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Car Rental Management System

[Development Of Car rental management system]

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ABSTRACT

The Car Rental System is being developed for customers so that they can book their vehicles from any part of the world. This application takes information from the customers through filling their details. A customer being registered in the website has the facility to book a vehicle which here quires. It is an online system through which customers can view available cars, register and book car. We developed this project to book a car on rent at the fare charges. In present system all booking work done manually and it takes very hard work to maintain the information of booking and cars. if you want to find which vehicle is available for booking then it takes a lot of time. It only makes the process more difficult and harder. This aim of the project is to automate the work performed in the car rental management system like records of cab, cabs available for booking, rental charges for cars, store records of the customer. Cars is a car booking software that provides a complete solution to all your day-to-day car booking office running needs. This system helps you to keep the information of customer online. You can check your customer information any time by using this system. Online car rental management system is a unique and innovative product. Based on this information you can take decision regarding your business development.

CHAPTER 1

1.INTRODUCTION

A database management system (DBMS)refers to the technology for creating and managing databases. DBMS is a software tool to organize (create, retrieve, update and manage) data in a database.The main aim of a DBMS is to supply away to store up and retrieve database information that is both convenient and efficient. By data,we mean known facts that can be recorded and that have embedded meaning. Normally people use software such as DBASEIV or V, Microsoft ACCESS, or EXCEL to store data in the form of a database. Database systems are meant to handle a large collection of information. Management of data involves both

defining structures for the storage of information and providing mechanisms that can do the manipulation that stored information. Moreover,the database system must ensure the safety of the information stored, despite system crashesor attempt sat unauthorized access.

In real world, not every person can afford their own personal car . A car rental is a vehicle that can be used temporarily for a fee during a specified period. Getting a rental car helps people get around despite the fact they do not have access to their own personal vehicle ordon'townavehicleatall.Theindividualwhoneedsacarmustcontactarentalcarcompanyandcontractoutforavehicle. Thissystemincreasescustomerretentionandsimplifyvehicleand staffmanagement.

To produce a web-based system that allow customer to register and reserve caronline and for the company to effectively manage their carrental business.To ease customer's task whenever they need to rentacar.Asallthesystemiscomputerized,thereisnoneedtofillanyapplicationformforrentingpurpose. So, the paperwork will be veryless.Tomakesureausergetshisdesirecarasearlyaspossible.Thecarrentalsystemwill provide a fasterresponsetocompletetheprocess

CHAPTER 2

2.LITERATURERE SURVEY

A literature review on car rental management systems would encompass studies, articles, and, benefits, challenges, and implementation strategies. Here's a brief overview of what such a literature review might cover:

2.1. Functionalities and Features

Reviewing literature to understand the core functionalities and features offered by car rental management systems. This could include reservation management, vehicle tracking, customer management, payment processing, and reporting capabilities.

2.2.Benefits and Advantages

Exploring the literature to identify the benefits and advantages associated with implementing a car rental management system. This may include improved operational efficiency, enhanced customer service, better fleet management, and increased revenue.

2.3. Challenges and Limitations

Examining the challenges and limitations faced by car rental businesses in implementing and using management systems., data security, user adoption, and technological constraints.

2.4. User Experience and Satisfaction

Analyzing studies that assess the user experience and satisfaction levels of customers and

Understanding how these systems impact the overall experience of renting a car and managing rental operations.

2.5. Technological Trends

Investigating emerging technological trends and innovations in car rental management systems, such as the integration of mobile apps, IoT devices for vehicle tracking, AI-driven analytics, and blockchain for secure transactions.

2.6. Case Studies and Success Stories

Reviewing case studies and success stories of car rental companies that have successfully implemented management systems. Understanding their experiences, challenges faced, and outcomes achieved can provide valuable insights for other businesses.

CHAPTER 3

3 SYSTEM ARCHITECTURE

The system architecture of a car rental management system typically involves several components working together to facilitate various functionalities and processes. Below is an overview of a typical architecture for such a system:

1. User Interface (UI)

Frontend components responsible for presenting the user interface to different stakeholders, including customers, rental agents, and administrators. Includes web interfaces, mobile apps, and possibly kiosks at rental locations for self-service options.

2. Application Layer

- Business logic and processing components responsible for handling user requests, managing data, and orchestrating system functionalities.
- Implements the core functionalities such as reservation management, vehicle tracking, customer management, and payment processing.

3**. Database Layer**

- Backend database system for storing and managing data related to vehicles, customers, reservations, transactions, and other relevant information.
- Utilizes a relational database management system (RDBMS) such as MySQL, PostgreSQL, or SQL Server, or NoSQL databases like MongoDB or Cassandra depending on the scalability and data requirements.

4. Integration Layer

- Middleware components responsible for integrating the car rental management system with external systems and services.
- Integrates with payment gateways for processing payments, GPS tracking systems for vehicle tracking, third-party booking platforms for reservation synchronization, and other relevant system

5. Security Layer

- Implements security measures to protect sensitive data, prevent unauthorized access, and ensure compliance with data protection regulations.
- Includes authentication mechanisms, role-based access control (RBAC), encryption for data transmission and storage, and monitoring/logging capabilities for auditing and compliance purposes.

6. Communication Layer

- Handles communication between different system components, including user interfaces, application servers, databases, and external services.
- Utilizes standard communication protocols such as HTTP/HTTPS for web-based interactions, TCP /IP for network communication, and messaging protocols for asynchronous communication.

7.Analytics and Reporting Layer

- Optional component for analyzing data, generating reports, and providing insights into system performance, customer behavior, and business trends.
- Utilizes data analytics tools, business intelligence (BI) platforms, and reporting frameworks to extract actionable insights from the data collected by the system.

8. Infrastructure Layer

- Physical or virtual infrastructure components that host and support the car rental management system. Includes servers, storage systems, networking equipment, and cloud services (if deployed in the cloud) required to run the system reliably and efficiently.

9. Monitoring and Management Layer

- Tools and utilities for monitoring system health, performance, and availability, as well as managing system configurations, updates, and deployments.
- Utilizes monitoring tools, logging frameworks, and management consoles to ensure the system operates smoothly and efficiently.

CHAPTER 4

4.SYSTEM REQUIREMENT

4.1HardwareRequirements

- Processor : Inteli3/i5/1.8GHz machine orabove
- Primarymemory : 4 GB RAM orabove
- Harddiskdrive : 1TB or greater

4.2SoftwareRequirements

- OperatingSystem: Windows 7 or higher
- FrontEnd : HTML5,CSS3,JavaScript
- BackEnd : PHP, SQL
- Frame work : Bootstrap
- Software : VisualStudioCode,XAMPP

4.3 TECHNOLOGIES USED

4.3.1 SQL

SQL (Structured Query Language) is a standardized programming language that's used tomanage relational databases and perform various operations on the data in them. The usesofSQLincludemodifyingdatabasetableandindexstructures;adding,updatinganddeletingrows of data; and retrieving subsets of information from within a database for transactionprocessing and analytics applications. Queries and other SQL operations take the form ofcommands written as statements -- commonly used SQL statements include select, add,insert, update, delete, create, alter and truncate. MySQL is a popular choice of database foruse in web applications, and is a central component of the widely used LAMP open sourcewebapplication software stack (and other 'AMP' stacks).

4.3.2 PHP

PHP is a server-side scripting language designed for web development but also used as ageneral-purpose programming language. PHP is now installed on more than 244 millionwebsites and 2.1 million web servers. Originally created by Rasmus Lerdorf in 1995, thereferenceimplementationofPHPisnowproducedbyThePHPGroup.WhilePHPoriginallystoodforPersonalHomePage,itnowstandsforPHP:HyperTextPreprocessPHP codeisinterpreted byawebserverwithaPHPprocessormodule,whichgeneratestheresultingweb page PHPcommandscanbeembeddeddirectlyintoanHTMLsourcedocumentratherthancallinganexternalfiletoprocessdata.Ithasalsoevolvedtoincludea command-line interface capability and can be used in standalone graphical applications.PHP is free software released under the PHP License. PHP can be deployed on most webservers and also as a standalone shell on almost every operating system and platform, freeofcharge.

4.3.3 HTML5

HTML5 is a markup language used for structuring and presenting content on the WorldWide Web.ItisthefifthandlastmajorHTMLversionthatisaWorldWideWebConsortium (W3C) recommendation. The current specification is known as the HTMLLiving Standard. It is maintained by the Web Hypertext Application Technology WorkingGroup (WHATWG), a consortium of the major browser vendors (Apple, Google, Mozilla,andMicrosoft).

4.3.4 CSS3

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentationofadocumentwritteninamarkuplanguagesuchasHTML.CSSisacornerstonetechnologyof the World Wide Web, alongside HTML and JavaScript. CSS is designed to enable theseparation of presentation and content, including layout, colors, and fonts. This separationcan improve content accessibility; provide more flexibility and control in the specificationofpresentationcharacteristics;enablemultiplewebpagestoshareformattingbyspecifyingthe relevant CSS in a separate .css file, which reduces complexity and repetition in thestructural content; and enable the .css file to be cached to improve the page load speedbetween the pagesthatsharethefile and its formatting.

4.3.5 JAVASCRIPT

JavaScript(JS)isadynamic computerprogramminglanguage.Itismost commonlyusedaspart of web browsers, whose implementations allow client side scripts to interact with theuser,controlthebrowser,communicateasynchronously,andalterthedocumentcontentthatis displayed. It is also being used in server-side programming, game development and thecreation of desktopandmobile applications. JavaScript is a prototype-based scriptinglanguagewithdynamictypingandhasfirst-classfunctions. ItssyntaxwasinfluencedbyC.ThekeydesignprincipleswithinJavaScriptaretakenfromtheSelfandSchemeprogram minglanguages.Itisamultiparadigmlanguage,supportingobject-oriented,imperative,and functional programming styles.

4.3.6 APACHEWEBSERVER

In this project apache server is used to parse and execute PHP pages, before deployingwebsitesontheserver,thewebsiteshouldbetestedatthedevelopersidetogetafeelofhowthewebsitewillwor k onactual server.Thereforeapacheserver is likea localserveron thedeveloperside,apacheservershouldbeinformedabouttheenvironmentonwhichitshouldwork. In our project apache server is configured to work with PHP, in this way all the PHPpagesareparsedandexecutedbytheserver.Whenapacheisinstalledonthesystem,thenitservicesiscontrolled byapache servicemonitor.

4.4 FEATURES
User friendly interface

Security

- The system should provide a high level of security and integrity of the data held bythe system , only authorized personnel of the company can gain access to thecompany's securedpage on thesystem.
- System provides security for the admin by allowing them to enter into the accountwiththeir respectiveIDand password.
- Ausercanonlyentertotheiraccountbyusingtheiremailandpassword.Onlyadminhaveprivilegesto updatedatabasecontents whichare usedby theuser.

Performance

- The system should have high performance rate when executing user's input andshould be able to provide feedback or response within a short time span usually 50secondsfor highly complicatedtask and 20to 25 seconds for lesscomplicatedtask.
- Thesystemprovidesuserfriendlyinterface,anycommonpeoplewithlittleknowledgecan use thesystem.
- Systemisrobust,reliableandfast,providesmoreefficiency.

Reliability

- It is the probability and percentage of the system performing without any failure fora specificnumberof usesoramount of time.
- Carrentalsystemprovidesreliableinterfaceasitprovidesdatasecurityanddatasafety.
- Usercan rely onthedetailspresentin thesystem, sinceitis providedby theadmin.

Consistency

- The car rental system provides consistency services, by retaining the data present inthedatabase.
- Theusergetsthedetailsthatareonlyprovidedbytheadmin,thusachievingcorrectnessof data in thedatabase

CHAPTER 5

5.SYSTEM DESIGN

5.1 FLOW CHART

A flowchart is a diagram that depicts a process, system or computer algorithm. They arewidely used in multiple fields to document, study, plan, improve and communicate oftencomplexprocessesinclear,easy-to-understanddiagrams.Flowcharts,sometimesspelledasflowcharts,userectangles,ovals,diamondsandpotentiallynumerousothershapestodefinethetypeofstep,along withconnectingarrows todefineflowandsequence. Theycanrangefrom simple, hand drawn charts to comprehensive computer-drawn diagrams depictingmultiplesteps and routes.

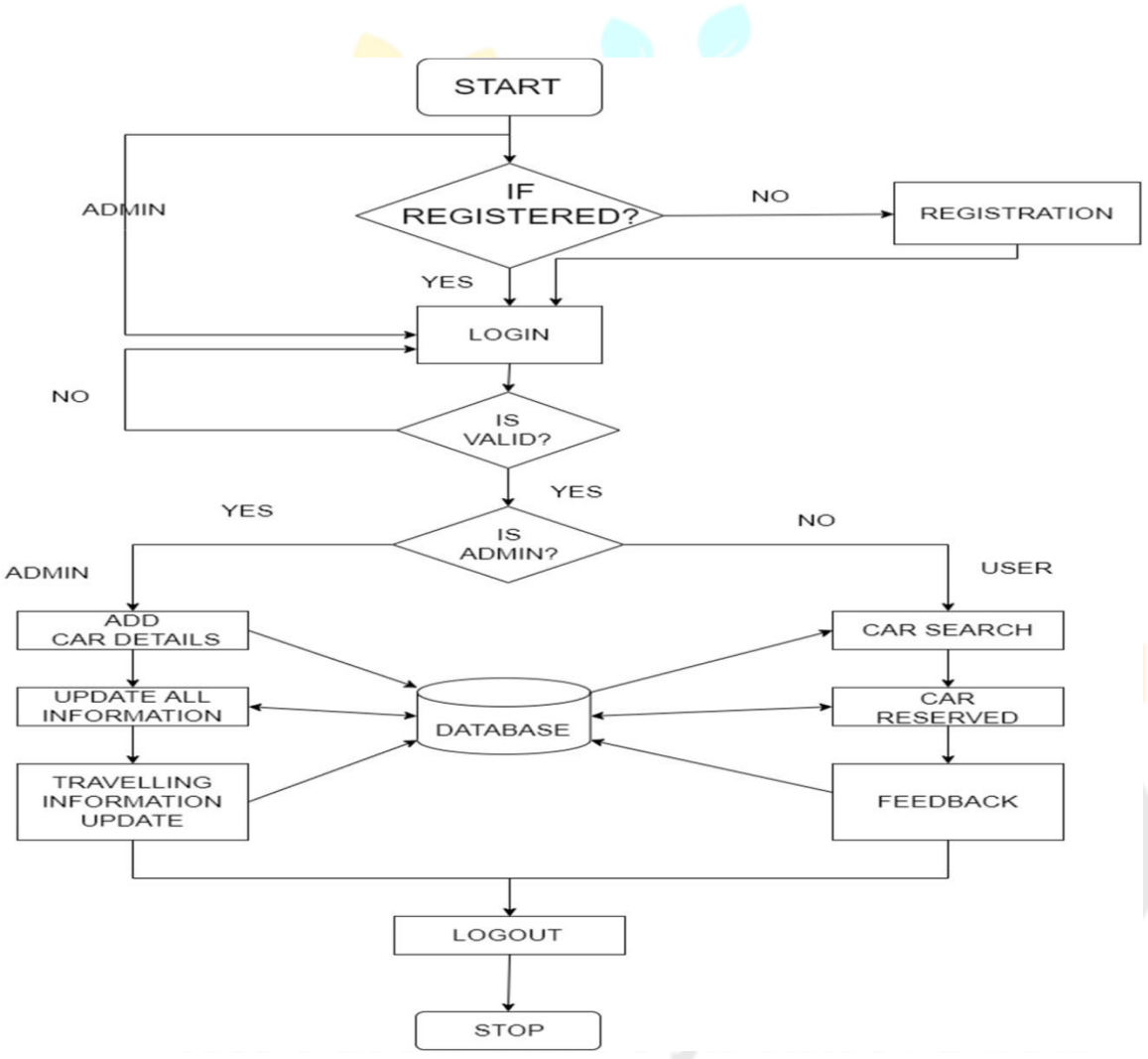


Figure 1 –Block Diagram

5.2ER DIAGRAM

ER Diagram stands for Entity Relationship Diagram, also known as ERD is a diagram thatdisplaystherelationshipofentitysetsstoredinadatabase.Inotherwords,ERdiagramshelpto explain the logical structure of databases. ER diagrams are created based on three basicconcepts: entities, attributes and relationships.ER Diagrams contain different symbols thatuserectanglestorepresententities,ovalstodefineattributesanddiamondshapestorepresentrelationships.

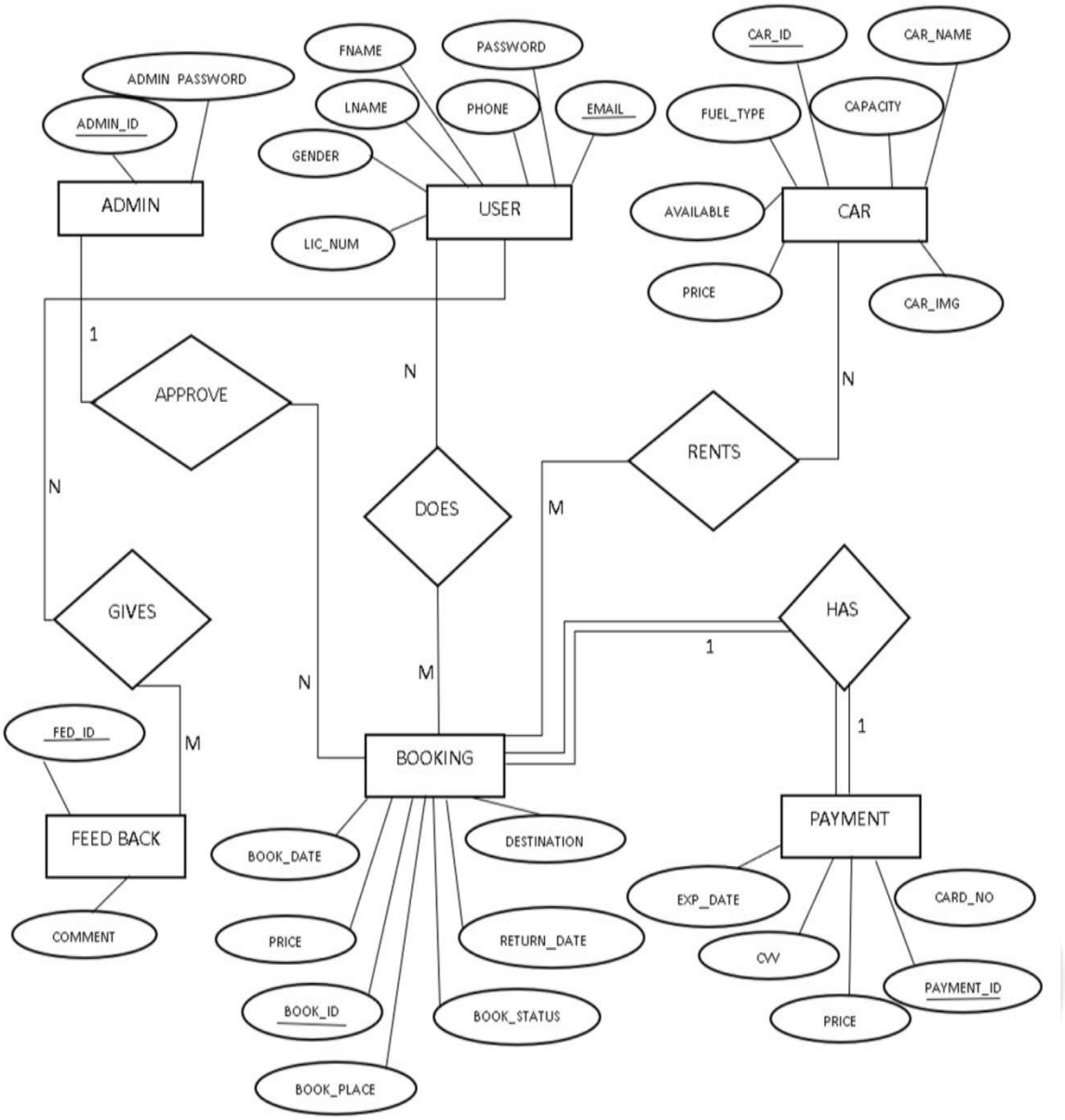


Figure 2 -ER DiagramofCarRentalSystem

Inthis,therearetotal6entitiesnamelyAdmin,User,Car,Booking,PaymentandFeedback Details. We took a relation APPROVE as a relationship between Admin andBooking entity with 1:N cardinality ratio because One admin can approve many booking.User entity has relationship DOES with Booking entity with N:M cardinality ratio sincemanyuserscandoesmanybookings.TherelationUserhasM:NrelationshipnamedGIVESwithFeedbackbecauseManyusercangivemanyfeedbacks.CarhasN:MrelationshipwithBooking entity as RENTS.Since car can haveN bookings. BookingDetails

has1:1relationshipbetweenPayment.InourERdiagramtherelationBookingandPaymentistotalparticipationand relation admin and booking, relation user and booking, relation user andfeedback,relation carand booking are partial participation.

5.3 SCHEMADIAGRAM

The design of the database is called a schema. This tells us about the structural view of thedatabase. It gives us an overall description of the database. A database schema defines howthe data is organized using the schema diagram. A schema diagram is a diagram whichcontains entities and the attributes that will define that schema. A schema diagram onlyshows us the database design. It does not show the actual data of the database. Schema canbe a single table or it can have more than one table which is related. The schema representstherelationship betweenthesetables.

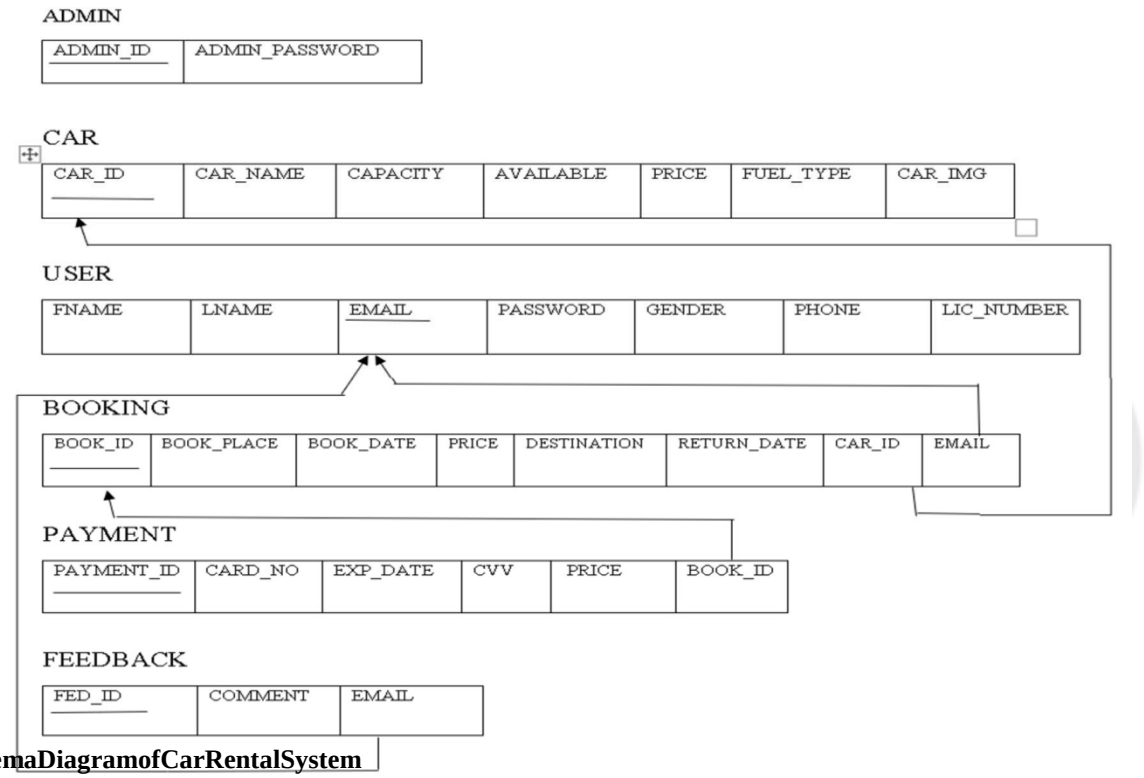


Figure 3-SchemaDiagramofCarRentalSystem

5.4 SYSTEM ARCHITECTURE

1.Client Interface

Web Interface: A user-friendly web application where customers can browse available cars, make reservations, view rental history, and manage their accounts.Mobile Interface: A mobile app with similar functionalities to the web interface, allowing users to access the system on the go.

2.Backend Services

User Management Service: Handles user authentication, registration, and account management.
Inventory Management Service: Manages the inventory of available cars, including adding new cars, updating car information, and marking cars as rented.Reservation Service: Facilitates the booking of cars, handles reservation requests, and manages reservation statuses.Payment Service:

Manages payments for reservations, handles payment processing, and ensures secure transactions.Notification Service: Sends notifications to users regarding reservation confirmations, reminders, and updates.Reporting Service: Generates reports on rental statistics, revenue, and other key metrics for administrative purposes.

3.Database Layer

User Database: Stores user information such as profiles, authentication credentials, and rental history.
Car Database: Stores information about available cars, including make, model, year, availability status, and rental history.

4.External Integrations

Payment Gateway Integration: Integrates with third-party payment gateways for processing credit card payments securely.Geolocation Services: Integrates with mapping APIs for location-based services, including finding nearby rental locations and calculating distances for pricing.
Vehicle Tracking Systems: Integrates with GPS tracking systems for real-time monitoring of vehicle locations, mileage, and maintenance schedules.

5.Security Layer

Authentication & Authorization: Implements secure authentication mechanisms such as OAuth or JWT to authenticate users and authorize access to resources.Data Encryption: Encrypts sensitive data such as user passwords, payment information, and personal details to ensure confidentiality.
Role-Based Access Control (RBAC): Defines roles and permissions to control access to different functionalities

within the system, ensuring data privacy and integrity.Secure Communication: Uses HTTPS protocol for secure communication between client applications and backend services, preventing data interception and tampering.

6.Infrastructure

Cloud Hosting: Utilizes cloud infrastructure providers such as AWS, Azure, or GCP for scalable and reliable hosting of the system components.Load Balancing: Distributes incoming traffic across multiple servers to improve system performance and availability.Containerization: Uses containerization technologies like Docker to package and deploy application components consistently across different environments.

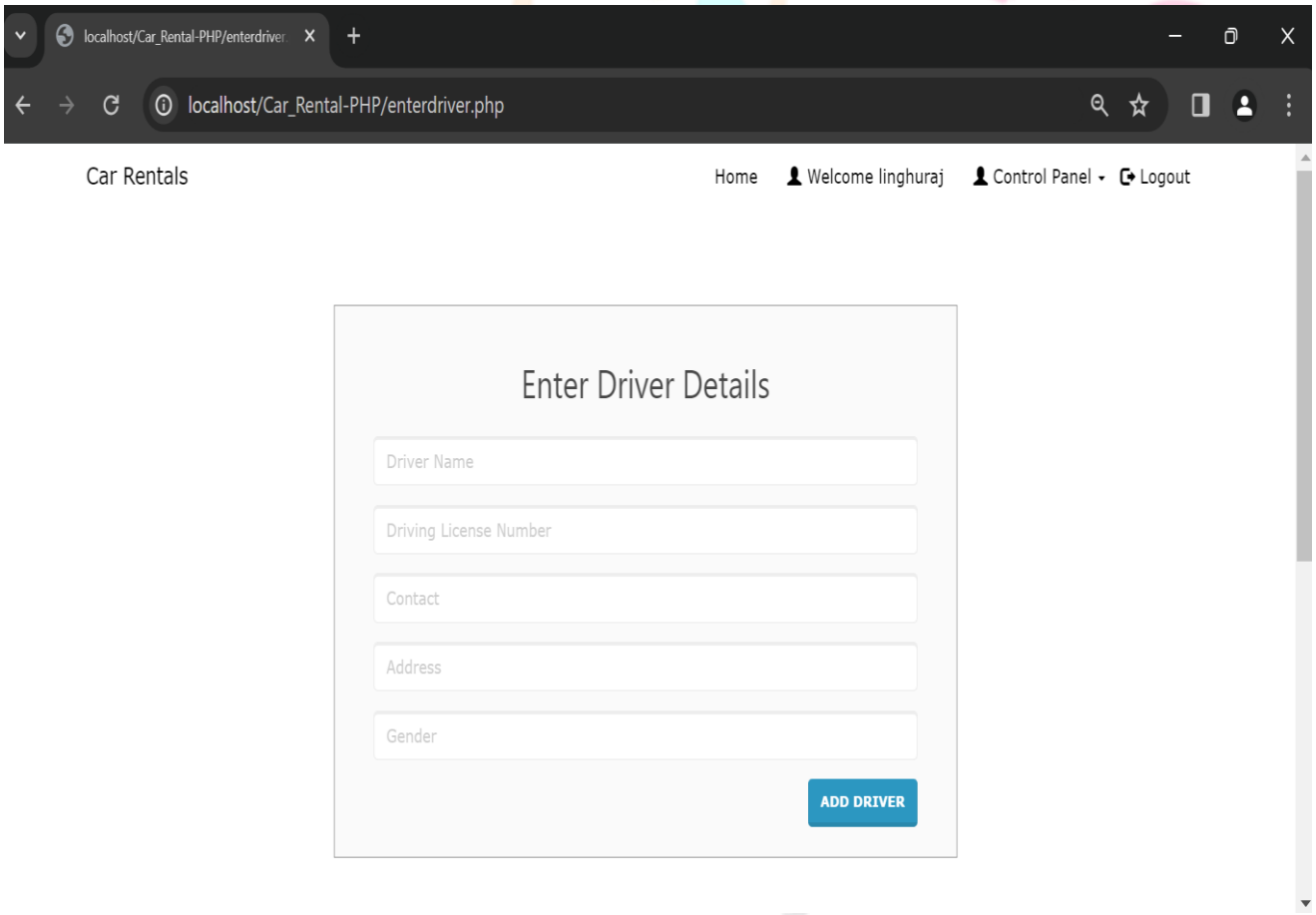
CHAPTER 6

6. MODULE IMPLEMENTATION

Register Module

The user needs to provide their first name, last name, email, license number, phone number, password, confirm password, gender for registration.

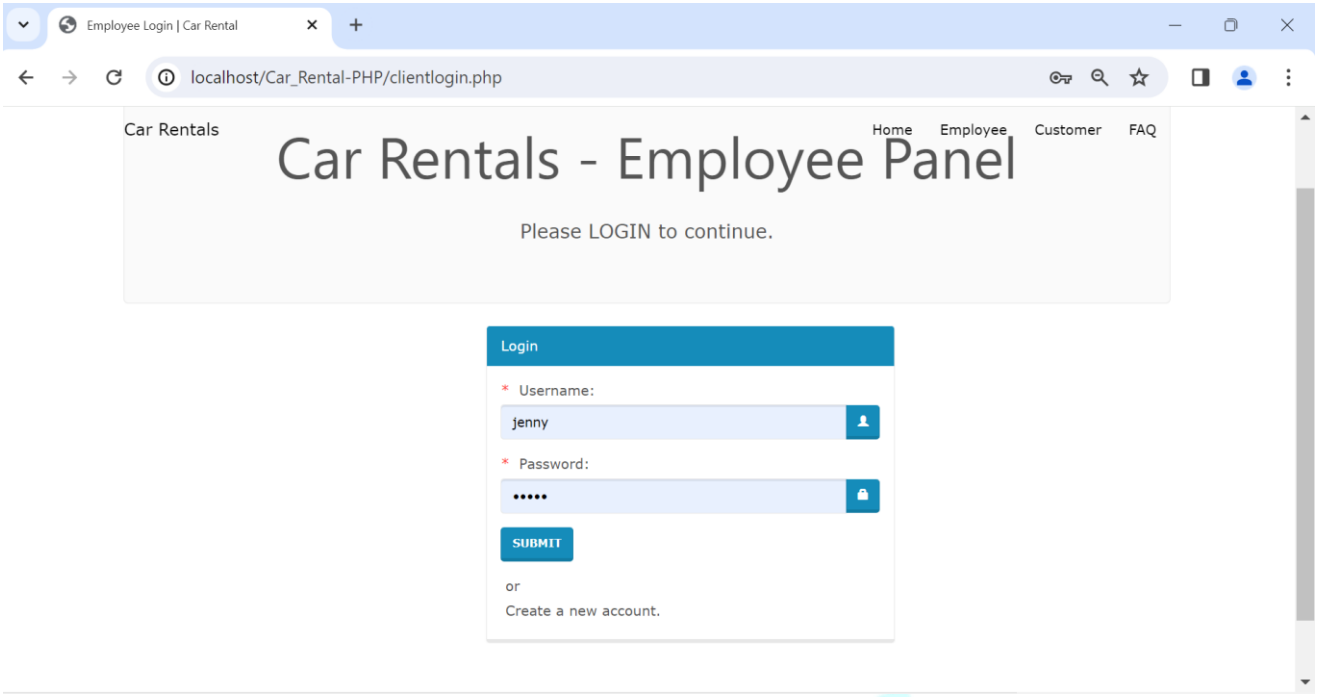
- These details will be stored in database.



Driver Login Module

- For login user will input their email and password .

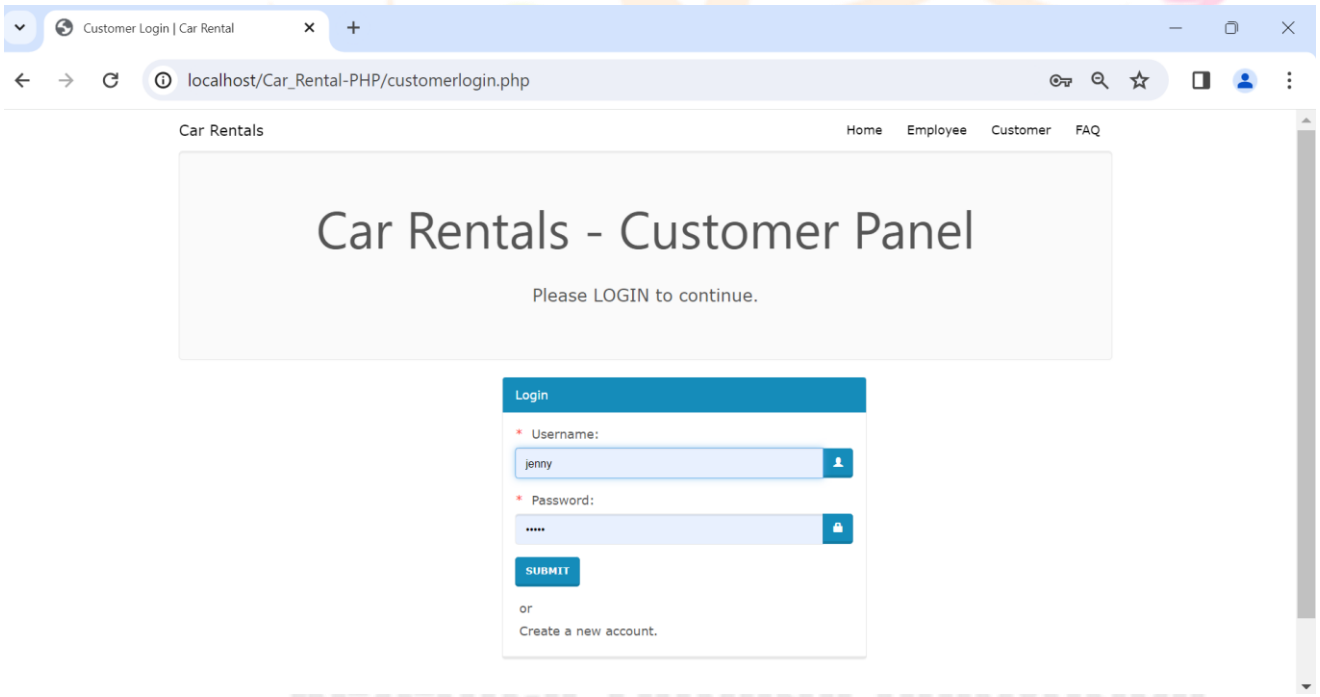
Admin will provide their admin id and password which will compared with a database content.



Customer Login Module

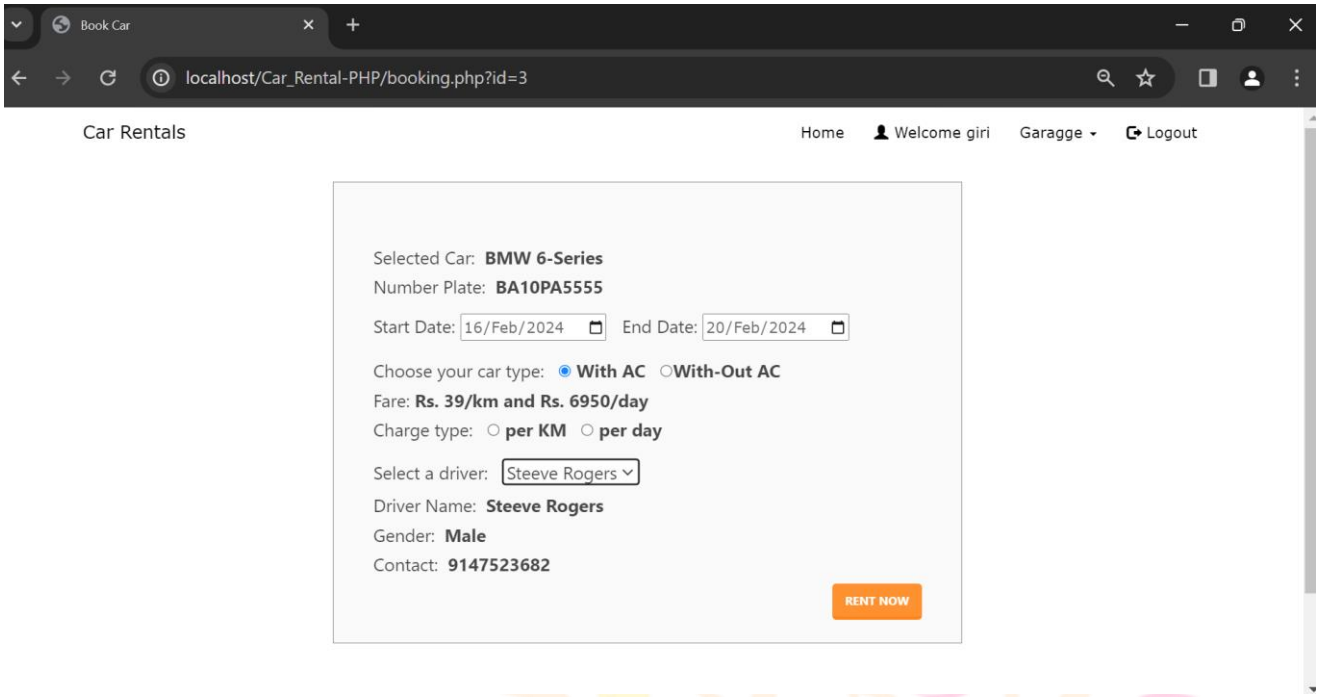
- For login user will input their email and password .

Admin will provide their admin id and password which will compared with a database content.



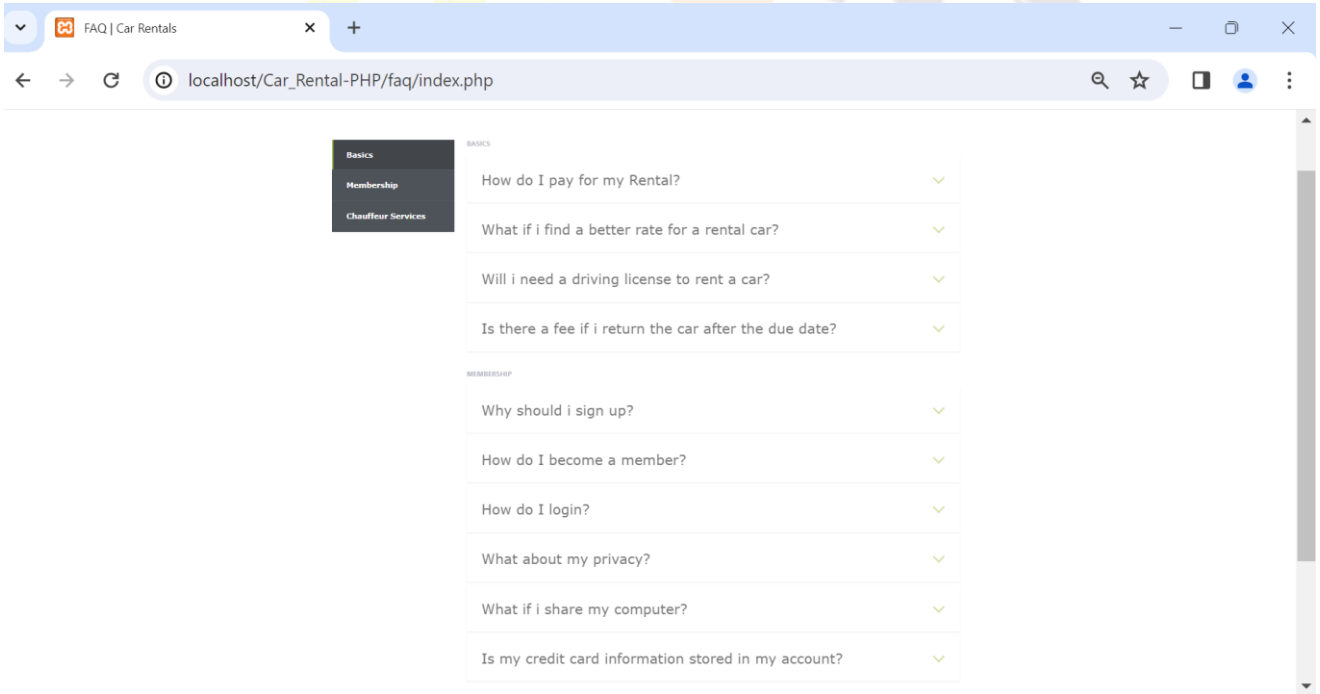
Booking Module

- User can view the list of cars. The booking details of cars are provided by the admin.
- User can select their preferred car and book for the same.



Feedback Module

- The system should allow user to gove feedback
- The system should also allow the users to give feedback



CHAPTER 7

7.APPLICATIONS

- The system automates various processes such as inventory management, reservation handling, and billing, leading to increased efficiency.

- Customers can easily browse available cars, make reservations online, and manage their bookings, improving overall satisfaction.
- The system provides insights into vehicle utilization, maintenance schedules, and performance metrics, enabling better fleet optimization and cost management.
- Companies can easily manage employee travel needs by booking rental cars in advance, tracking expenses, and ensuring compliance with corporate policies.
- Integration with tour operators and travel agencies allows for seamless booking of rental cars as part of vacation packages or travel itineraries.
- The system facilitates group reservations for events, conferences, or corporate gatherings, ensuring that participants have access to transportation as needed.
- Booking and Payment Integration: Integration with mobile apps and online platforms allows users to book rental cars or rides seamlessly and process payments securely.

The system can support dynamic pricing models based on demand, time of day, and other factors, optimizing revenue for service providers.

CHAPTER 8

9. CONCLUSION

- Online Car Rental Management System is user-friendly and customized software for car renting company.
- Online Car Rental Management System has been developed to manage and automate the overall processing of any large car renting company.
- Online Car Rental Management System project is capable of managing cars, booking, feedbacks, payment etc.
- It is a user friendly and customized software for providing support for company admin.
- This project is a very flexible software and it can be upgraded according to the individual needs.

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