

ONLINE VEHICLE PARKING MANAGEMENT SYSTEM

BY

SHEIKH MD. TASLIM UDDIN

ID: 151-15-5380

This Report Submitted to the Daffodil International University in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

Supervised By

MD. TAREK HABIB

Assistant Professor

Department of CSE

Daffodil International University

Co-Supervised By

MD. ABBAS ALI KHAN

Lecturer

Department of CSE

Daffodil International University



DAFFODIL INTERNATIONAL UNIVERSITY

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APPROVAL

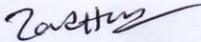
The Project titled “**Online Vehicle Parking Management System**”, submitted by **Sheikh Md. Taslim Uddin**, ID No: 151-15-5380 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 07-12-2019.

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Dr. Syed Akhter Hossain
Professor and Head

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Faculty of Science & Information Technology
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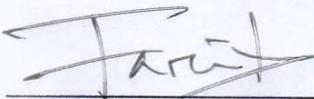
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Sadekur Rahman
Assistant Professor

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

Internal Examiner



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United International University

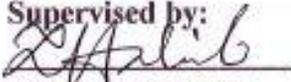
External Examiner

DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Md. Tarek Habib, Assistant Professor, Department of CSE** Daffodil International University in partial fulfillment of the requirements for the degree of Bachelor of Science in Electronics and Telecommunication Engineering.

We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

Supervised by:



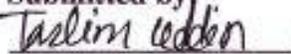
Md. Tarek Habib
Assistant Professor
Department of CSE
Daffodil International University

Co-Supervised by:



Md. Abbas Ali Khan
Lecturer
Department of CSE
Daffodil International University

Submitted by:



Sheikh Md. Taslim Uddin
ID: 151-15-5380
Department of CSE
Daffodil International University

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ABSTRACT

Car parking becomes a great concern for the city development nowadays. Increase in population, great revolution in automation industry, increase in per capita income of the people, messy arrangement of the available parking space has turned out to parking related problems. A huge crowd in the cities, parking cars anywhere and the carelessness of the people are worsening the problem tremendously. If this problem gets going, in the near future, it will arise to a major obstacle for the city development. Hence, there is a need of such a system that can be reliable, efficient, intelligent and cost-effective. Our developed system named “Smart Parking Lot” delivers parking availability, pre-identification of parking space, data accuracy, and the proper management of the parking facility. It ensures the reduction of space, optimized parking and enhanced user experience. This system aims at providing the control system of the number of the cars in it, monitoring the movement of the parking lot, checking the space availability for new cars and the dwell time of the cars, thus ensuring the precision and the effectiveness of the system.

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CHAPTER 1

INTRODUCTION

In this chapter, we will get acquainted about the introductory synopsis of the entire work. Section 1.1 summarizes the fundamental concept of the project work. Section 1.2 demonstrates the motivation and dedication to the beginning of the project. Section 1.3 comes up with the some of the fruitful objectives and goals of our project. Section 1.4 describes the contribution of the project and Section 1.5 reminds the arrangement of the chapters.

1.1 Overview:

Cities have a big mobility which leads its inhabitants to the dynamism, elegant living standard and modern technology that results to a major concern in some cases. Most importantly, parking problem is one of them that causes a traffic jam in the urban areas just because of the illegal parking and the lack of parking space. People have to face parking related issues everyday due to not having proper arrangement for it. Hence, there is an inevitability to have a smart and intelligent system that can be effective, secure, reliable and efficient in parking cars.

To achieve this goal we designed a system called “Smart Parking Lot” that delivers optimized parking, reduction of traffic jam, effective management of parking space. The developed system is time-saving, cost-effective and easily accessible. The system is capable of capturing process and retrieving data to authorized users. Moreover, it provides the status of the parking space to the incoming vehicles, computes the amount due from the vehicle and ensures on-spot payment facility.

It’s a token based system that manages customer’s waiting list and allocation process in an organized way which can be maintained by an ordinary person.

Besides, it’s a user-friendly system, thus requiring minimal staff to operate this. The working process of the invented system is very accurate, thereby tracking oncoming vehicles, providing space, dealing with monetary issue and releasing vehicles get done

very precisely. The system is capable of preventing parking violation and suspicious activity, as it exposes real time data to the admin who operates the system and can take actions against doubtful activities. Thus contributing to the development of the cities the traffic jam can be reduced.

1.2 Motivation:

With the help of modern technology, the industrial growth in automation field has benefited the life of mankind and on the contrary, caused lots of parking related problems. The traditional parking system is so messy, time-consuming and a slow processing system. Moreover, there is a shortage of parking place in the urban areas. Due to now having the proper management and disorderly space allocation is worsening the problem even more. Besides, impatience of the drivers, the search of parking place and waiting for it waste their valuable time and make them careless and thus lead them to park cars anywhere on the streets. This scenario put a positive impact on us and motivated us in exploring an efficient parking lot.

Once upon a time, I went to a shopping mall with my uncle. While parking car, we faced a problem of finding a space despite having a large parking area. Abruptly, I noticed the problem that their parking sequence and management are poor. After I face the trouble I discussed with my batch-mates to find a way for solving the problem. Then we decided to develop this system which is smart, intelligent and efficient. In addition, there are many intelligent parking systems used in the developed countries which are invented of advanced technologies. It tremendously inspired us towards the research for developing such a system.

There are a lot of smart parking systems which don't provide expected parking facilities. Most of them are not well-optimized, effective and efficient. Moreover, they are not web-based and don't provide real time status and also deliver less data accuracy in the system. Furthermore, there is a deficiency of proper maintenance of the system

due to complex user interface and slow working process. In this manner, the existing parking systems are not capable of providing the effective solution for parking related problems. From this point of view we aimed at developing such an intelligent system that can ensure effectiveness of the system, safety of vehicles, use of advanced technology, data accuracy and saving of time, thus reducing the traffic jam.

1.3 Objectives:

The key objectives and the goals of the developed system are listed below:

- To provide a cost-effective, time-saving, and intelligent system.
- To deliver real-time status of the parking lot, tracking of vehicle and efficient management of the system.
- To enhance the user experience by providing a user-friendly interface.
- To ensure the safety of the vehicles by the updated features of the technology.
- To monitor space availability and ensure optimized parking.
- To provide a simple, convenient, and effective parking system for the vehicles.
- To contribute to reducing traffic jam by providing all sorts of parking facilities.
- To take part in the development of urban areas by introducing this technology.

1.4 Contribution to the project:

The great contribution behind a project plays an important role to make the project successful. There are no such projects around us which have been successful without proper contribution. Our contribution behind this project is a great effort to take the project to its ending.

At first, we understood the end goal on how the project gets desired result. Understanding the desired outcome helped us take individual decision, reduce confusion, work having a patience & according to plan. We identified the clear roles of the tasks and tried to accomplish it on a regular basis.

As this is a big project for us, we segmented the project's tasks and tried to accomplish according to deadlines, which was a most effective way to implement the whole project. Collaborating in any task is a faster way to complete the task and imperative to the ultimate success of the project which we maintained and it led us to make the project successful.

There are many more ways to make a project successful. We just took these steps which helped us a lot feel more confident and motivated us to achieve the project's goals.

1.5 Organization of the chapters:

Chapter 1: in this chapter, the core concept of the developed work was described. The lessons of this chapter include the functionality and purpose of the project. Therefore, we have discussed motivation, objectives, brief summary and contributions of the project.

Chapter 2: in this chapter, we have demonstrated literature review, research gap and proposed solution of our developing system. Besides, we tried to explain an overview of social & economical impact on the project which we developed.

Chapter 3: in this chapter, we illustrated the tools and technologies which we used to develop the project.

Chapter 4: in this chapter, the entire work of our developed system was stated gradually. We added requirement analysis, data collection, and implementation process along with some of the important figures of the project.

Chapter 5: in this chapter, we discussed the both technical and non-technical challenges which we encountered while working on the project. Moreover, the future scope of the work, significance of the project, and limitations were clearly demonstrated.

CHAPTER 2

LITERATURE REVIEW

In this chapter, we have demonstrated the acquaintance and perspective of today's cyber security and illustrated the present circumstance of security issues in both academic and commercial fields. Section 2.1 states the short summary of the existing system. Section 2.2 introduces about the Network Security and its importance in details. Section 2.3 illustrates the socio-economic impact and statistics of cyber-attacks with the survey data.

2.1 Literature Review:

With the help of technology the world is moving towards modernization day by day. Automation industry has been the greatest example of technology which is changing the perspective of the world greatly. However, increase of vehicles in such a manner can be a threat to the city development. Mismanagement of vehicles, illegal parking and carelessness of the drivers are the most common reasons behind this concern which cause lots of parking-related problems in the urban areas. Even if the traditional parking systems are present in the urban areas, however, they are time-wasting and run on a slow process. Hence, to get rid of this a smart parking system is essential which can be secure, intelligent, effective and reliable, and can reduce traffic congestion in the cities.

Our proposed system named "Smart Parking Lot" is a web based parking management system that is capable of solving parking-related problems in the metropolitan areas. The object oriented approach of this system aims at providing optimized parking, space availability, on-spot payment facility, guidance towards parking and proper management of the parking space. It's a time-saving and affordable system that is helpful for the parking lot owner and parking users. The

designed project delivers real-time status of the parking lot, thereby users can get the status of parking availability/unavailability, entrance and exit etc. The developed system is able to control the number of cars inside it, monitor the movement and dwell time of cars.

The working procedure of the proposed system is as follows; when a driver comes to park his car then at entrance gate he will have to provide necessary information such as his name, phone number and car number etc. to the operator. Then the operator puts an entry on the system if a parking space is available and allocates a space with a token for his car to be parked in the zone. The dwell time of a car in the parking area depends on two parameters; one is for fixed hours and another is for an unlimited period. Hence, the owner of the parking lot will set the cost for a car to be stayed in the zone as per the driver's need. Once the car's time is up then the operator will calculate the total parking cost of the car.

The system is split into three categories for the users. These are Super Admin, Admin, and Operator. The Super Admin can do the whole system customization, update and set up all the important things for the users such as payment status, token management etc. The Admin can have access to the entire system, but he cannot set up things as Super Admin does. The Operator is allowed only for accessing the information on the parking lot. He just maintains the front-end work like providing a token for a car to be parked in the parking zone, dealing with payment issue etc. The Super Admin can provide the full access of the system to the Admin and Operator in some sectors if he wants.

2.2 What is Smart Car Parking System?

As the name implies, a smart car parking system refers to the intelligent, logical, reliable and automated parking system which is designed by the technology to provide a faster, efficient and smooth parking management system. Smart car parking systems help people get rid of the time-wasting and slower traditional parking system. Smart parking systems typically convey information about the parking availability in a particular area and allow vehicles to be parked at the available positions. It involves real-time data collection, the safety of cars, automated payment system, and proper management of the parking space. If a smart parking system is developed in this way, then it can reduce car emissions in urban centers.

2.3 Different Types of Automated Parking Systems:

Automated parking systems can be split into seven categories according to the use of technology. These are as follows:

- AGV system.
- Crane system.
- Puzzle system.
- RGC system.
- Shuttle system.
- Silo system.
- Tower system.

2.3.1 AGV System:

AGV stands for Automated Guided Vehicle, is a most common parking system widely used in the industrial applications where vehicles are parked on the pallets to get moved from one place to another. It's a computer-controlled, wheel-based load carrier that runs on the warehouse without the need of a driver. In this system, carts, pallets or trays are used to carry vehicles and the movement of vehicles is controlled by a computer program. Thus, using this system vehicles are moved between different

manufacturing and warehouse stations without a driver. This system is helpful in terms of efficiency, effectiveness and maintenance [1] [2].

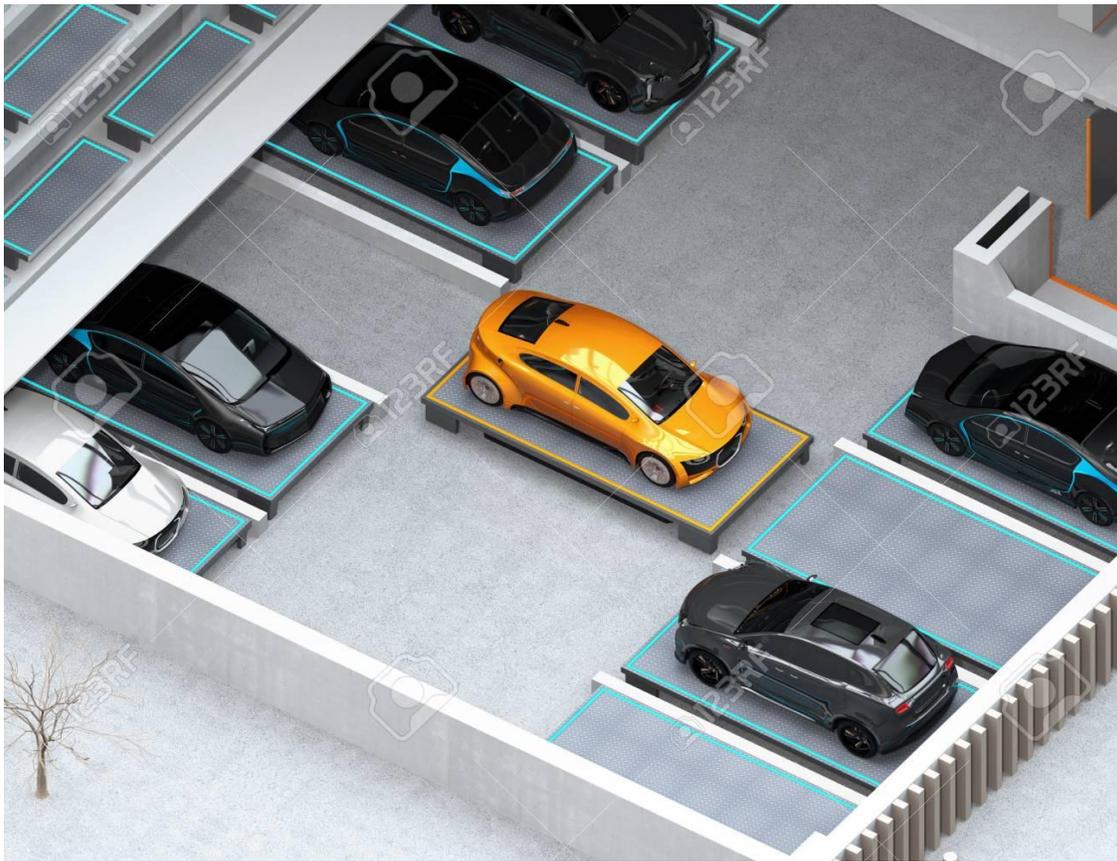


Figure 2.1: AGV Parking System.

2.3.2 Crane System:

Crane parking systems come with a central lifting and positioning mechanism which helps vehicles move horizontally and vertically while parking. This crane mechanism moves on rails which are installed on the floor and ceiling of the parking system. This mechanism helps in positioning a vehicle at a targeted parking slot. The crane itself has the capability of moving up-down and left-right, thereby positioning a vehicle and selecting a parking slot for the vehicle is quite easier, this quicker process has added a key advantage with its name. Hence, when there is a need for horizontal and vertical movement of the vehicles this system is found to be very useful in terms of parking vehicles from one spot to another [1] [3].



Figure 2.2: Vehicles Parking By Crane System.

2.3.3 Puzzle System:

Puzzle system offers horizontal and vertical movement of the parking spots by the means of automated technology. This automated system is a combination of numerous pallets to park and retrieve cars. In terms of horizontal movement the pallets are situated on a floor or steel frame and rollers and belts operated by the motors are used to assist each pallet. The rollers and belts interact with the pallets until the vehicle on the pallet is reached the desired location for parking. It's an automatic independent system that offers a highly adaptable configuration to help the pallets in maneuvering in any direction, thereby maintaining the system is much easier [1] [4].



Figure 2.3: Puzzle Cars Parking System.

2.3.4 RGC system:

RGC stands for Rail Guided Cart, is a comprehensively used vehicle parking system which is designed to reduce the complexity in vehicle parking. This automated system is similar to the AGV system in terms of operation which comes with a more reliable, robust and cost-effective way than that of the AGV system. Vehicles are situated on the pallets in the parking modules then the RGC system drives the vehicle plate and then moves it into the parking place. It's a flexible system which works on solid concrete floors and can be moved in both lengthways and sideways directions, thus lifting and moving the vehicle into the right position is much faster and easier [1].



Figure 2.4: RGC Parking Technology.

2.3.5 Shuttle System:

This system comprises of shuttles and elevators which ensures fast access and simple operation in parking lots with high capacity. In this automated system, the vehicles are placed into the desired position with the help of vertical lifts, and horizontal shuttles. When a vehicle needs to be moved from the entrance to the parking location then first of all, a vehicle elevator is used to move the vehicle allocated parking level then a shuttle collects the vehicle from the elevator and takes it to the available parking position. This system is a great choice for many parking owners in terms of user safety, cost-effectiveness and fast operation [1].



Figure 2.5: Shuttle System for Vehicle Parking.

2.3.6 Silo System:

This system comes with a cylindrical structure and has a huge capacity of storing a large number of vehicles, thereby ensuring a fast and effective process while parking and retrieving vehicles. The mechanism used in this system typically works at the center which allows vehicles to shift from one parking spot to another very speedily. In general, this system is set up underground so that lifting and positioning vehicles to the desired location becomes easier [1].



Figure 2.6: Silo Automated Vehicle Parking System.

2.3.7 Tower system:

In this automated system, an elevator is used to lift or move the vehicle into the desired parking space. This configuration acts repeatedly over a number of levels to place the vehicles into the parking tower, thus making the system much faster and efficient compared to the other parking systems. A module is set up on the ground floor which helps the vehicles reach the parking location. Since there is a single mechanism to park and retrieve vehicles, system redundancy can be an issue with this system [1].



Figure 2.7: Tower System for Vehicle Parking.

2.4 Importance of Smart Car Parking for City Modernization:

The development is nowadays a common term since the technology has been able to improve the living standard of humankind. A city is then said to be smart or developed when it's able to meet the basic demands of its residents where technology mostly takes place. The industrial growth in the automation sector has changed the quality of people's life greatly. As a consequence, a large number of vehicles are increasing day-by-day. On the contrary, this rapid improvement in the automation field can be a barrier in terms of the city's development. Slow-paced city planning, lack of sufficient parking space, improper management of the parking place and incaution of the citizens are the responsible reasons that make the traffic congestion and grow plenty of parking difficulties in the cities. In this perspective there is a dire need of a smart parking solution that can help the cities get rid of parking difficulties, thereby reducing the traffic congestion and contributing to the city modernization.

2.5 Car Parking System in the Developed Countries:

This era is known as the era of Information and Technology (IT). The world is now on our hands. Information and Technology has not only revolutionized the living standard of humankind but also his existence. New inventions and methods are being brought to the world with the help of technology to facilitate and ease the lives of the people. The automation industry is also in touch with the information and technology and thus, innovations are being brought to this sector gradually.

The technology has also taken the responsibility for the vehicle parking. There are lots of automated vehicle parking systems in the developed countries which have been invented by means of advanced technology. These parking systems are found in different forms such as semi-automated system, fully automated system, IoT based parking technology, and robotic based system.

In USA, two types of vehicle parking systems are present such as semi-automated system and fully-automated system. The semi-automated systems are the widely used car parking systems in the US where these systems are capable of moving a car into its parking space mechanically, but here an operator or driver is required to put the car into the system. The puzzle design is the greatest example of such systems.

On the contrary, the fully-automated systems are designed to move a car into its parking position in a completely automated technique where the driver and passengers leave the vehicle during parking. An example of such systems is the Hive Parking Structure which is much faster and efficient than that of semi-automated systems [5].

In Japan, there are plenty of automated systems designed for vehicle parking. The car elevator, vertical & horizontal circulation system, the two-storied or multi-storied system and the plane surface slide system are the most common vehicle parking systems used in Japan. These automated systems are much faster, efficient, flexible, and can be easily maintained [6].

CHAPTER 3

REQUIREMENT SPECIFICATION

This chapter addresses the overall system methodology in different sections and subsections. Section 3.1 provides an overview about the back-end technology used in the system. Section 3.4 states the used tools and technologies in details by which we were able to accomplish the project successfully.

3.1 Back-end Technology:

The back-end development is the kernel of a web application which refers to the server side development and ensures the working mechanism of a website and also the language wherein the web application works. The back-end takes the responsibility of update, change, customization and modification of a website. An application's front-end refers to the craft of a web page, but if the application itself doesn't work then it will go in vain. This sort of development is formed with a server, an application, and a database. The server is responsible for storing, retrieving, and sending data to other computers on a specific application while the database acts as the arrangement of data, and a repository that supports the back-end data processing of an application [8] [9].

The back-end of an application ensures security concerns, authentication and authorization, performance, and database interaction. It's often named as behind the scenes that interacts with the front-end for the information to be exposed as a web page. Moreover, the back-end focuses on application data access, application business logic, database administration, and scalability. Furthermore, it is responsible for software architecture, data backup and data transformation so that the front-end users can have easier access to the application [7] [9].

In order to make the server, application, and database the back-end development uses server-side languages like PHP, Ruby, Python, Java, and .Net. This project is developed by PHP as PHP is highly effective and easily customizable and also supports Windows, Linux and Mac platform [8].

3.1.1 Hypertext Pre-processor (PHP):

PHP stands for Hypertext Pre-processor, is a server side programming language which is especially suited for web development and can be embedded into HTML. PHP was originally developed by Rasmus Lerdorf in 1994. It's an open source language that is used for the development of web applications. Moreover, this scripting language is capable of creating dynamic websites or web applications and is compatible with almost all servers used today (Apache, IIS etc.) [10].

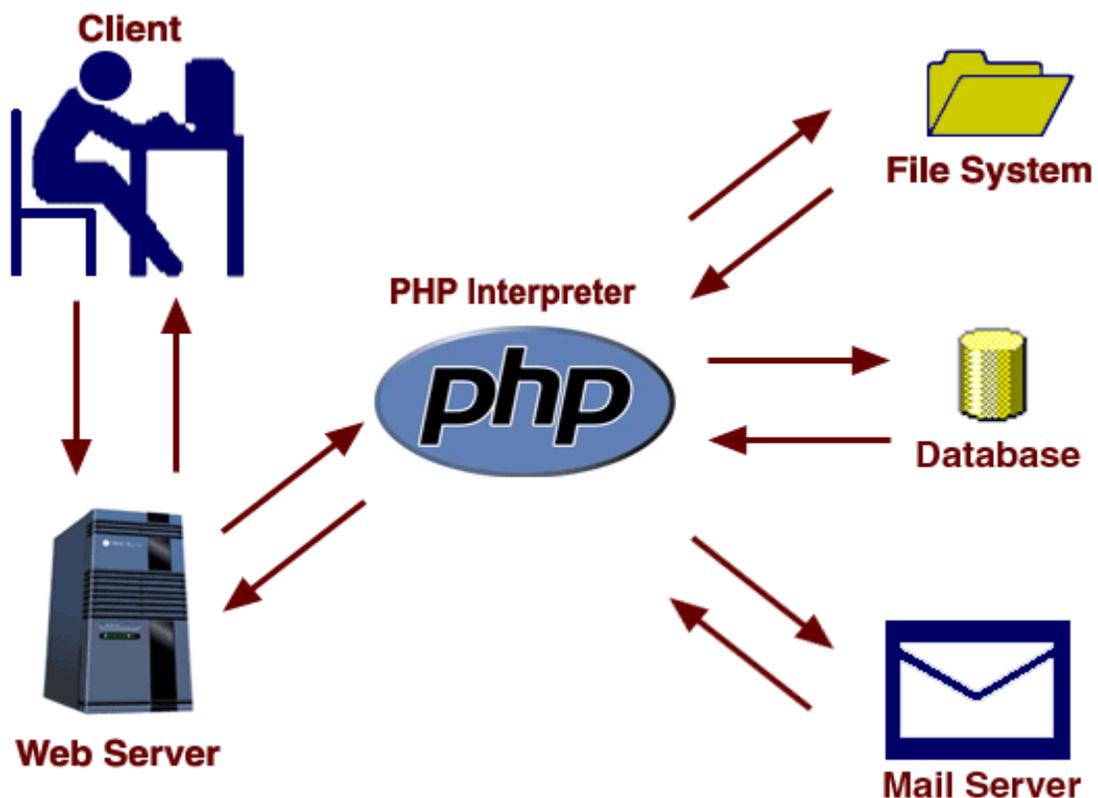


Figure 3.1: Workflow Diagram of PHP.

Key Features of PHP:

1. PHP is widely used and an open source scripting language, it means anyone can have access to its resources and get in touch with its modified features.
2. PHP is a cross platform, this means the application made of PHP can be deployed on various operating systems such as Windows, Linux, Mac etc.
3. PHP ensures us in supporting a wide range of databases while others maybe don't and it also delivers a great efficiency while running on the server side.
4. PHP can deal with collecting data from file, saving data to a file, adding, deleting and modifying elements in database very efficiently.
5. Most of the web hosting servers support PHP by default while other languages may not, this feature makes PHP a unique and cost effective choice [11].

Advantages of PHP:

1. PHP is very simple and easy to learn; any enthusiast who has a little knowledge in object oriented programming can easily learn PHP as it comes from the concepts of C and C++ language.
2. The great advantage of PHP is that it has a full support from the communities and forums on the internet while facing trouble with its codes.
3. PHP is secure and it also provides fast output and better result, thereby users can interact with the websites more comfortably.
4. PHP has some efficient frameworks which allow developers to follow for creating more attractive dynamic websites and also allow programmers to work with a number of widely used relational databases.
5. It's easier to fix problems in PHP is a open source platform
6. Coding with PHP is free while other languages require paid hosting, thereby provides a great benefit for the business [12] [13].

Disadvantages of PHP:

1. Things are not always rosy for PHP; since it's an open source and free platform, hence source codes of PHP are exposed to the programmers and hackers as well. Thus, hackers can identify bugs in the codes and attack websites which are developed by PHP.
2. PHP is not suitable for vast applications. Since, programming language is not very modular, thereby maintaining large applications developed by PHP is very much difficult.
3. Since PHP has less number of debugging tools which are responsible for searching errors in the codes, therefore it's a little bit difficult for handling errors and warnings [12] [13].

3.1.2 Laravel:

Laravel is a free and open source PHP web framework, created by Taylor Otwell which is designed for the development of web applications. It's a framework with expressive and elegant syntax that follows MVC model for the architectural purpose of the applications. Laravel is a highly secured PHP framework and has lots of object oriented libraries that helps developers make their applications very easily. Moreover, this framework enables programmers to design their web applications and connect them with different APIs. Furthermore, laravel focuses on fast extension ability, development speed and scalability, thus providing better programming results compared to the other frameworks.

Why Laravel:

- Authorization plays a vital role for any web application. Laravel ensures the arrangement of authorization logic and helps in controlling access to the resources.
- Laravel provides high security to the web application by creating encrypted passwords with the help of Bcrypt hash algorithm.
- Laravel has in-built lightweight templates which help developers create superb layouts for their applications.

- It is efficient, powerful and easy to learn that aims at making the web development process very enjoyable for the developers.
- Laravel has different ways for accessing relational databases through routing and it ensures modular packaging system which is responsible for managing large laravel applications [14] [15].

Server Requirements:

We used the Laravel framework as back-end technology in our project. The Laravel framework has a few system requirements. Hence, it's needed to make sure that the server meets the following requirements:

- PHP >= 7.0.0
- Open SSL PHP Extension.
- PDO PHP Extension.
- Mbstring PHP Extension.
- Tokenized PHP Extension.
- XML PHP Extension.

Main Features of Laravel:

Architecture:

The architectural pattern of a system plays a vital role towards the tasks of that system to be performed very smoothly. Laravel owns a good architecture that eases the development process and helps to do all the essential tasks in a simplified way. It's a full stack framework that controls all the tasks ranging from web serving and database management to HTML generation, thus creating a smooth workflow environment for the developers [16].

MVC:

MVC stands for Model View Controller, is a designing pattern used by the developers while creating web applications. MVC lets us know the application structure with regards to how the data flow of our application works. It allows the web applications

to have many different views of a single common model. The MVC pattern consists of three parts; model, view, and controller. The model acts as the manipulation of data by the developers.

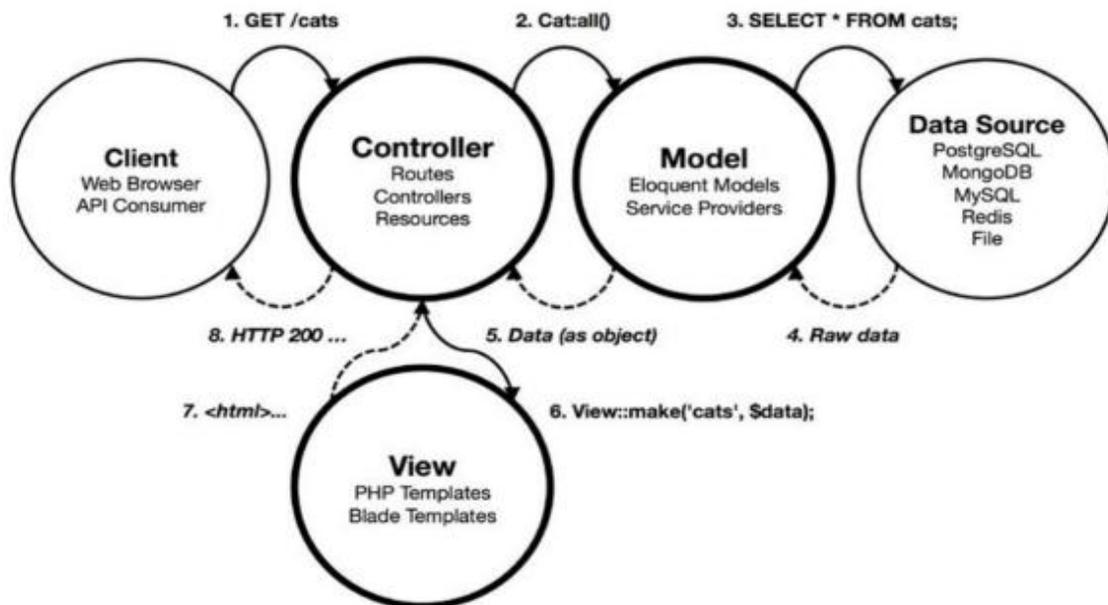


Figure 3.2: Interactions between all the constituent parts of an MVC architecture pattern.

The view is the visual representation of the web applications where the users interact. The controller acts as the key role for this pattern. When a user takes an action, the controller manages the action and updates the model if needed [16] [14].

Eloquent ORM:

The Eloquent ORM (object-relational mapping) with a simple PHP ActiveRecord in Laravel helps the developers in introducing database queries with PHP syntax instead of writing SQL code. An ORM is comparatively faster than all other PHP frameworks [16].

Composer:

Composer is a tool for dependency management in PHP that allows the developers in declaring and managing the libraries for their applications. It helps programmers to

install and update many different components for their web applications. Composer works on a command line basis that generates and manages autoload information for ease of the developers in using third-party code [16].

Artisan:

Since Laravel eases the development process for the programmers, therefore it added a great benefit for them to code in an easiest and smooth way which is called Artisan. It's a built-in tool by which the developers usually interact with the Laravel framework using a command line. This tool helps developers to perform the repetitive tasks which they avoid to accomplish manually [16].

3.2 Front-end Technology:

When it comes to the designing of an interface for the user interaction to the web applications then a common term revolves into our mind called Front-end Development. The front-end is that which helps users interact with the websites. It's referred to as client-side language wherein users can experience everything such as from text and colors to buttons, images, and navigation menus. This development usually focuses on fulfilling users' demand and helps programmers put something new on the websites so that the users can find a simplified way to interact directly with the websites on their browsers.

Furthermore, this development is responsible for things like speed of websites, adding & deleting menus, screen size and resolution, website's content style, responsiveness of websites and many more. The front-end technology helps developers in analyzing code, design, and debugging applications for ensuring an attractive user interface. We used HTML, CSS, Bootstrap 3, JavaScript, JQuery, and Ajax to develop our project [8] [9].

3.2.1 HTML:

HTML stands for Hypertext Markup Language, is a standard markup language used widely by the developers to create web pages and web applications. HTML is responsible for things like creation and structuring of sections, paragraphs, headings, and links for web pages and applications. This markup language communicates with the web browsers to display the text, images and other forms of multimedia on a webpage [18] [19].

3.2.2 CSS:

CSS stands for Cascading Style Sheets, is a simple designing language used to represent the web documents written in HTML. CSS is the presentation aspect of the web pages that brings an attractive look to the websites by interacting with the HTML elements. Using CSS, one can control page layouts, colors of the text, style of fonts, column size and resolution, responsive design and other visual settings. CSS provides faster speed for the websites, easy maintenance of the elements, and it's compatible with multiple devices [20] [21].

3.2.3 JavaScript:

JavaScript is a high-level, interpreted scripting language used to create and control dynamic website content. It's a faster and lightweight language that helps users to interact with the web pages in an attractive way. JavaScript provides highly responsive interfaces that improve user experience and fixes browser issues so that users find a comfortable [22] [23].

3.2.4 JQuery:

JQuery is a JavaScript library designed for simplifying many different tasks of JavaScript and can make web applications more interactive and attractive for users. JQuery is often referred to as “write less, do more” meaning that it helps web designers

not to code for some common tasks in JavaScript as it takes the responsibility of those tasks. It's a fast, small and cross-platform which is compatible with different sorts of browsers. Moreover, it's very useful and effective that makes a lot of complicated things much easier such as HTML manipulation, DOM manipulation, CSS manipulation, Effects and Animations, and so on [24] [25].

```
<script type="text/javascript">
  $(document).ready(function () {
    $('.dd').mouseenter(function () {
      $('.s_links').stop(false, true).hide();
      var chmenu = $(this).parent().next();
      chmenu.css({
        position: 'absolute',
        top: $(this).offset().top + $(this).height() + 'px',
        left: $(this).offset().left + 'px',
        zIndex: 1000
      });
      chmenu.stop().slideDown(500);
      chmenu.mouseleave(function () {
        $(this).slideUp(500);
      });
    });
  });
</script>
```

Figure: JQuery Code Structure.

3.2.5 Ajax:

Ajax is the acronym of Asynchronous JavaScript and XML which contains a set of development techniques for creating interactive websites and web applications. Even if Ajax is not a programming language or a tool, however it makes some complicated things much easier like programming languages do by delivering some techniques. It works with a combination of HTML, CSS, XML, and JavaScript for providing effective, faster, and more interactive web applications. [26] [27].

3.2.6 Bootstrap:

Bootstrap is a free and open-source front-end development framework, used for simplifying the development of websites and web applications. It's a framework of HTML, CSS, and JavaScript which eases the creation of responsive, mobile-first design of web pages much easier and faster. It is easily customizable and compatible with most of the web browsers such as chrome, firefox, opera etc [28] [29].

CHAPTER 4

DESIGN AND SPECIFICATION

Every system make to proper represent by design and implementation. We have collect all the requirements and analysis it before design and implementation process. This chapter, wediscuss design and implementation process, requirement collection and analysis and main module functions, which is review our total system.

4.1 Requirement Collection & Analysis

We have collected basic requirements from field level. Some are following

- Needed to save client information that might help to owner.
- Booking history needed to store for later calculation analysis.
- Admin would be able to see the booking history.
- Admin can be generate day or monthly reports.
- Customer will get booking notification and alert message.
- Admin can communicate with the client via SMS or Email.
- Admin can be set two differentcategories pricing system.
- Operator can access his parking lot data & reports.
- Operator can collect the booking money.
- Booking notification base on different criteria. A Crone job or scheduler will work in background to send mail or SMS notification to the customer. Based on requirement we have selected LARAVEL (PHP Framework) for development purpose. We have selected MySQL as database and Eloquent as ORM. Our project developed with module system called HMVC system, which will help to distinguish different modules.

4.2 System and Development Tools

To develop our project we have used some tools. In this topics, we have discussed all the tools which we used. Here, we used operating system windows for making development environment and Sublime Text as a development IDE etc.

4.2.1 Operating System

We have developed the system in Windows 10 operating system. We have used Windows operating system it is very familiar to us. It's more compatible with xampp server which is included php, MySQL and apache server.

4.2.2 HeidiSql

We have used HeidiSql as a database development tool. By this tool, we can easily explore our database graphically. Nowadays it is most elegant and easier to perform an operation for MySQL Database [9].

4.2.3 Sublime Text

Our project development we use Sublime Text as a development IDE. The special features of it's it is more flexible than another IDE, lightweight and smooth [10].

4.3 Requirements

To develop a PHP project medium configured computer is needed. Below the minimum requirements given:

- CPU: Dual core or Higher.
- RAM: 1GB.
- Hard Disk: 40GB.
- Apache server.
- PHP Parser.
- MySQL Database [11].

4.4 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. There are three types of users interact with the system,

which is super admin, admin and operator. In the Figure: 4.1 Use Case Diagram shows the use case boundary defines their activity details.

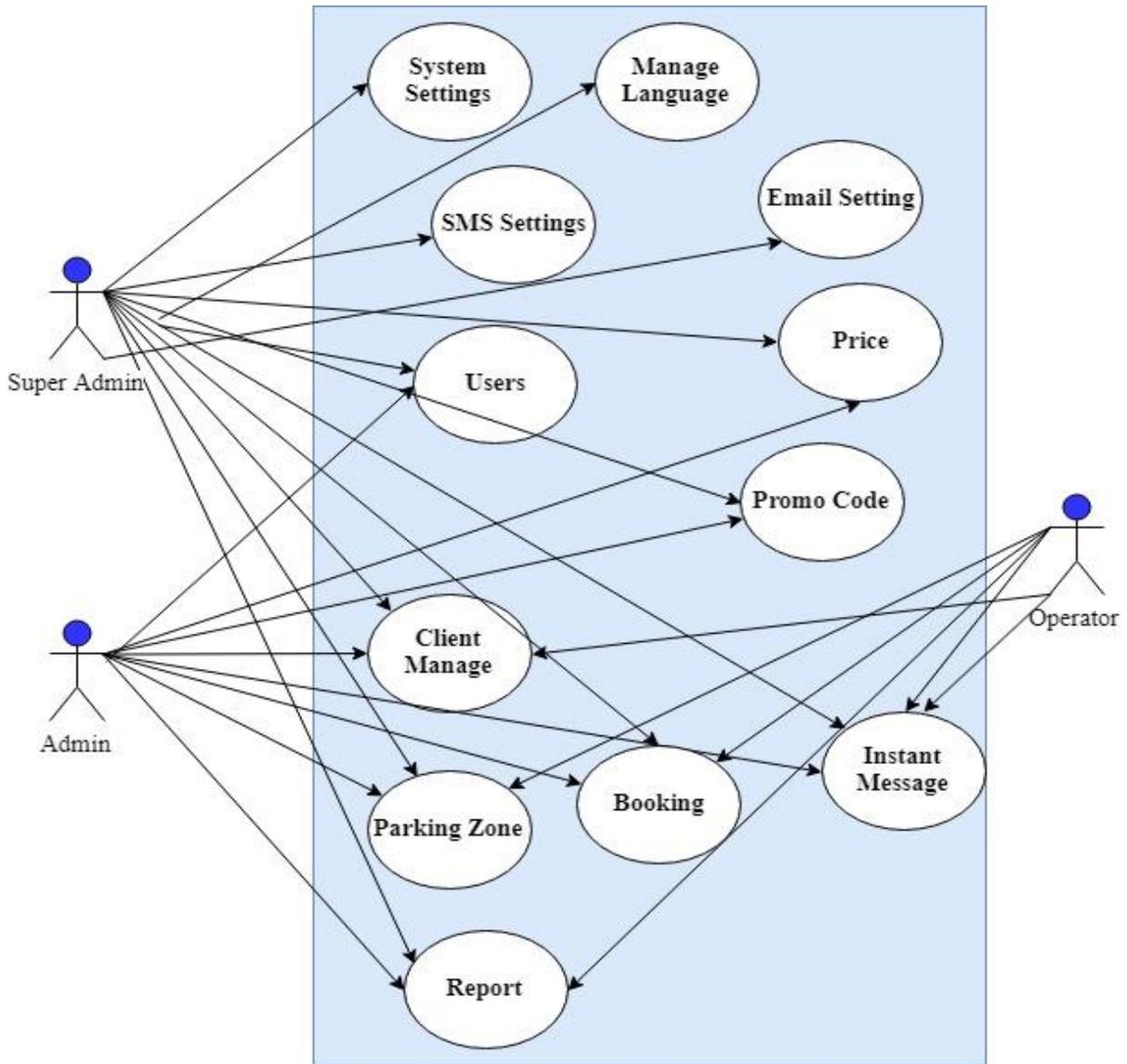


Figure: 4.1 Use Case Diagram

4.5 Entity Relationship Diagram

This is entity relationship diagram of our project. Every rectangular shape represents each table/entity, every title on the rectangular form is represented column of the table. Every linked signed indicate relationship both table and here is mention relationship

title. In the Figure: 4.2 Entity Relationship Diagram shows relationship between entities.

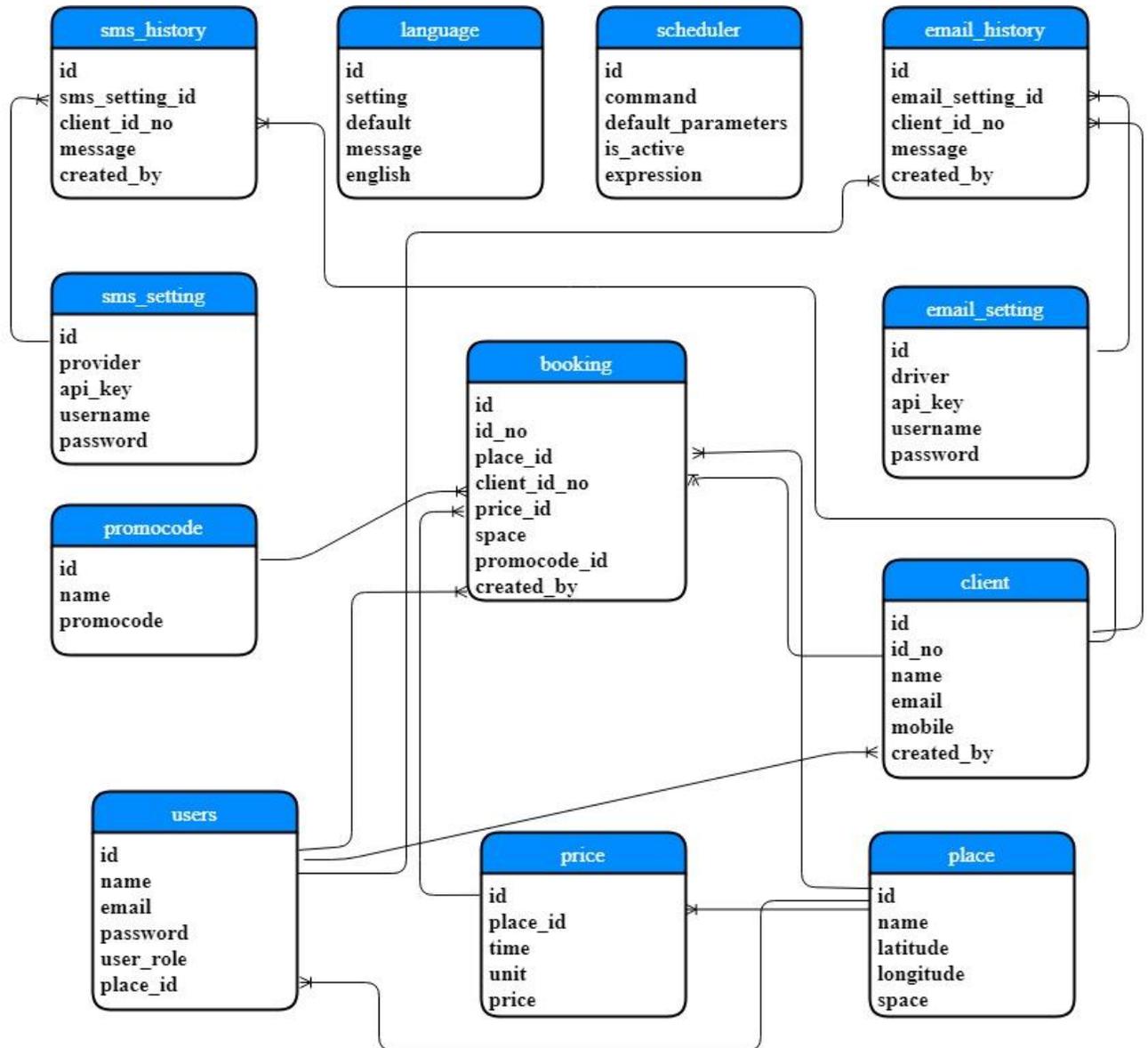


Figure: 4.2 Entity Relationship Diagram

4.6 Functions and Main Module of the System

- Login
- Dashboard
- Client/Customer

- Parking Zone
- Price
- Promo code
- Booking
- *Report*
- User
- Setting

4.6.1 Login

This is the home page of our developed system. In our system have Three types of users, Super Admin, Admin and Operator, and every user can login using this login interface. And after login, they can perform an action based on the defined role and user type. Here is our project login interface below in Figure 4.3 Login Interface.

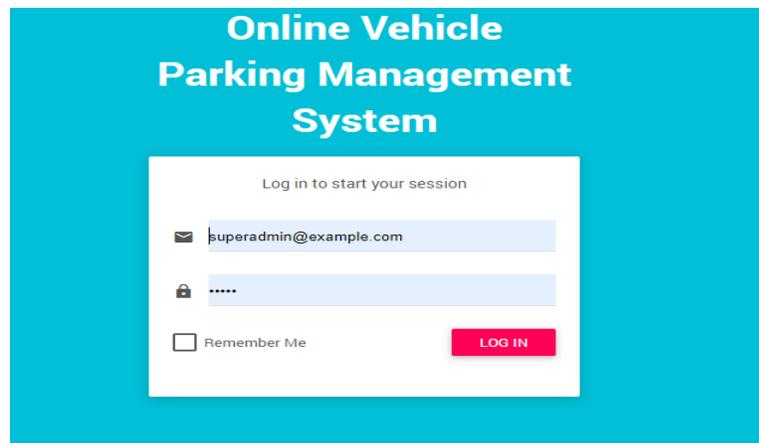


Figure 4.3 Login Interface

4.6.2 Dashboard

A dashboard, in website administration, is typically the index page of the control panel for a website's content management system. We will be able to easily administer all

aspects of our website in one place - such as updating our website's content, changing settings, backing up our data and much more - via our Dashboard. We will be able to login to our Website Dashboard any time we like. We figure out all section in Figure: 4.4 Dashboard. All sections are given below on list

- Total Booking
- Active Booking
- Release Booking
- Paid Booking
- Unpaid Booking
- Net Amount
- Total Amount
- And finally a total booking map in current year.

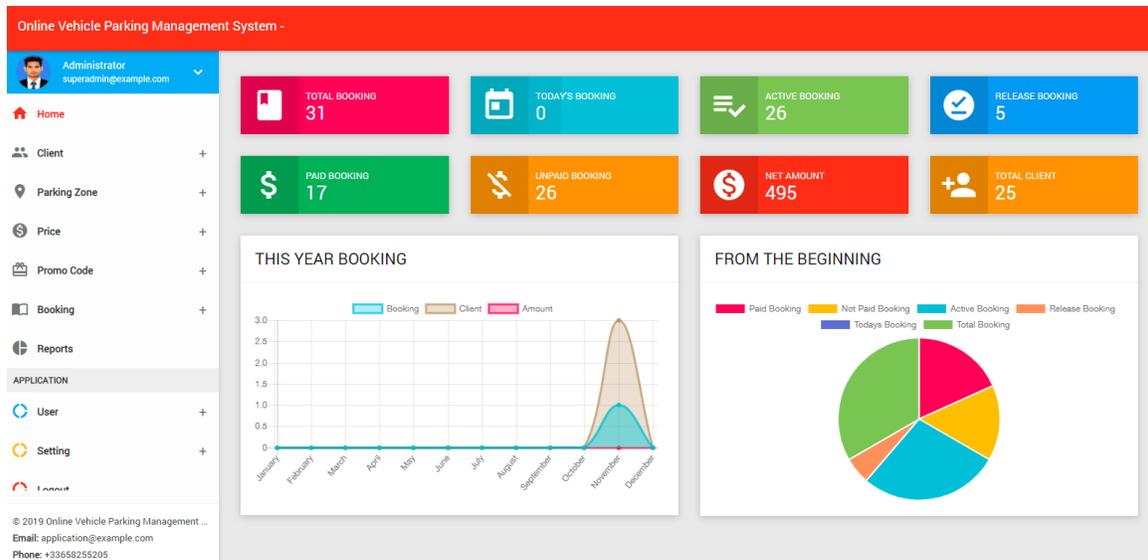


Figure: 4.4 Dashboard

4.6.3 Client/Customer

The major objective of this project is to provide facilities to the vehicles users. here the vehicles owner can keep their vehicles very easily and the vehicles took care concernedly along with security. The users can be categorized like

- Total booking user

- Active booking user
- Release booking user
- Paid booking user
- Unpaid booking user

Their name, mobile number, email address and address can be kept through which all the security information can be sent. Below in Figure: 4.5 Client List shown all types of client in the form of the list

Online Vehicle Parking Management System - Administrator superadmin@example.com

Client List

| SL No. | ID No. | Name | Phone / Mobile | Email | Address | Vehicle Licence | Vehicle Photo | Note | Status | Action |
|--------|--------|---------|----------------|-------------------|---------|-----------------|---------------|------|-------------------------------------|--------|
| 1 | A0012 | XYZ Doe | 0123456789 | admin@example.com | | Dhaka -12345 | | | <input checked="" type="checkbox"/> | |
| 2 | A0000 | Label 1 | 0123456789 | admin@example.com | | E3232 | | | <input checked="" type="checkbox"/> | |
| 3 | A0013 | Label 1 | 0123456789 | admin@example.com | | E3232 | | | <input checked="" type="checkbox"/> | |
| 4 | A0007 | Label 1 | 0123456789 | admin@example.com | | E3232 | | | <input checked="" type="checkbox"/> | |
| 5 | A0011 | Label 1 | 0123456789 | admin@example.com | | E3232 | | | <input checked="" type="checkbox"/> | |

© 2019 Online Vehicle Parking Management ...
Email: application@example.com
Phone: +33658255205

Figure: 4. 5 Client List

New client can be included in this section. Here a new Registration form can be used where user name, address mobile number, email address and license number, vehicle photo (not required), note (not required) and status. Should be put on this form. After fill-up the Client Registration form has to click on “Save button” then the message will show “Registration Successful.”. In Figure: 4.6NewClient shown the new client registration form.

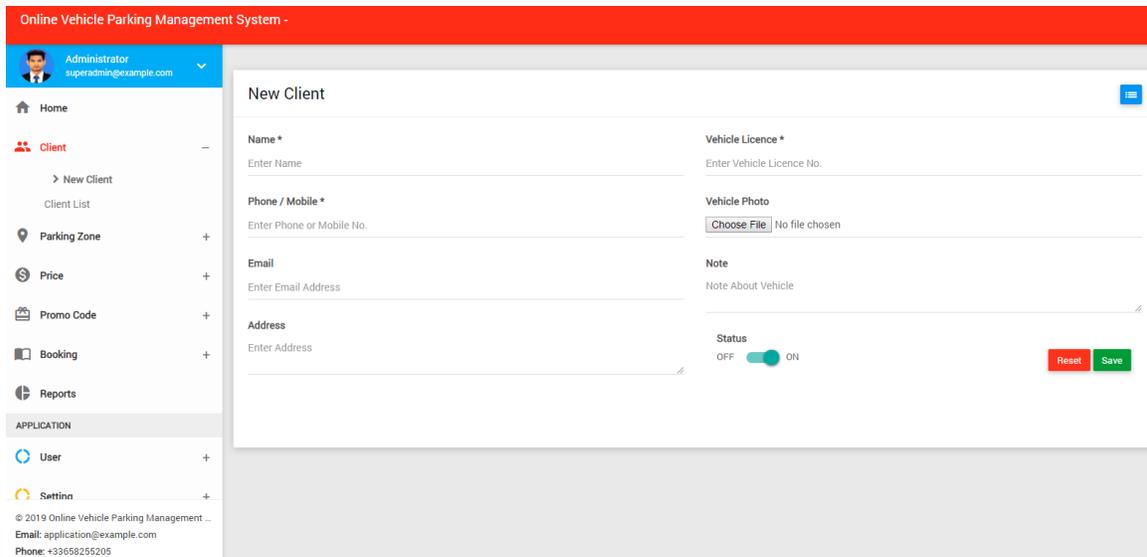


Figure: 4.6NewClient

4.6.4 Parking Zone

To add new parking zone at first should be select perfect location to using Google map. To find out very easily in a short time while a Google map used here, after select location using Google map should be fill up all given fields with proper information. New parking zone has Parking place name, latitude & longitude, Address, Limit, Space and Note fields. In space filed system admin can add many space using comma. Here also has status button it's give off on status. After fill-up the New Parking Zone form has to click on "Save" button. And if you think something is wrong, you can reset it by clicking on the "Reset" button. In Figure: 4.7NewParking Zone shown the New Parking Zone overview.

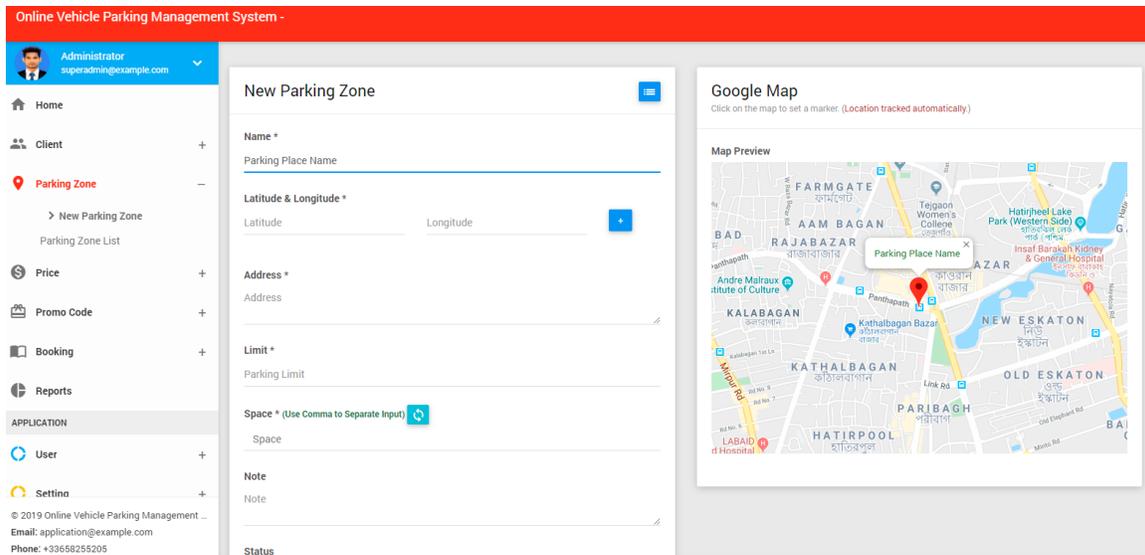


Figure: 4.7 New Parking Zone

4.6.5 Price

Different prices have been shown in the price section which helps clients to choose the price. Here in this section the price should be different among the new and old users. Price will be divided into 3 sections. The list of price is below

- New Price
- Parking Wise Price
- Price list

Open New Price page, here shown new price form. New price form has Perking zone, Time & price and Note fields. Should be put on this form. Here also has a status button it's give time and price status. Here are two types of time and price sharing

- Hourly based
- Unit based

In Hourly based section customer pay hourly and Unit based section customer pay every single unit. When status button is off Hourly based system id on and when status is on that time Unit based is on.

After fill-up the form has to click on “Send” button then the message will show “Message has been send successfully”. And if you think something is wrong, you can reset it by clicking on the Reset button. Figure: 4.8

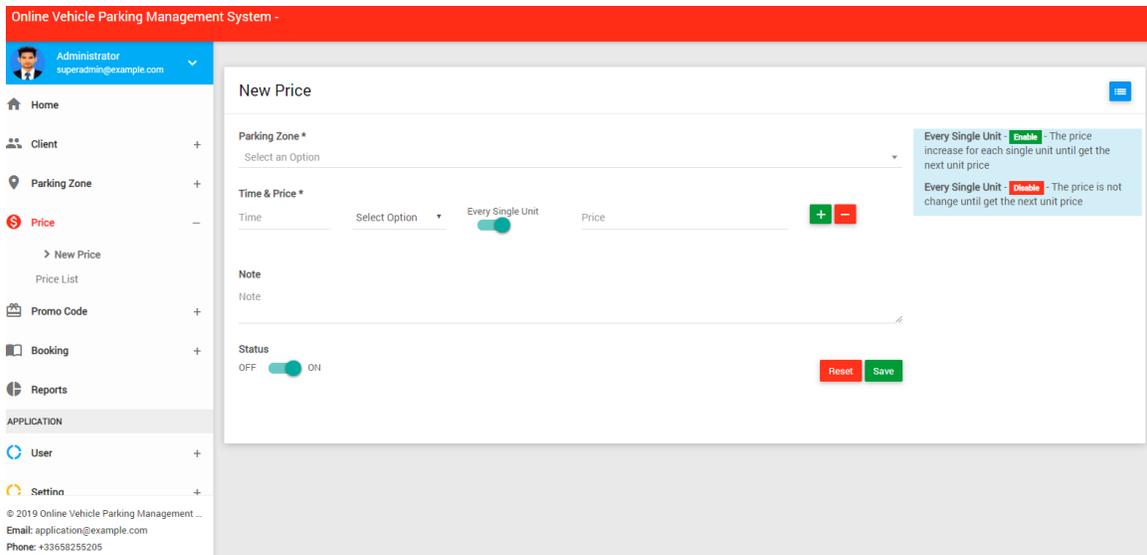


Figure: 4.8 New Price

Parking Wise Price will be different due to the different categorized of parking wise price like upper level, lower level and middle level.. In Figure: 4.9 Parking Wise Price shown the parking zone, time, unit, price and every single unit over view into Parking Wise Price section.

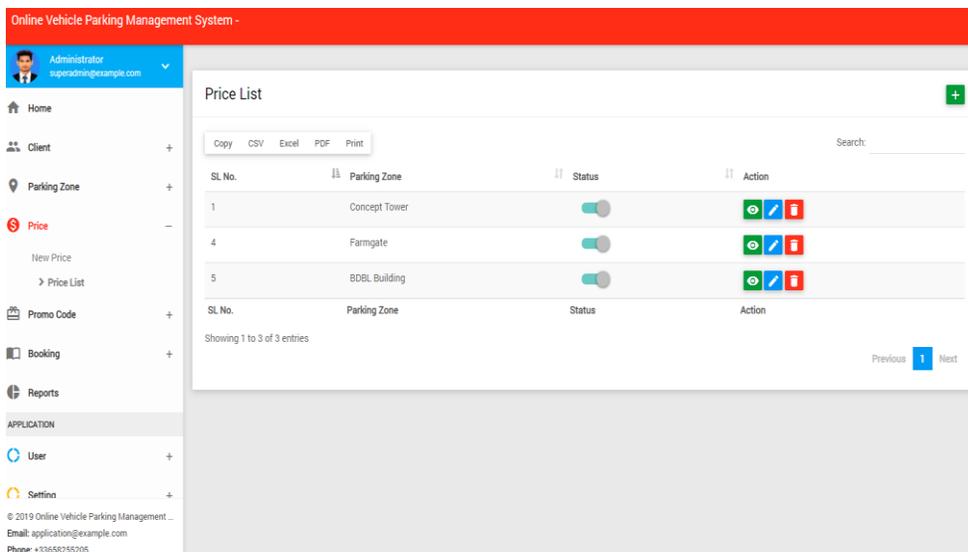


Figure: 4.9 Parking Wise Price

Here the Price list can be displayed according to the all types of price and price level. In Figure: 4.10 Price List shown the Price list of all types of price.

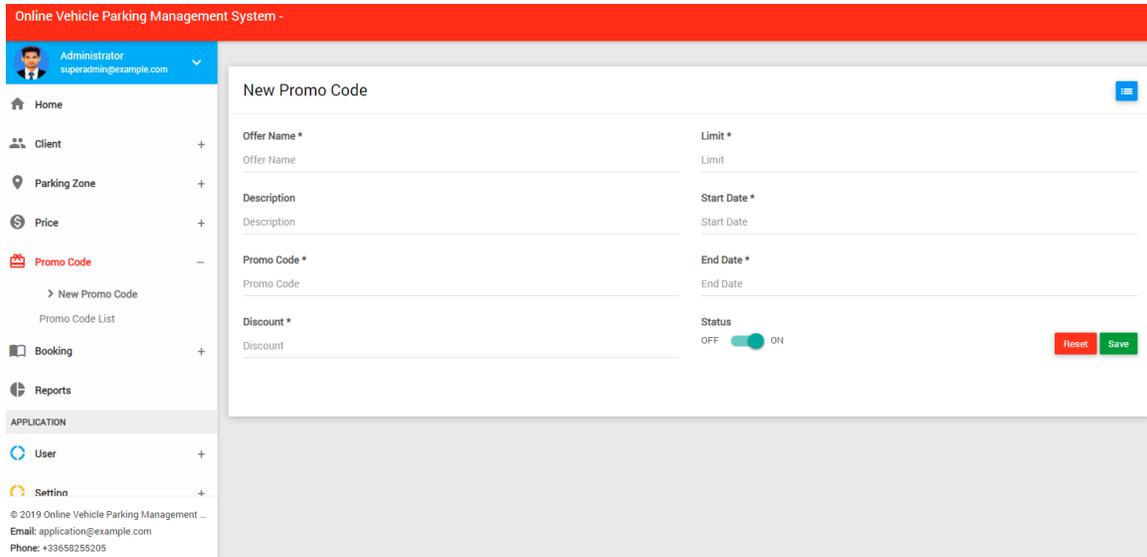


Figure: 4.10 Price List

4.6.6 Promo Code

If there is any offer, then promo code will be used. Usually offered in any festival. In Offer time promo code will be provided by system admin to users, they can use the code in offer time. The offer will have a specific time, in case the promo cannot be used at the offer time, if the offer time is gone then it cannot be used. Different types of promo code be used for different users for a particular offer. How many time can be used the promo code system admin will be mentioned in offer.

New Promo code can be included in this section. Here a new Promo code form can be used where offer name, description, Promo code, discount, limit, start time, end and status. Should be put on this form. Here a status button also when button is on offer is going on and when button is off that time offer is off After fill up the form has to click on “Save button” then the message will show “You have successfully created Promo code”. In Figure: 4.11 New Promo Code shown the Add Promo code form.

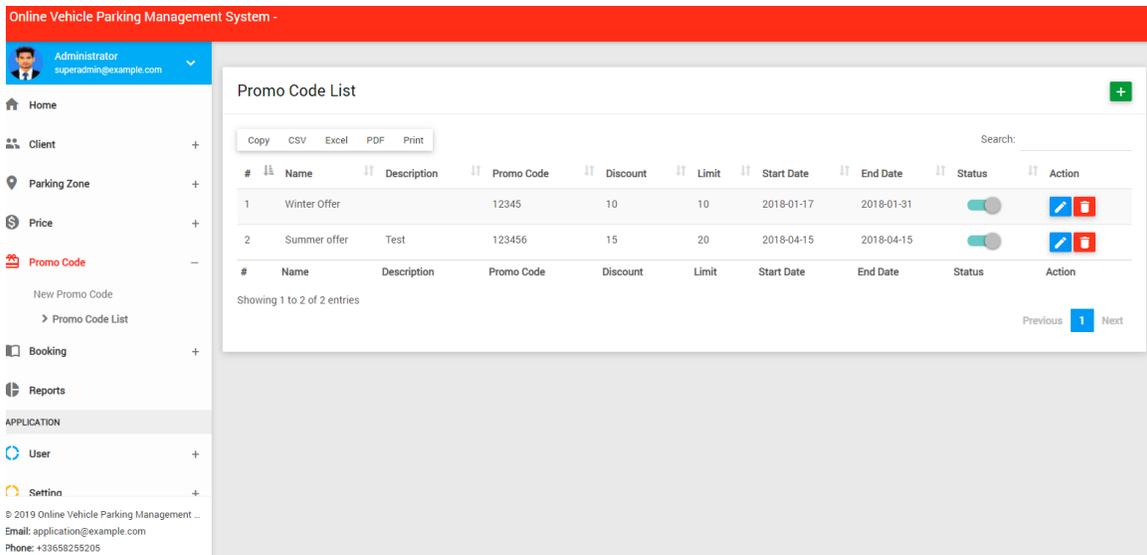


Figure: 4.11 New Promo Code

Here the Promo code list can be displayed according to the all types of Promo code and level. Figure: 4.12 Promo Code List shown the list of Promo code and promo code user's details.

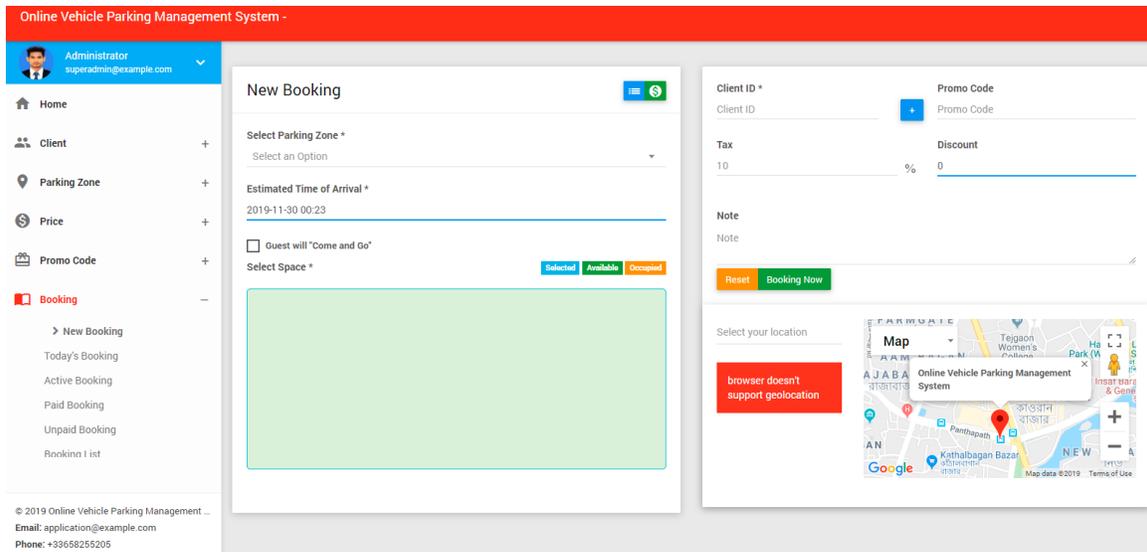


Figure: 4.12 Promo Code List

4.6.9 Booking

The proposed project is a smart parking booking system that provides vehicles owner an easy way of reserving a parking space online using web portal. It overcomes the problem of finding a parking space in marketing areas that unnecessary consumes time. Hence, this project offers a web application based reservation system where vehicles owner can view various parking spaces and select nearby or specific area of their choice to view whether space is available or not. If the booking space is available, then vehicles owner can book it for specific time slot. The booked space will be marked and will not be available for anyone else for the specified time.

New Booking can be included in this section. Here a new Booking form can be used where select parking zoon, estimated time of arrival, client id, Promo code, discount, and tax should be put on this form. To find out very easily in a short time while a Google map can be used here. After fill-up the form has to click on booking new button then the message will show “You have successfully booked”. In Figure: 4.19 New Booking shown overview of New booking system form.

The screenshot displays the 'New Booking' form within the 'Online Vehicle Parking Management System' interface. The form is divided into several sections:

- Header:** 'Online Vehicle Parking Management System -' in a red bar, and a user profile for 'Administrator' (superadmin@example.com).
- Left Sidebar:** A navigation menu with options: Home, Client, Parking Zone, Price, Promo Code, and Booking (highlighted in red). Under 'Booking', there are sub-options: New Booking, Today's Booking, Active Booking, Paid Booking, Unpaid Booking, and Bookings List.
- Main Form Area:**
 - Select Parking Zone *:** A dropdown menu with the text 'Select an Option'.
 - Estimated Time of Arrival *:** A text input field containing '2019-11-30 00:23'.
 - Guest will "Come and Go":** A checkbox that is currently unchecked.
 - Select Space *:** A large green rectangular area representing the available parking spaces.
- Right Panel:**
 - Client ID *:** A text input field with 'Client ID' below it.
 - Promo Code:** A text input field with 'Promo Code' below it.
 - Tax:** A text input field with '10' and a '%' symbol.
 - Discount:** A text input field with '0'.
 - Note:** A text area with 'Note' below it.
 - Buttons:** 'Reset' (orange) and 'Booking Now' (green).
 - Map:** A Google Map showing the current location with a red pin. A red box over the map says 'browser doesn't support geolocation'.
- Footer:** Copyright information: '© 2019 Online Vehicle Parking Management ...', email 'application@example.com', and phone '+33658255205'.

Figure: 4.13 New Booking

Here the Booking List can be displayed according to the all types of Booking. In Figure: 4.20 Booking List shown overview Booking List of booking system below.

Online Vehicle Parking Management System -

Administrator
superadmin@example.com

Home

Client

Parking Zone

Price

Promo Code

Booking

Reports

© 2019 Online Vehicle Parking Management ...
Email: application@example.com
Phone: +33658255205

Booking List

Showing 1 to 25 of 31 entries

Show 25 entries Copy CSV Excel PDF Print Selected Print Column visibility Search:

| SL No. | ID No. | Parking Zone | Space | Client ID | Price | Tax | Fine | Discount | Estimated Time of Arrival | Departure Time | Booking Status | Action |
|--------|---------|---------------|-------|-----------|-------|-----|------|----------|---------------------------|---------------------|-----------------|----------------------------|
| 1 | A000001 | Farmgate | 1 | A0018 | 30 | 3 | 3 | 0 | 2018-04-27 13:50:00 | 2018-04-28 23:48:00 | Released Paid | Token Delete Release |
| 2 | A000002 | Farmgate | 2 | A0017 | 30 | 3 | 0 | 0 | 2018-04-27 17:12:00 | 2018-04-28 23:48:00 | Released Paid | Token Delete Release |
| 3 | A000003 | Farmgate | 3 | A0017 | 30 | 3 | 3 | 0 | 2018-04-27 17:12:00 | 2018-04-28 23:49:00 | Released Paid | Token Delete Release |
| 4 | A000005 | Concept Tower | 2 | A0017 | 0 | 0 | 0 | 0 | 2018-04-28 03:03:00 | | Active Not Paid | Token Delete Release |
| 5 | A000006 | Concept Tower | 2 | A0017 | 0 | 0 | 0 | 0 | 2018-04-28 03:03:00 | | Active Not Paid | Token Delete Release |
| 6 | A000007 | Concept Tower | 2 | A0017 | 0 | 0 | 0 | 0 | 2018-04-28 03:03:00 | | Active Not Paid | Token Delete Release |
| 7 | A000008 | Concept | 2 | A0017 | 0 | 0 | 0 | 0 | 2018-04-28 | | Active Not Paid | Token Delete Release |

Figure: 4.14 Booking List

4.6.10 Reports

In this section, the various published reports based on the criteria including criteria such as booking, release booking, today's booking, all booking, parking zone analysis, client ID, booking ID and date date filter. In Figure 4.21 Reports shown overview of Reports.

Online Vehicle Parking Management System -

Administrator
superadmin@example.com

Home

Client

Parking Zone

Price

Promo Code

Booking

Reports

APPLICATION

User

Setting

Logout

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Email: application@example.com
Phone: +33658255205

Reports

Start Date End Date All Booking Select Parking Zone

Select Filter Type Search Search

Copy CSV Excel PDF Print Selected Print Column visibility Search:

| SL No. | ID No. | Parking Zone | Space | Client ID | Vehicle Licence | Price | Tax | Fine | Discount | Estimated Time of Arrival | Departure Time | Status |
|--------|---------|---------------|-------|-----------|-----------------|-------|-----|------|----------|---------------------------|---------------------|--------------------|
| 1 | A000031 | BDBL Building | 5 | A0001 | E3232 | 0 | 0 | 0 | 0 | 2018-11-12 18:25:00 | | Active Not Paid |
| 2 | A000002 | Farmgate | 2 | A0017 | Feni-Ha-1000 | 3 | 3 | 0 | 0 | 2018-04-27 17:12:00 | 2018-04-28 23:48:00 | Released Paid |
| 3 | A000003 | Farmgate | 3 | A0017 | Feni-Ha-1000 | 3 | 3 | 3 | 0 | 2018-04-27 17:12:00 | 2018-04-28 23:49:00 | Released Paid |
| 4 | A000005 | Concept Tower | 2 | A0017 | Feni-Ha-1000 | 0 | 0 | 0 | 0 | 2018-04-28 03:03:00 | | Active Not Paid |
| 5 | A000006 | Concept Tower | 2 | A0017 | Feni-Ha-1000 | 0 | 0 | 0 | 0 | 2018-04-28 03:03:00 | | Active Not Paid |

Figure: 4.15 Repots

4.6.13 User

A **user** is a person who uses a computer or network service. **Users** generally use a system or a software product without the technical expertise required to fully understand it. Power **users** use advanced features of programs, though they are not necessarily capable of computer programming and system administration.

Add New User can be included in this section. Here a new form can be used where user name, email address, password and confirm password, user code, photo and status. Should be put on this form. After fill-up the form have to press” Save button”. Then an acknowledgment message show “You are successfully added”. In Figure: 4.27 Add New User shown overview Add New User.

The screenshot shows a web application interface for an "Online Vehicle Parking Management System". The top navigation bar is red and contains the system name and the user's role as "Administrator" with the email "superadmin@example.com". A sidebar menu on the left lists various system components: Home, Client, Parking Zone, Price, Promo Code, Booking, Reports, and an "APPLICATION" section with sub-items like "User", "New User", "User List", and "Settings". The main content area is titled "New User" and contains a form with the following fields: "Name *" (empty), "Email *" (pre-filled with "superadmin@example.com"), "Password *" (masked with "*****"), "Confirm Password *" (empty), "User Role *" (a dropdown menu with "Select an Option"), "Photo" (a "Choose File" button with "No file chosen" text), and "Status" (a toggle switch currently set to "OFF"). At the bottom right of the form are "Reset" and "Save" buttons.

Figure: 4.16 Add New User

Here the **User List** can be displayed according to the all types of users. In User list all users are stored. Figure: 4.28UserList shown Admin list.

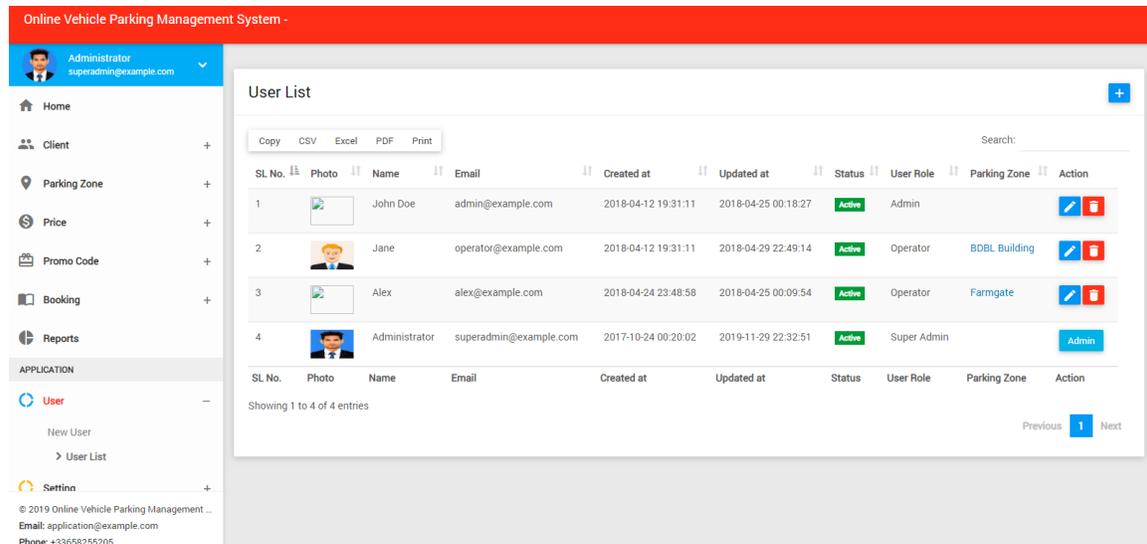


Figure: 4.17 User List

4.6.14 Setting

In this project have three types of admin user. They are Supper admin, Admin and Operator. Super admin has full control of project system, he can update, delete and add everything to his wish. and System admin can access all the rest except for a few features of project system, but Operator can access only some options likes, user adding, sending emails, sms, message and could see list of sms, email, message, booking list, user list and booking list of customers.

This is the **Application Settings** option for system admin where Bit Parking lot admin can manage specialty and departments. Which is used when any new user, client/customer, new price and new feature adds into the system. System admin has to press on Settings option then come on the Application Setting. After fill-up the form, system admin has to click on add button then the message will show “You have successfully added. System admin also can edit, update and delete. Figure: 4.29 Application Settings shown the application setting overview.

Online Vehicle Parking Management System -

Administrator
superadmin@example.com

- Home
- Client +
- Parking Zone +
- Price +
- Promo Code +
- Booking +
- Reports +

APPLICATION

- User +
- Setting -

Profile

© 2019 Online Vehicle Parking Management ...
Email: application@example.com
Phone: +33658255205

Application Setting

Application Title *
Online Vehicle Parking Management System

Short Description / Slogan
Short Description / Slogan

Email *
application@example.com

Phone
+33658255205

Address
Address

Favicon
Choose File No file chosen

Logo
Choose File No file chosen

Google Map

Click on the map to set center point. (Location track automatically)

Google Map Api Key *
AlzaSyDDXkzEij9sB3J_ohqT0woVWqAJQiyRmAE

Map Zoom Level * (Range 1 to 20 and the best zoom level is 7)
15

Latitude & Longitude *
23.749937868096605 90.39224624633789

Map Preview
Search your location

Figure: 4.18 Application Settings

CHAPTER 5

CONCLUSION

In this chapter, we have finalized the thesis paper with some important points. Section 5.1 summarizes the significance of the work in practical field. Section 5.2 states some challenges which we had to encounter during project's work. Section 5.3 demonstrates the future work of the developed project and introduces some of the new technologies which can be added in future in the manifested system. Section 5.4 brings some of the restrictions of the work which can be a barrier for the system and finally, Section 5.5 concludes the chapter.

5.1 Significance of the work:

The significance of a smart car parking system is inevitable. Our developed system is capable of reducing parking related problems. It is a secure, efficient, intelligent and reliable system that ensures space availability, proper management of the parking lot, real time status, and negotiation of the parking fee. Users can be relaxed with their valuable time since the system is time-saving and faster. The system is capable of controlling the number of cars inside it, monitoring the movement of the parking lot, and checking the space for the cars to be parked very precisely, thus delivering an effective system for the users. Moreover, it shows the real-time status of data that can help to prevent parking violations and suspicious activities if taken by the employees or security guards in the parking zone. In this manner, the system increases safety to the parking areas. In a nutshell, the significance of the developed system plays a vital role to the reduction of parking problems. If it's well-maintained and well-monitored, then the system can be able to help urban areas get rid of the parking concern.

5.2 Challenges:

While working on this project, we had to face several challenges. Some of them are technical and some of them are non-technical. These challenges are described below:

5.2.1 Technical Challenges:

We faced some of the technical challenges at the beginning of our project as we were unacquainted with the tools we used to make the project. Some of them are Laravel, HTML, CSS and JavaScript which helped us a lot and facilitated our project's tasks.

Since our project is large, we have chosen Laravel PHP framework for the back-end development. This is because, Laravel is a free and open-source platform which provided organized codes and helped us to manage codes and solve bugs of the project. Besides, we used HTML, Bootstrap, JavaScript, and Ajax for front-end development. However, things were not rosy initially. We had to be familiar about these toolkits before we apply these into our project which was a big challenge for us. We studied some books, blogs, and documentations to gather knowledge about these technologies and discussed a lot with our course-mates which was a challenging issue for us.

5.2.2 Non-technical Challenges:

We are “service holder” doing job in different private companies. Moreover, we are pursuing B.sc in CSE in the evening at Green University of Bangladesh. Hence, it was quite harder for us to learn about this project and research on the tools and technologies of making this project. However, we tried heart and soul to complete this project in spite of being busy. As we reside in different places, so, there was a communication gap between us and it was too much hard to get together. Consequently, we had to communicate through online which was annoying and time wasting at the beginning. Nevertheless, overcoming all the obstacles we were able to accomplish this project. Hopefully, it would be positive ones to us all.

5.3 Future Scope:

The future of the developed system is bright since we are moving towards advanced technology. The system has been developed by considering future modification possibility with new technology. The proposed system can be enhanced in future by adding new features and methods of the upcoming technology. The developers of this system intend to continue their involvement and contribution to this system for further development. The following features may be included in future:

- Parking availability, procedure, cost, and all the related information can be added in a website by which drivers can get the exact information before parking in depth.
- It's a little bit difficult for the drivers to find out a parking space and also it wastes their valuable time. Hence, to make them get rid of this situation GPS tracking can be a greatest advantage which helps them find out the place and thus, saves their time.
- There could be a mobile application for future modification of this project through which users can get the occupancy status of the parking space, updates, notifications and suggestions of the parking space, and they can book the area for their cars to be parked.
- Artificial Intelligence (AI) is the greatest stuff of modern technology which allows machines or computer systems to perform tasks like a human brain does. An AI based system can be added with the existing one to make the system operate on its own, meaning that no staff is required to maintain it and for number plate detection of the cars.
- Besides, the developed system can be more connected and integrated with trends and technologies such as Machine-to-Machine, IoT (Internet of Things) and cloud-based services.

5.4 Limitations:

The system is designed to provide a better solution for parking related problems. It allows users to park their cars in a simplified and effective way. However, the proposed comes with a few limitations which can be due to system vulnerabilities or technical difficulties during operation. These limitations may hamper the efficiency of the system if it's not well-operated. Some of the limitations are described below:

- There is no process of returning ticket or token in our system.
- The facility of advance booking for the users is absent in the system, and they will not get emails, notifications, and updates about the parking space in advance.
- Since the system is web-based and hosted on a server, it might have server down or disconnection issue and some technical difficulties may occur in the system when it's active.

5.5 Final Verdict:

The humankind always dreams for Smart Cities that can provide them a better quality of life, sustainability, mobility, security, education, and many more essential things. The modern technology has given a hope in making smart cities in a reality. Smart cities refer to the development in every sector. Hence, the smart parking system is in dire necessity which may change the perspective of the cities, thus contributing to the progression of smart cities. The efforts made in this project intend to lessen parking issues of a city and thereby aiming to enhance the living standard of its residents.

We worked heart and soul to make this project much effective. At the beginning, we encountered some of the challenges and finally overcame them just because of having interest on this project. Our dedication, patience, love and motivation to this project led us to its accomplishment. The developed system can be improved and upgraded further by extending the system with new features and modules of advanced

REFERENCE

- [1] Automated Parking <<<https://automatedparking.com/>>>last accessed on 05-05-2019 at 11:00 AM
- [2] AGV <<<http://www.mhi.org/what-is-an-agv.pdf>>>last accessed on 07-01-2019 at 12:30 PM
- [3]Crane Parking<<<http://www.automatedroboticparking.com/>>>last accessed on 08-01-2019 at 10:00 AM
- [4] Puzzle Parking<<<https://www.rrparkon.com/puzzle>>>last accessed on 10-01-2019 at 10:00 AM
- [5] Comes to the USC at<<<https://cityliftparking.com/>>> last accessed on 07-02-2019 at 11:00AM
- [6] Intelligent Parking << <http://www.japanretailnews.com/>>>last accessed on 05-02-2019 at 12:00 PM
- [7] Front and back ends <<<https://en.wikipedia.org/>>> last accessed on10-02-2019 at 04:00 PM
- [8] Front vs Back End<<<https://www.coursereport.com/>>>in last accessed on 11-02-2019 at 02:00 PM
- [9] What are front and back-end<<<https://www.quora.com/>>>in last accessed on 12-02-2019 at 05:00PM
- [10] PHP. History<<<http://php.net/manual/en/histor.php>>>in last accessed on 15-02-2019 at 12:00 PM
- [11] What is PHP<<<https://www.guru99.com/>>> last accesses on 15-02-2019 at 02:00 PM
- [12]PHP Advantages <<<https://bigcheaphosting.com/>>>last accessed on 20-02-2019 at 05:00 PM
- [13] PHP Disadvantages<<<https://www.w3trainingschool.com/>>>last accessed on 20-03-2019 at 07:00 PM
- [14] Laravel PHP framework<<<http://blog.flds.fr/site/assets/>>>last accessed on 25-03-2019 at 11:00 AM
- [15]What is Laravel<<<https://www.miraclenext.com/>>>last accessed on 11-04-2019 at 08:00 PM
- [15] Why It Is The Best PHP Framework<<<https://www.miraclenext.com/>>> last accessed on 11-04-2019 at 08:00 PM
- [16]Web application <<<https://www.theseus.fi/>>> last accessed on 20-04-2019 at 10:00 PM
- [17] MVC and how to use it effectively at<<<https://blog.pusher.com/laravel-mvc-use/>>>in last accessed on 16-02-2019 at 09:00 PM
- [18] Study HTML and Learn<<<https://html.com/>>>in last accessed on 18-02-2019 at 03:00 PM
- [19] HTML<<<https://www.theserverside.com/>>>in last accessed on 20-02-2019 at 09:00 PM

- [20] Ultimate Guide to CSS at <<<https://skillcrush.com/>>> in last accessed on 18-02-2019 at 09:00 PM
- [21] What is CSS <<<https://www.tutorialspoint.com/css/>>> last accessed on 18-02-2019 at 09:00 PM
- [22] The purpose of JavaScript <<<https://webplatform.github.io/docs/>>> last accessed on 18-02-10:00 PM.
- [23] What is JavaScript <<<https://www.bigcommerce.com/>>> last accessed on 18-02-2019 at 10:00 PM.
- [24] What is jQuery <<<https://jquery.com/>>> in last accessed on 20-02-2019 at 11:00 AM
- [25] jQuery <<<https://www.javatpoint.com/>>> last accessed on 20-02-2019 at 11:00 AM
- [26] What is Ajax <<<https://www.seguetech.com/>>> last accessed on 21-02-2019 at 12:00 PM.
- [27] Asynchronous JavaScript and XML <<<https://searchwinddevelopment.techtarget.com/>>> last accessed on 21-02-2019 at 12:00 PM.
- [28] Beginners Guide <<[URL:https://careerfoundry.com/](https://careerfoundry.com/)>> in last accessed on 21-02-2019 at 09:00 PM.
- [29] Bootstrap <<<https://getbootstrap.com/>>> last accessed on 22-02-2019 at 12:00 PM