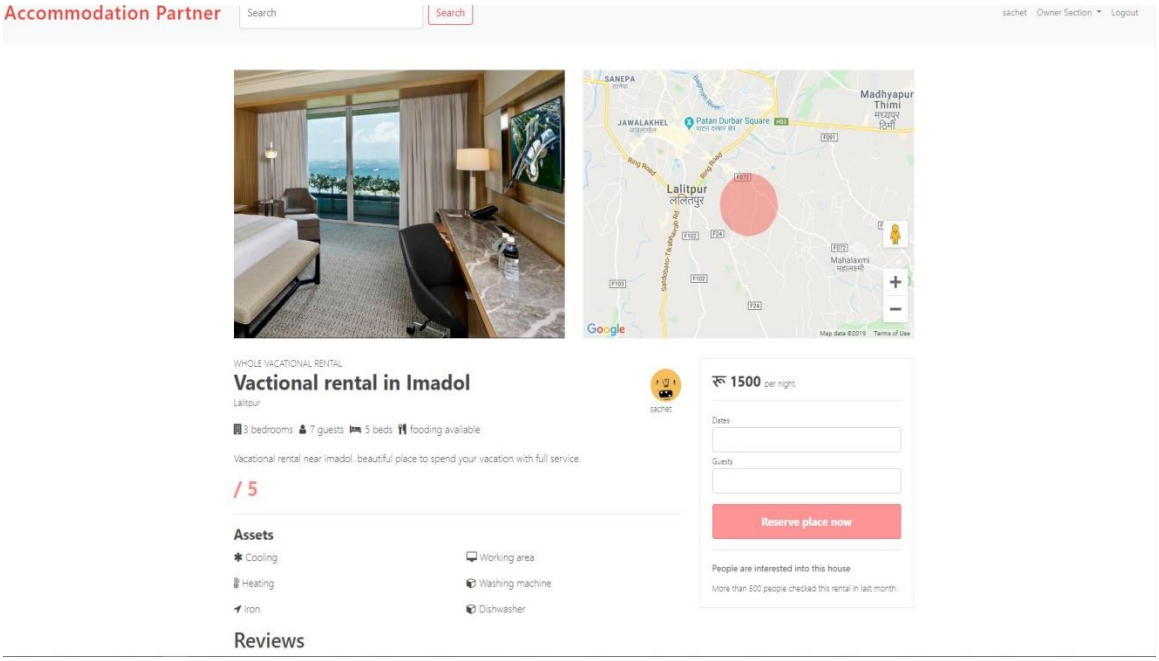

Figure 20: Successfully host HHV

Test 6.1: Payment

Purpose: Check whether user can make payment from their credit/debit card

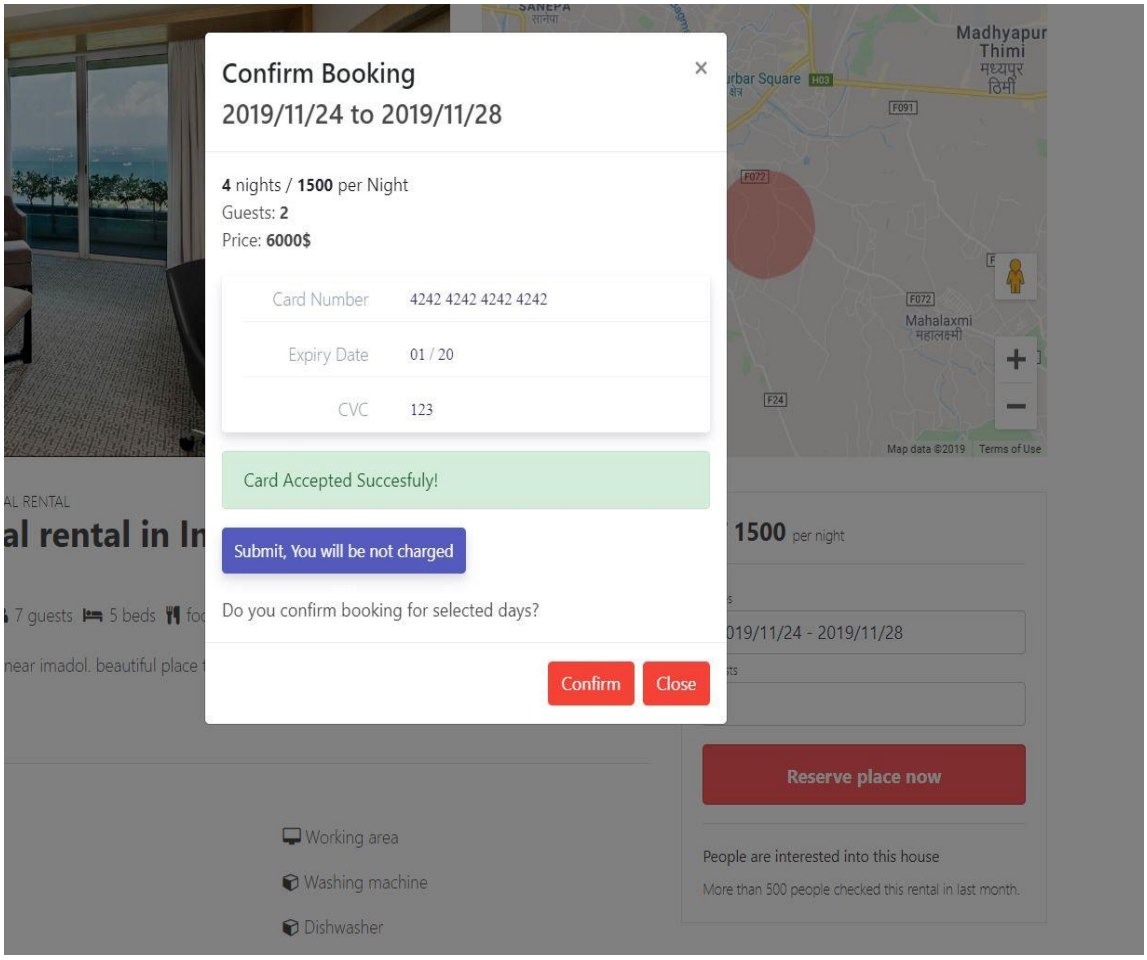

Figure 21: Making payment

Expected outcome: User can successfully make their payment through their card

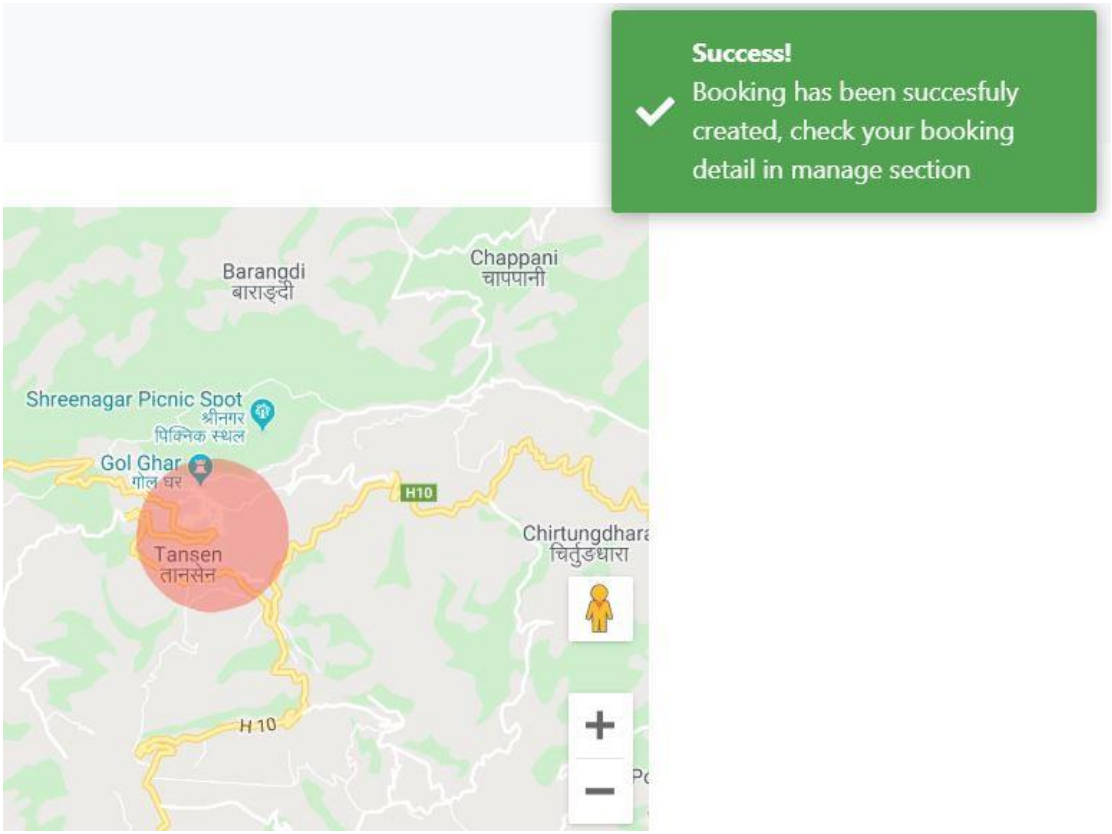

Figure 22: Booking successs

9. Project task and Schedule:

Project task has been completed within the time schedule and time schedule has been designed as per the requirements. This project was scheduled to be completed in approx. 3 months. Requirement analysis has been given more emphasis and then System Design was done. Testing and Debugging was done alongside with the development of the project. Finally we develop and modify documentation throughout the project. We had used incremental model so, in each iteration we gather requirements and modify design with the requirements of the project and test the project iteratively.

9.1 Gantt Chart:

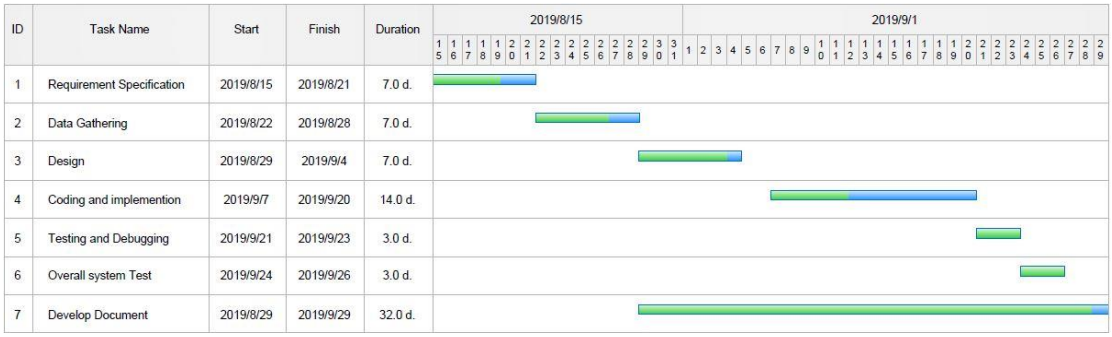

Figure 23: Gantt Chart for 1st iteration

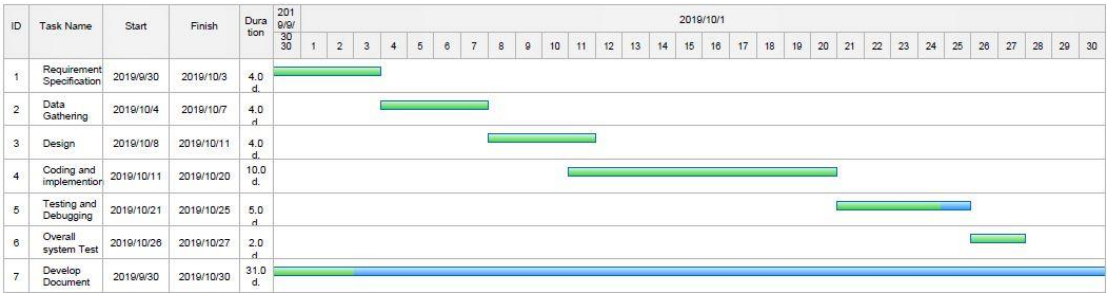

Figure 24: Gantt Chart for 2nd iteration

ID	Task Name	Start	Finish	Duration
1	Requirement Specification	2019/11/1	2019/11/2	2.0 d.
2	Data Gathering	2019/11/3	2019/11/4	2.0 d.
3	Design	2019/11/5	2019/11/8	4.0 d.
4	Coding and implementation	2019/11/9	2019/11/17	9.0 d.
5	Testing and Debugging	2019/11/18	2019/11/19	2.0 d.
6	Overall System Test	2019/11/21	2019/11/23	3.0 d.
7	Develop Document	2019/11/1	2019/11/26	26.0 d.

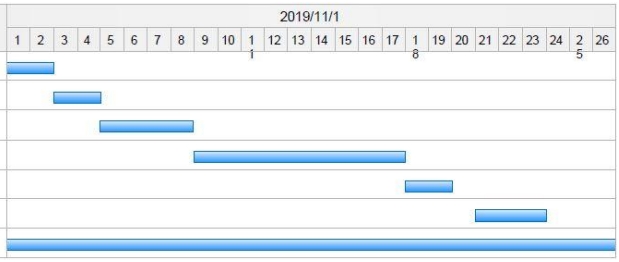

Figure 25: Gantt Chart for 3rd iteration

10. Output and Results:

As per our objective we have developed a web based platform where landlords and hotel owners can host their housing properties and hotel rooms respectively which will help landlords and hotel owners to publish their properties, as well as provides the platform for customers where they can pick the desired HHV host by landlords or hotel owners via online from their home which saves time and effort.

11.Conclusion:

Hence, in our final major project, we were able to develop a web based application that acts as a communication channel between landlords/ hotel owners and customers/tourists. Not only the gap between the customers and the property owners is minimized, it brings the big market opportunity for the landlord and the hotel owners as there are many customers online. Publicity of the HVV is uplifted as many people around the world can see the published HVV. Thus it opens a great door for nepali people for a new business.

12.Further works/Recommendations:

Although our project/website is able to meet the proposed objectives, but after adding some of the key features like Review system of the published HHV, Integrating nepali payment system, our website can best meet the market requirement.

We can further integrate SMS notification for sending mobile notification to landlord or property owner when his/her HHV has been booked, we can provide performance data in demand which helps analysist to develop strategic plans to uplift business.

Bibliography:

1. Retrieved on: 3th Aug, accessed from: https://hamrobazaar.com/
2. Retrieved on: 6th Aug, accessed from: http://www.rentalnepal.com/
3. Retrieved on: 8th Aug, accessed from: https://www.airbnb.com/
4. Retrieved on: 9th Aug, accessed from: https://www.oyorooms.com/

Appendixes:

We want to make sure that all the elements of developed work functioned properly. For this, we created a test cases for our work, in which elements such as validation, reliability, and user acceptance will be tested. The system will be tested for normal condition, primarily.

Homepage

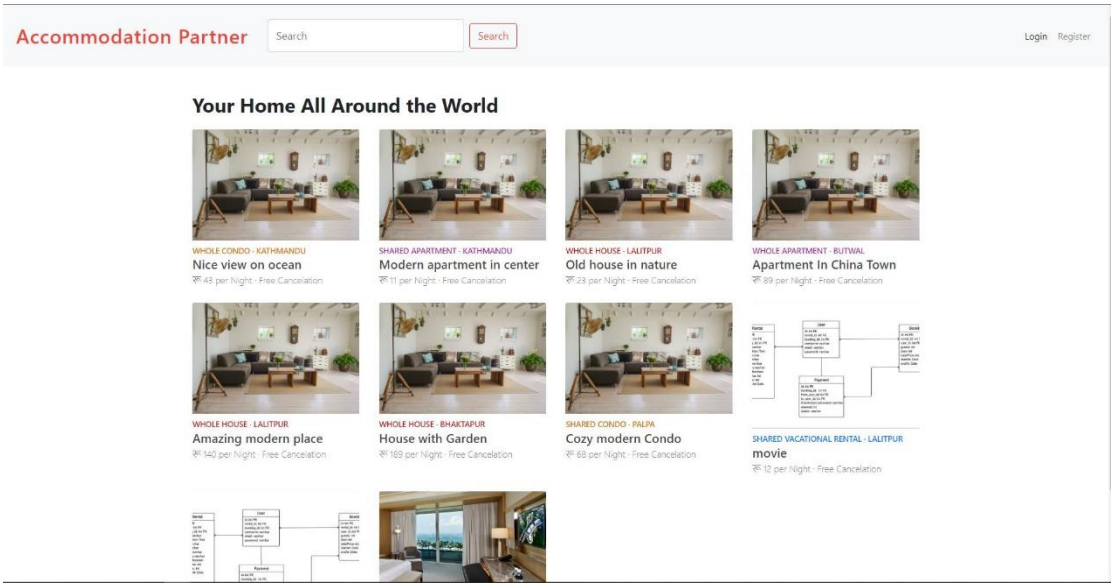

Figure 26: Homepage

Registration Page

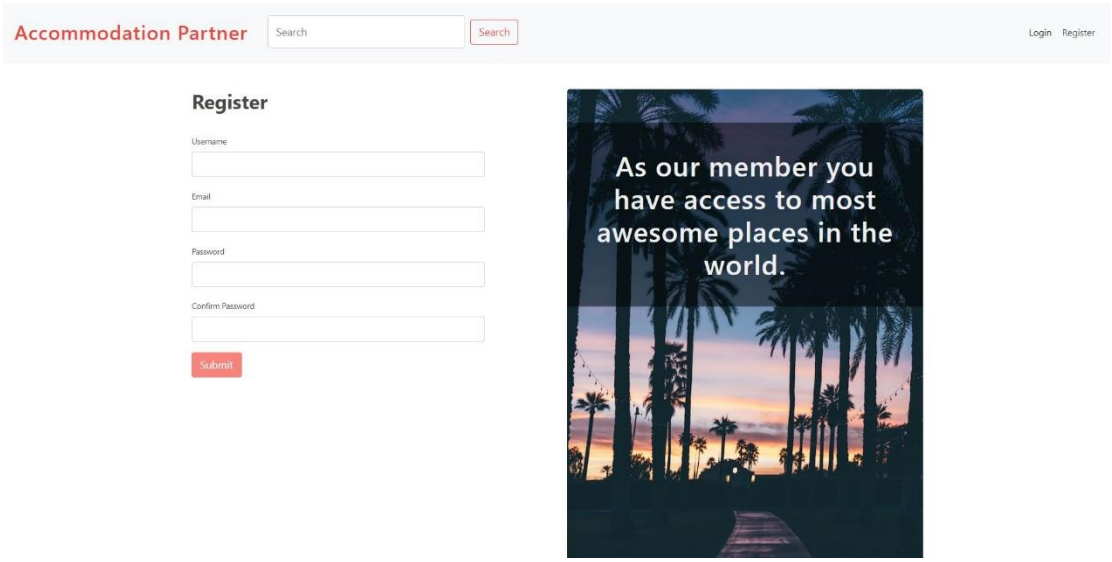

Figure 27: User Registration page

Login Page

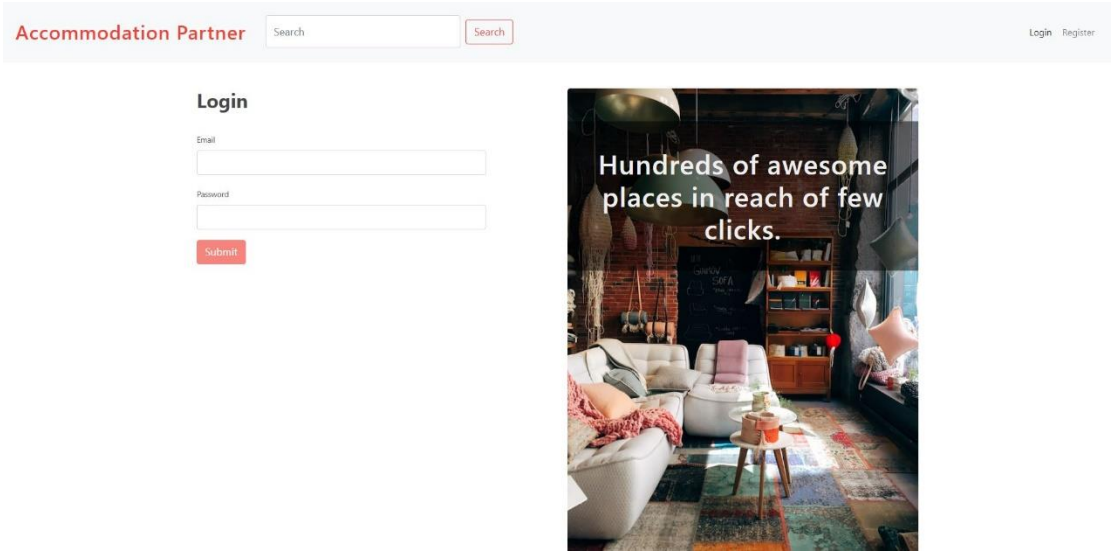

Figure 28: User Login page

Detail page

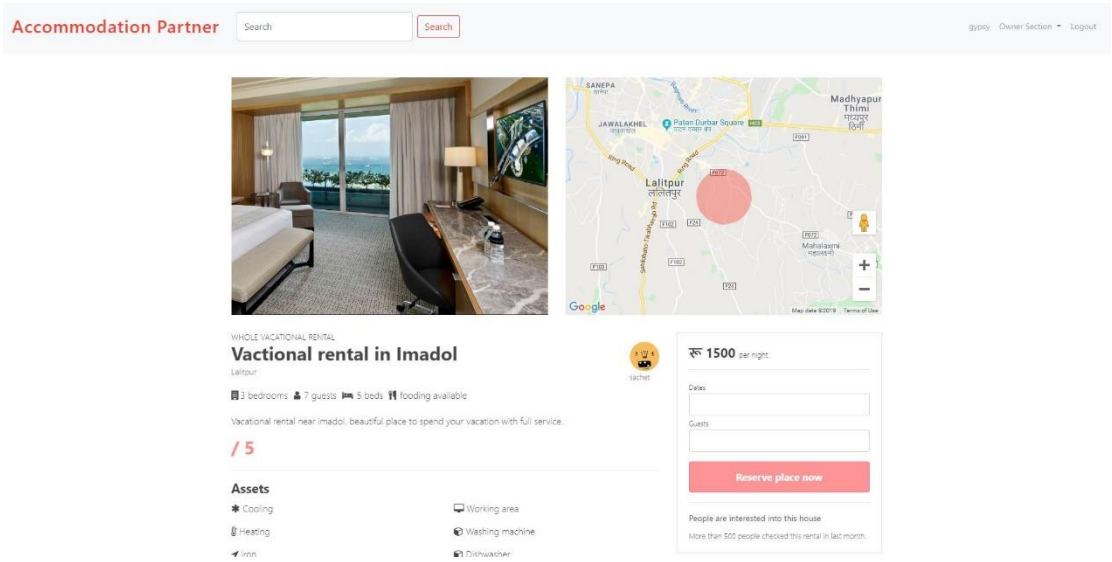

Figure 29: Detail page

Create HHV

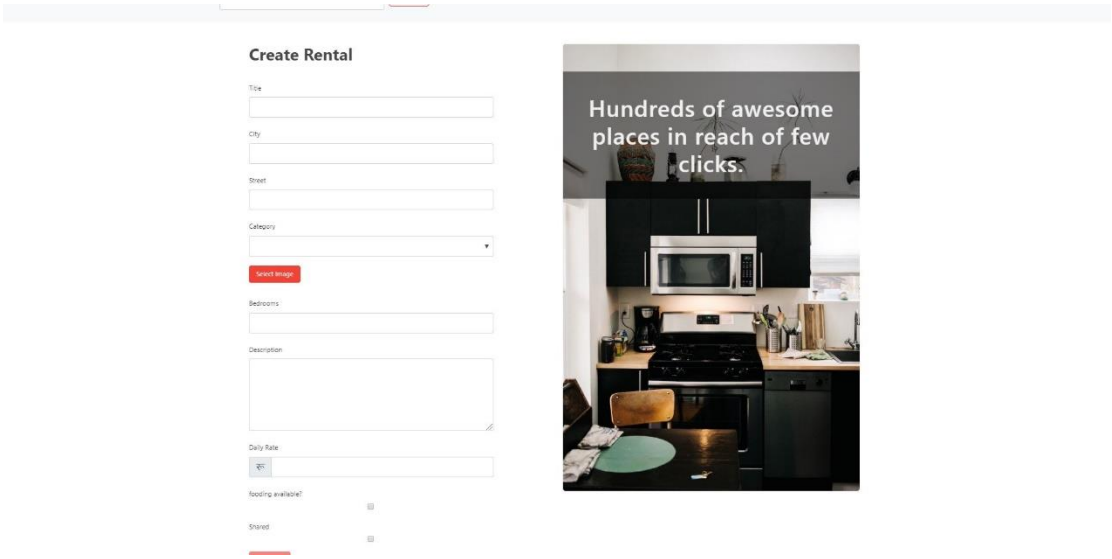

Figure 30: Create HHV

Manage Rental

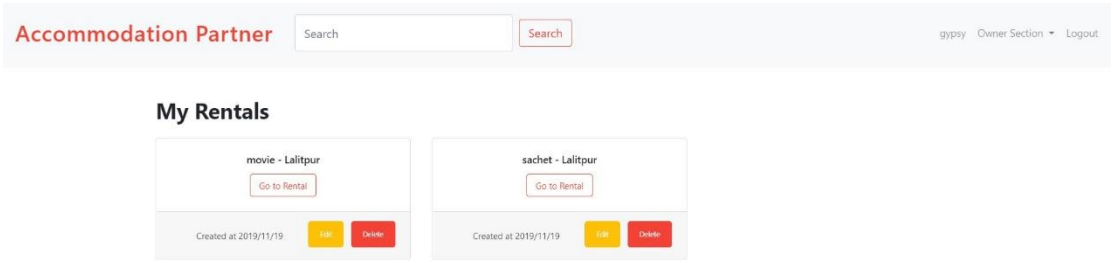

Figure 31: Manage Rental

Manage Booking

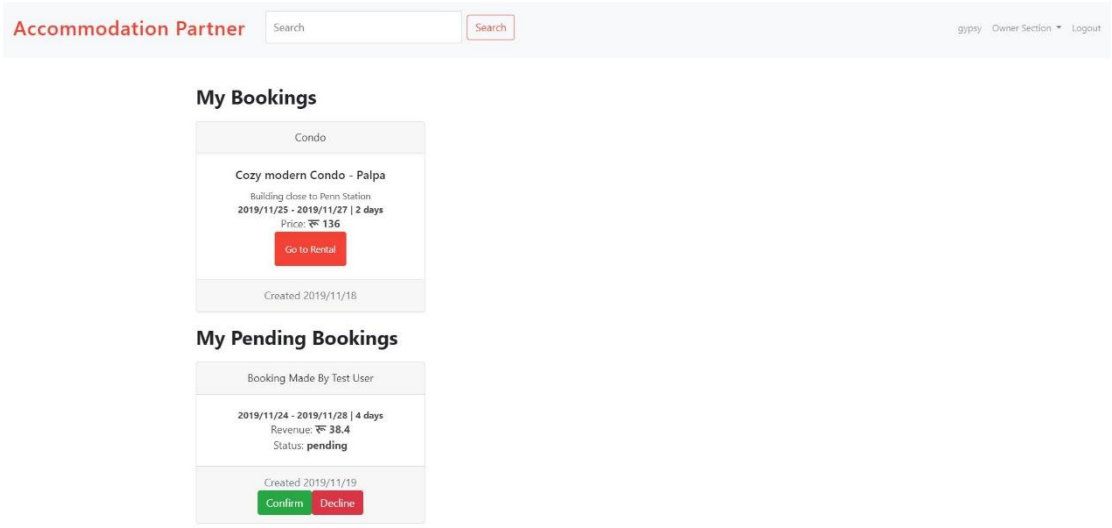

Figure 32: Manage Booking

Making Payment

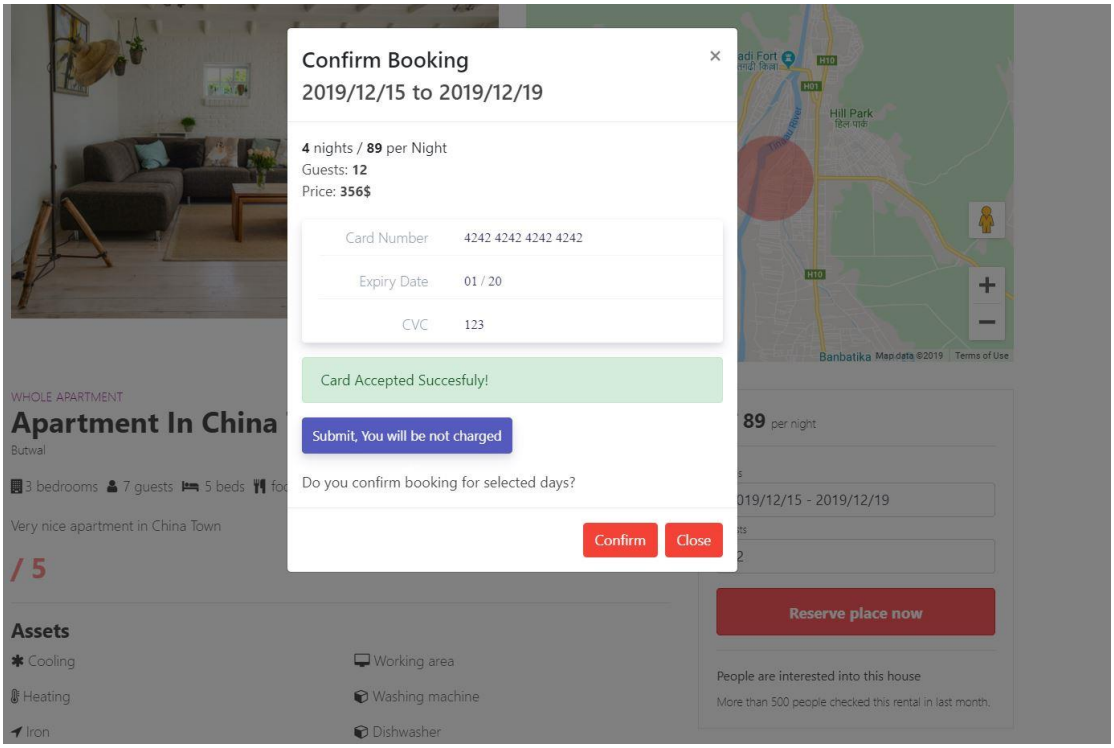

Figure 33: Making Payment

User Profile page

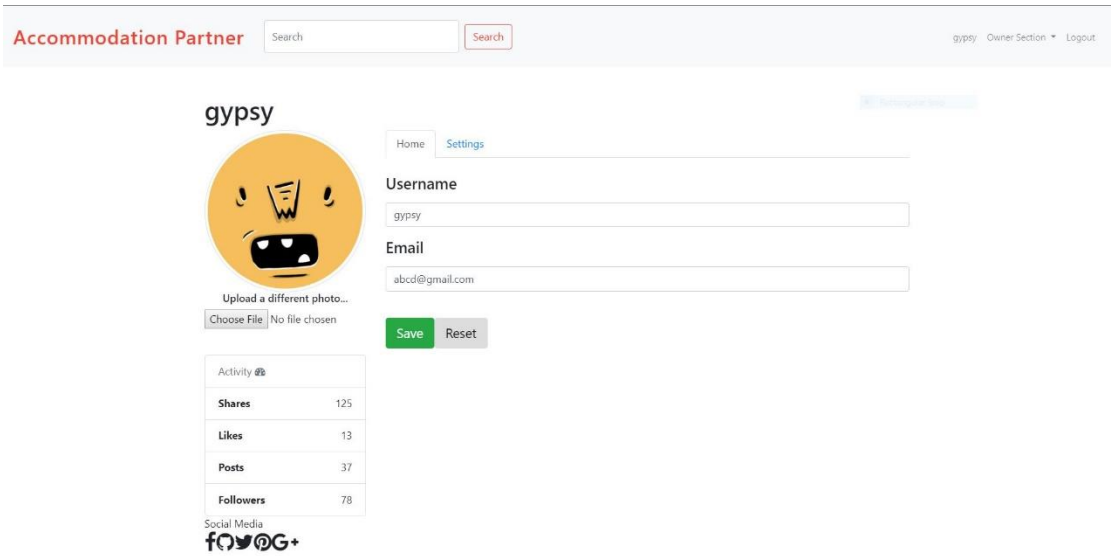

Figure 34: User Profile page