Online Car Rental System

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Abstract— This paper explains the design, development, implementation and simulation of car rental service in a digital web-page. The design allows the customers to login and go through the service like setting the details of the car, booking the car based on the tariff. It is a user friendly interface and this increases the retention, simplify the vehicles and staff management. This model simplifies the admin work on modifying the data of cars, bookings, transaction details, car's availability and updating the details of models. Hence, this design reduces the manual paper work and missing of records or data thereby, this model is helpful for both user and in admin perspective. This Car Rental System is being produced for clients so they can book their vehicles from any piece of the city. This application takes data from the clients through filling their subtleties. A client being enlisted in the site has the access to book a vehicle which he requires. The proposed framework is totally incorporated online frameworks. It mechanizes manual methodology in a powerful and proficient way. This computerized framework encourages client and gives to top off the subtleties as per their necessities. It incorporates sort of vehicle they are endeavouring to contract and area. The motivation behind this framework is to build up a site for the general population who can book their vehicles alongside prerequisites from any piece of the city.

Keywords— Car Rental, Online System, Car Brands, Car Type, Bookings, Booking Management, Registered users

I. INTRODUCTION

This project is planned in order to be utilized via Car Rental Company having some expertise in leasing autos to clients. It is an online framework through which clients can see accessible autos, register, see profile and book vehicle. The progression in Information Technology and web entrance has incredibly improved different business procedures and correspondence between organizations (administrations supplier) and their clients of which vehicle rental industry isn't forgotten. This project aims to provide software to car rental servicing center that maintains the information about the customer details, vehicle details, insurance details, driver details, booking details and transaction details of the customer. This is an RDBMS based project which is currently using MySQL for all the transactions. A relational database management system (RDBMS) is a database management system that is based on the relational model as invented by E.F. Codd of IBM's San Jose Research laboratory. Many popular databases currently used are based. This System uses PHP 5.6 as front-end and MySQL as a back-end to provide a flexible, easy to use environment.

- Relational Database Management System (RDBMS)

This is an RDBMS based project which is currently using MySQL for all the transaction statements. MySQL is an open source RDBMS System.

- Brief Introduction about RDBMS:

A relational database management system (RDBMS) is a database management system (DBMS) that is based on the relational model as invented by E. F. Codd, of IBM's San Jose Research Laboratory. Many popular databases currently in use are based on the relational database model.

RDBMSs have become a predominant choice for the storage of information in new databases used for financial records, manufacturing and logistical information, personnel data, and much more since the 1980s. Relational databases have often replaced legacy hierarchical databases and network databases because they are easier to understand and use. However, relational databases have been challenged by object databases, which were introduced in an attempt to address the object-relational impedance mismatch in relational database, and XML databases.

Rest of the paper is organized as follows, Section I contains the introduction of Online Car Rental System , Section II contain the related work of proposed system , Section III

explains the implementation methodology with E-R diagram, Section IV describes results and discussion and snapshots of Online Car Rental System, Section V contains the conclusion and future scope.

II. RELATED WORK

"Simulating different car class upgrades in a car rental company's operations" – Abdullah A. Alabdulkarim

This paper exclusively speaks about simulating the the car class upgradation in the car rental system using discrete tools and methodology. Describes a generic discrete event simulation for studying the complex nature of a car rental company's operations. Simulating experiments regarding rental prices and car upgrades was designed and run it and obtained 0.5% error for various performance criteria. The generic tool for car rentals was created in extends (2018) which incorporates adequate flexibility and can be fitted to any car rental operating system of any size. This software can facilitate decisions on the number of upgrade levels to be offered to customer if the car class they asked for is unavailable during pickup. This paper specifies the development of new generic simulation tool. Results also suggest that the cars in the higher categories ought to be offered at slightly higher price than the average budget of customers for that car class. [1]

"Forecasting Car Rental demand based on Temporal and Spatial Travel pattern" -Shou Lei, Haiquan Wang, Chen Yang, Bowen DU, Runxing Zhong, Runhe Huang

The aim of this paper is to analyse the rental mobility pattern by examining multiple factors in a holistic manner. A special goal is to predict the demand of a given region. Specifically first analyse regular mobility based on real trips of rental class. Then extract key features from multiple types of rental-related data such as rental business profiles and geo social information of regions. Build flexible predictive model based on multi-tasking, which considers the geographical correlations of regions rather than view the station as stand-alone object. Develop a comprehensive approach for predicting the demand of rental car using multi-tasking learning method. This also helps in learning relationships between regions by considering multiple factors. [2]

"Demand responsive mobility as a service" -Jecinta Kamau Asir Ahmed, Anderw Reberio-H, Hironobu Kitaoka, Hiroshi Okajaima, Zahidul Hossein Ripon

Fundamental requirements in mobility are time, cost and comfort. Recent research in shared mobility systems, specifically demand responsive system addresses this kind of complex situations. Objective is to reduce passengers waiting time and propose a design of a DRT based Demand Responsive Maas (mobility as a service) model that provides

centralised management and ICT support. Using this discussed methodology the company can provide the service to the customers on demand using Demand Responsive Mobility as a service. [3]

"A new certificate less electronic cash scheme with multiple banks based on group signatures" -Shanping Wang, Zhiqiang Chen, Xiaofeng Wang

Most of the proposed E-cash systems require that the service provider and customer should belong to the same bank, which becomes the bottle-neck of E-cash wide applications. Objective is to propose a model of E-cash using multi-banks but a trusted third party. To propose a new E-cash scheme based on group signature form bilinear pairings. The identity based on public key cryptosystem is used. This designed E-cash scheme satisfies various security requirements. [4]

"On the prediction of future vehicle location in free-floating car sharing system" -Simone Formentin, Andera G. Bianchessi and Sergio M. Savaresi.

The aim of this paper is to enable car sharing anywhere within the operational area. There are some issues where there is no information about where the car will be available on the future location hence user needs to plan the usage of vehicles. VDP (Vehicle distance Prediction) is proposed to predict the distance of the nearest vehicle available at further instant. VSS is the service conceived for the drivers who use their car occasionally VDP uses past vehicle location to compute the prediction of further vehicle location and provide the distance from the nearest vehicle to the user. It allows user to return the car anywhere they opt. x (t+|k|t) =y (t) can be used to predict the future car location. Where y (t) is the distance of nearest vehicle at time t. System architecture is of three main-components. The server where the algorithm runs, The database storing the past data, The application should interact with the system used. [5]

"Implementation of RVND, VNS, ILS heuristic for the Travelling Car Renter Problem" -Rogerio Ferreira de Moraes, Andre Renato Villela da Silva, Luiz Satoru Ochi and Luis Marti.
This paper uses the methodology of travelling sales-man concept, where the customer wants to visit a set of cities using a rental car at a minimum cost. TSP uses Hamilton graph where the nodes represents the cities. The tariff depends on the type of car and service opted by the customer .The problem can arise where there is no car rental company, thus the customer cannot return the car in such cities. [6]

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"Optimization Approach to Station Location of car Sharing system" -Jingna Wang, Guowei Hua

This paper approaches to develop and solve a MILP model for rental station location taking into vehicle
Relocation problem at the same time. The optimization objective is minimizing the cost of system construction and optimizing the cost of users. The innovation of the paper is that the model combines both the strategic problem and operational problem to optimise the network layout of car sharing system and adjust the number of vehicles parked at the station by working staff during the operation period.[8]

III. METHODOLOGY

This is an RDBMS based project which is currently using MySQL for all the back-end transaction MySQL is a open source RDBMS System. All the details like car type, model, mileage and other features is inserted to the tables that is being created by the developers. Later when the user proceeds with bookings even those details be recorded in the tables which will be verified by the admin. The interaction between the database and the user is achieved by using PHP the web-designing tool. In this project PHP is being used as the frontend web designer tool which invokes the database of cars and services offered by the admin and plays the role presentation to the user according to their convenience. Users can acquire the services offered like booking the car as per their requirements or enquire about the models available using their unique ID.

This project provides the service of renting cars by the users based on specific tariff collected which depends on the service opted by the users. There is a certain protocol for the user to follow to book the cars and obtain the services. Initially, the customer has to login to the website using his unique ID (password) and it is verified by the admin. Once the user has logged-in he/she can go through the services or check for the car variants available and their tariff according the requirement. After the user books the car it should be confirmed by the admin where he checks for the availability for the particular car. The user her to enter the details of pickup date and delivery date, then his tariff will be displayed. Wherefore, he has confirm the bookings after entering essential details. The booking is not confirmed until the admin accepts the request because he has to verify the details of the

user and check the availability of the car requested by the user. After checking the details the admin should confirm the request, hence the request is confirmed and the message pops up in the user account.

Implementation is as follows:-
1. Steps for Creation Of tables-
1.1. Create table required for this system with entities along with their datatypes using MySQL CREATE TABLE command.
1.2. Insert the respected credentials into the table using MySQL INSERT command.
1.3. Update the primary key for each table in the database.

Similarly create all the essential and required tables into the database insert the values for each database. Now the database is ready to be used for retrieving the credentials of the customers, users, vehicles and the bookings.

2. Steps for creating a Web page-
2.1. Open the PHP software and open PHP coding page which has some default code and thus there is no need to write <html>, <head>, <body>.
2.2. Save the coding page and select the location to save that page. Select C drive and select the XAMPP.
2.3. Select htdocs folder in the XAMPP folder and save the file.
2.4. Now start to design the page. This page is divided into header, menu and centre. This also declares three menus, which link to home, login and feedback. Now we have to create a home page, login page and feedback page, so declare <ahref="#">.
2.5. Next step is to view the design of the page click Design. This shows our page design.
2.5. Open XAMPP control panel which is used to run our web page application.
2.6. Start apache in the XAMPP control panel it acts as the server to run the Web page.
2.7. Now select any web browser and type the link. The link is localhost/Online_Car_Rental and press enter. Now run the web page
2.8. Select CSS. CSS is cascading stylesheet. This is used to create style for Web page.
2.9. Open stylesheet coding page and develop the style and designing of the Web page.
2.10. Save the file as style.css in the open demo file.
2.11. First create the header page. Declare the #header and create the Background colour, which shows the colour and select one colour.
2.12. Declare the width size and height size, colour, border, size, image, margin-left and right size. Subsequently close the header.

2.13. Connect PHP and stylesheet. Link the stylesheet in the PHP coding. In the coding after </title>, link the stylesheet. Browse the stylesheet.

2.14. Select the stylesheet location select file name and click OK. Now the link is connected.

2.15. Now connect PHP and stylesheet. Declare the type and rel. Type is text/css and rel is Sttylesheet. Later go to the Browser and type localhost/Online_Car_Rental and run the Web page.

Follow the above steps to create the other essential required pages, like user login page and admin login page. Later connect the created Database and these web pages. Finally the system will be ready to use and provide desired services to the customers.

IV.   RESULTS AND DISCUSSION

The Online Car Rental System designed by following the above discussed steps is fully functional ready and is efficiently used to serve the purpose for which it was built. This system is capable of allowing users to login into the web page and surf through the web page and select which ever vehicle users requires and rent that vehicle for a limited time period. It also allows the admin to login into the system and handle all the transactions such as managing bookings, adding a new brand, new vehicle, managing the quarries raised by the customers and to also provide the service support to the customers. We have added few snapshots below which shows the results of certain operations carried out in the entire Online Car Rental System

Snapshots-
1. Database Snapshots-

id	UserName	Password	updationDate
1	Shankar	shanky	2019-04-02 19:32:44
3	Karthik	karthik	0000-00-00 00:00:00

IMG IV.1.1 Admin Details Table.

This table represents the data of the admin table. Name, Username and Password of the admins are stored in this table.

FullName	EmailId	Password	ContactNo	dob	Address	City	Country	RegDate	UpdationDate
Channa Keshava	channakeshava@gmail.com	channakeshava	9985456578	01/12/1998	31 Firstfloor Brigade Maganum MG Road	Bangalore	India	2017-06-18 01:29:27	2019-04-01 23:09:09
Chiranth Gowda	chirigowda@gmail.com	chiri	8265703354	19/06/1998	32nd Floor 3A block Sobha city RK Hegde Nagar Ben...	Bengaluru	India	2015-12-01 01:30:49	2019-04-02 15:08:43
Dilip G K	gkdilip@gmail.com	dilip	09999857868	03/02/1990	31 5th cross KR Circle New Delhi	New Delhi	India	2017-06-18 01:31:43	2019-04-02 19:37:43
Bindu M	bindu@gmail.com	binjuu	9999857868	5/08/1998	50th floor Manyata Tech Park Manali	Manali	India	2016-06-01 01:33:36	2019-04-02 15:15:12
Leela	leela@gmail.com	leelas	9015501898	17/04/1998	10th floor 2B block RMZ galleria Bandra	Mumbai	India	2017-06-29 23:49:08	NULL
Chermanna	ronith@gmail.com	chermanna	9015501898	10/12/1985	B11 Prestige Apartments Ghoripalya Dispur	Dispur	India	2014-03-14 16:36:55	2019-04-02 15:23:35
Adarsh H J	adarsh@gmail.com	adarsh	8147539179	14/07/1992	31 Prestige apartments JP Park Bengaluru	Bengaluru	India	2018-11-15 00:00:00	NULL

IMG IV.1.2 User Details Table

IMG IV.1.2 represents the tables of registered users stored in the database of the Online Car Rental system.

VehiclesTitle	VehiclesBrand	VehiclesOverview	PricePerDay	FuelType	ModelYear	SeatingCapacity
Innova Crysta	5	Luxury, 2D drive	300	Petrol	2017	7
Endeavour	6	SUV , 4D and 2D drive ,1066cc Engine	450	Diesel	2019	8
Phantom VIII	7	Luxury line, Automatic, Refridgerator, Massage fun...	5000	Petrol	2019	4
A8-L	3	Sedan, Luxury, 4WD	750	Petrol	2018	5
Swift	1	Sedan , Compact, Cruzier	150	Diesel	2017	4
Sunny	4	Sedan, Comfort, 1115cc Engine	120	Petrol	2014	5
Waganor	1	Sedan, Comfort,Eco-Friendly	100	CNG	2015	4
M760-li	2	Luxury, Sedan, 4WD, Mpower Engine	750	Petrol	2019	4
Mybach	8	Sedan, Luxury, 4WD, Convertible	650	Diesel	2018	4

IMG IV.1.3 Car Details Table

IMG IV.1.4 shows all the available cars with the company for rental purpose. "Select * from tblvehicles" is the MySQL command used retrieve the contents of this particular table.
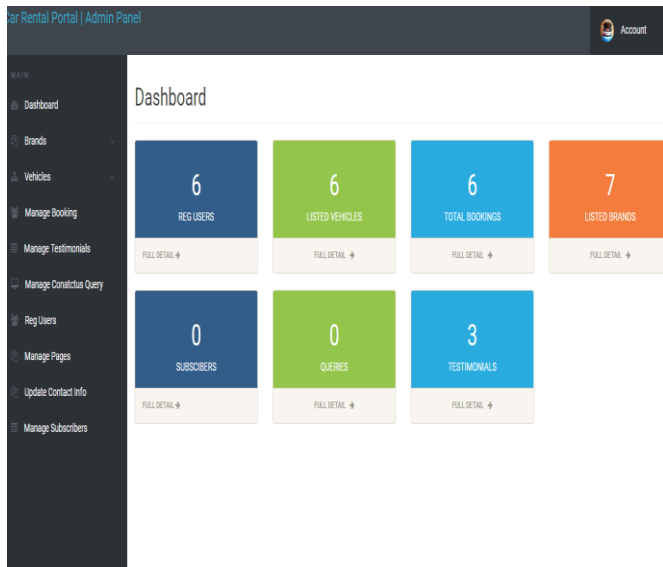
2. PHP Web page snapshots-

ADMIN LOGIN

YOUR USERNAME
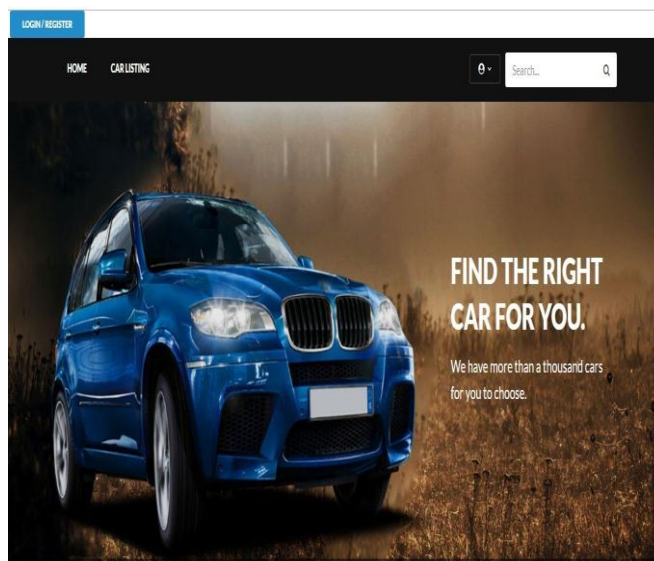
Username

PASSWORD

Password

LOGIN

IMG IV.2.1 Admin Login Page

This is an Image which represents the admin login page where admin ca login into the system by entering his unique Username and password. And can manage the internal transactions.
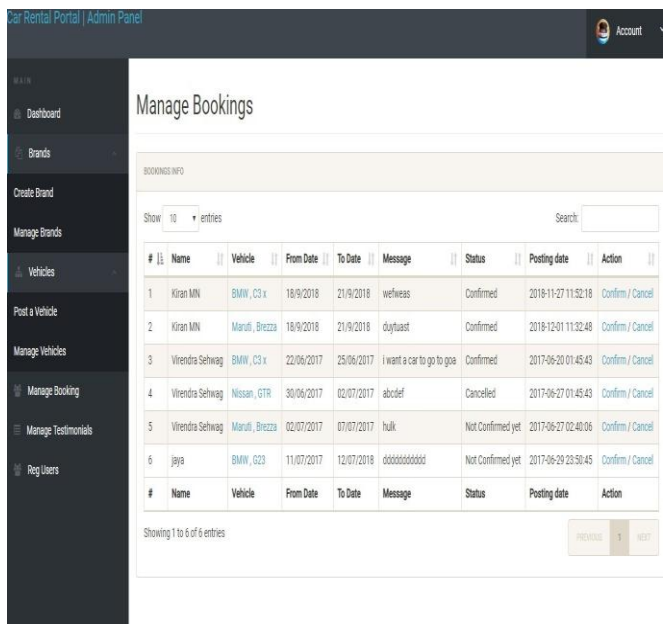
IMG IV.2.2 Admin Dashboard

This is the image of the admin web page which has the control over every operation or task performed in the designed system.


IMG IV.2.3 Manage Bookings Page

This picture represents the manage booking portal where admins manage the bookings of the users. The admin can confirm or reject the booking made by the user.

IMG IV.2.4 User Login Web-page

This image represents the User login page where user can enter the unique username and password given and login into the system and can rent the desired vehicle.
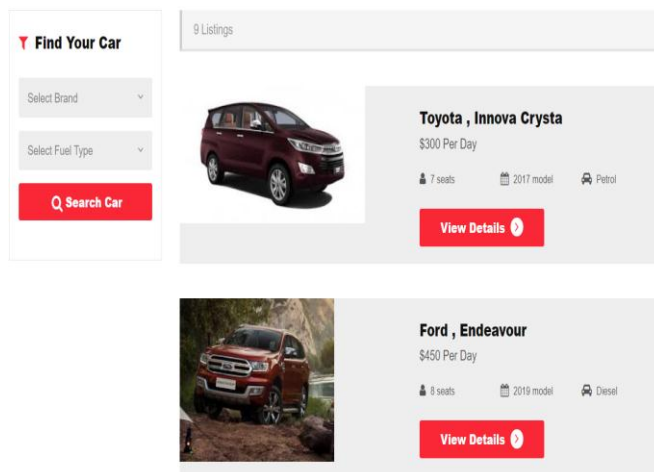
IMG IV.2.5 Car Listing Page
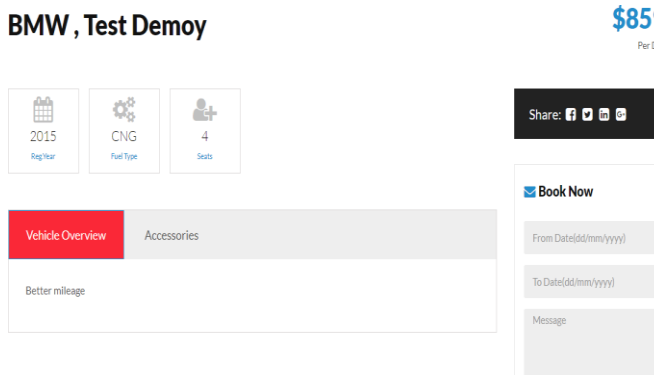
IMG IV.2.6 Booking Page

IMG IV.2.5 represents the car listings that is the company has listed all the cars available for the rental bookings and IMG IV.2.6 shows the page where user selects car, reads and knows about the car, price per day for rental of that particular car and enters the booking dates and clicks book button to book the car.

V. CONCLUSION AND FUTURE SCOPE

This work minimizes the use of books and is easily accessible by just clicking on the button. The project can be maintained for life-long purpose as the data can be edited, deleted and added if needed. It basically aims at low cost, most durable, secure and reliable user experience. This application is developed according to specific requirements. The efficiency of the developed system can be enhanced with some minor modifications. Future development can be made in proposed system by integrating various other services. Car rental business has developed with another treats contrasted with the past experience where each movement concerning Car rental business is restricted to a physical area as it were. Despite the fact that the physical area has not been completely annihilated; the nature of capacities and how these capacities are accomplished has been reshaped by the intensity of web. These days, clients can save cars on the web, lease cars on the web, and have the cars conveyed to their doorstep once the client is an enlisted part or go to the workplace to pick the car. The electronic Car rental framework has offered leverage to the two clients just as Car Rental Company to productively and successfully deal with the business and fulfils client's need at the snap of a catch.

This proposed system is a Non-Dynamic Online system. This designed system works on the local host platform that is, it is not accessible on other devices. One can enhance this system into Dynamic system accessible anywhere in the future by importing certain modules required and by implementing the IP address and mapping this with DNS server. Further one can also upgrade this system easily by importing the desired modules into the system.

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