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AUTOMATING CAR RENTAL SERVICES A MODERN MANAGEMENT SYSTEM FRAMEWORK

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Abstract— **Nowadays, there are online car reservations that give many benefits to the user. A rental service is a service in which customers arrive to request the hire of a rental unit. It is more convenient than carrying the cost of owning and maintaining the unit. A Renty or car hire agency is a company that rents automobiles for short period for a fee whether in a few days or week. It is an extended form of a rental shop, often organized with numerous local branches (which allow a user to return a vehicle to a different location), and primarily 'located near airports or busy city areas and often complemented by a website allowing online reservations. In short, it is a system design especially for large, premium and small car rental business. The car rental system provides complete functionality of listing and booking car. This online application can be easily accessed from any computer/laptop or android phones with internet access and depends upon the bandwidth and device capacity, thus removing any constraint of places. It is a client server-based application. It is secure web application. The "Renty" has a user-friendly and responsive interface that is suitable for all devices.**

Keywords- Covid-19, tracker, android based, XML, Firebase program

I. INTRODUCTION

The world has become a place where there is a lot of technological development; where every single thing done physically has been transformed into a computerized form. Nowadays, people's activities have been transformed into work done by computerized systems. One of which is the main target of this project is about Car Rental System. The system of renting cars exists back in the previous years, where people rent cars for personal reasons. Car renting is essential to many peoples' plan to travel or move from one place to another for business purposes, tour, and visit or holidays, for these reasons Car renting is very helpful. The starting point of Car renting is really unknown as said by Thomas Pretty; he also mentioned that many beliefs that Joe Saunders was the first man to start a Car renting company. According to Thomas Pretty, charges were calculated with the help of mileage tracking device [1, 2]. Many people became interested in the Car rental business and hence got involved. Car renting became more popular as years pass by. Today Car renting services is found all over the world, especially in developed and developing countries. To make this service more popular and accessible to the public it has been transformed into a web-based system and connected to the internet where everyone could be able to have access to it [3].

In our country where most of the population belong to the middle-class family. Most of them can't afford a car. In this era, people have less time and more work than force them to travel to different places to work, business meeting and tourism. Renty (Car rent) is a web-based system for a company that rents out cars. This system enables the company to make their services available to the public through the internet and also keep records about their services [4]. This project is designed to be used by Car Rental Company specializing in renting cars to customers. It is an online system through which customers can view available cars, login, register, view or update profile, book car cars, view booking and feedback. Will be a growth-oriented car rental association by efficiently serving value conscious clients for all of their car rental events [5]. Will constantly deliver a quality product, friendly service and great value that make a customers assured that Cost-effective is their best car rental choice. "Renty" Web application is a combination of two things website and Database. Will design a web application which is used by a user and connect to database for user data. Our goal is to facilitate Customers with finding domains according to their interests and wants where they can easily find and book favorite car also find all information about cars where they can want book.

II. STATEMENT OF THE PROBLEM

The problem with some of the current systems is that: Based on observations, some small companies already have a car rental system which is not a web-based application. This limitation gives them capability to store customer's details, but at the same time, they cannot make their services more available to the public through the internet; they rather make use of posters to advertise their services to the public. These types of companies can overcome these problems by switching to the web-based application of their type of system. They also make use of phone call reservations which is also limited to many features as compare to a web base system [6, 7]. For example, a customer may make a phone

call reservation for a particular car, but when he/she comes to pick the car, he/she might turn not to like the car; this could be because the customer could not see a sample picture of the car, he/she wants to rent.

III. PROPOSED SOLUTION

This system is developed to solve the problems that usually happen when customers want to rent a car in the city. All activities are done manually which is no record have done on computerize or on mobile technology. So, they have many problems using this existing way of process. A web application is an application that is accessed over a network such as the Internet or an intranet. Therefore, with this new method, the process will be more three efficient and the safety of hiring car will be secure. It's also the best way to increase the quality of management and can reduce the time constraints. Fig. 1. Shows the semantic diagram of the proposed method.

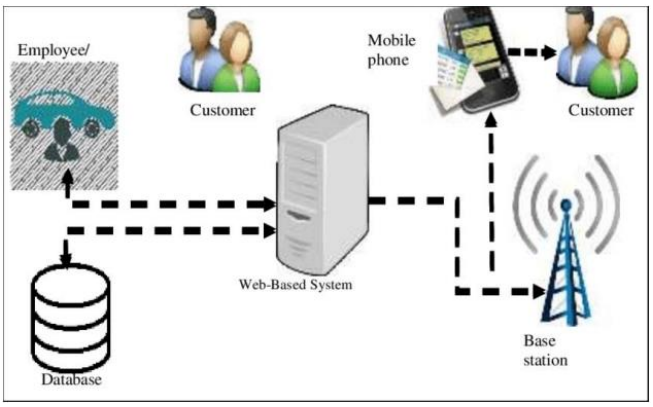

Figure 1. The proposed flow diagram

IV. REQUIREMENT ANALYSIS

A. *Availability*

Application must be responsive and available at any time.
Availability of a high-speed internet connection is the major requirement of the application. The system should be available for service when requested and freely accessible to all the end users [10, 11].

B. *Maintainability*

Making changes or upgradeability in the site will not be that much difficult. By having some knowledge of programming, and designing some features of the application might be converted to a new version or design based on trending model of web application [14, 15].

C. *Consistency*

When an administrator is updating information, consistency must hold there.

D. *Portability*

Renty is a web application that is why there is no problem in the portability process.

E. *Database Requirements*

The database requirements for this application IS MYSQL Server.

V. USE CASES

An essential part of the analysis phase is to draw the diagrams of Use Cases. They are used through the phase of analysis of a project to find and divide functionality of the application. Application is separated into actors and use cases. A use case diagram is a dynamic or behaviour diagram in Unified Modeling Language (UML) [8, 9]. Use case diagrams model the functionality of a system using actors and use cases. Use cases are a set of actions, services, and functions that the system needs to perform. In this context, a "system" is something being developed or operated, such as a web site. The "actors" are people or entities operating under defined roles within the system. Usually the use case describes everything that can go wrong during the detailed behavior and what will be helpful action taken by the application.

A. *UC1 (Machine Learning Repository) Login*

Pre-Condition: For the member, he/she must have registered already in application by the administrator. User must enter correct Email address and password for login.
Post-Condition: User can access to application's main features. Basic Path: Enter Email-Address and password for login. The application verifies the correct format and valid email address and Password. If provided inputs are correct, the application displays the all other user's content of the application and session of particular user started. Constraints: If provided email address and password are incorrect or invalid, application redirect to main page. Non-Functional Requirements: Short Response, Time Better performance, Availability, Robustness. Fig. 2. Shows the login page for the clients [12, 13].

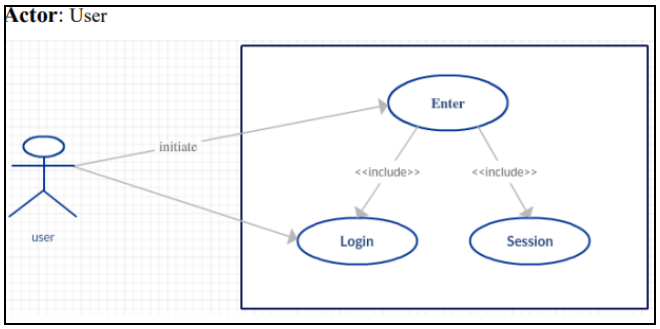

Figure 2. Login Use Case

Pre-Condition: The member's detail is required in admin dashboard.

Post-Condition: The member information should be deleted. Basic Path: The administrator views the member's & admin

detail and then select a particular member & admin to perform these activities. For deleting information of specific member/admin, applications display the message of confirmation. Administrator clicks on delete button for deleting that member/admin [16].

Non-Functional Requirements:

- Better response
- Easy to use
- Secure
- Availability
- Short response time.

Fig. 3. Highlights the internal details of the proposed method.

Figure 3. Use Case

VI. Methodology & Work-plan

Whenever a small or large project has started to develop, the first thing, all programmers or developers requires a methodology. Methodology is a way of developing a project, in which all of the programmers gather the user's requirements, design the project, implement it, and after all the testing and maintenance of the project, which is a satisfaction of user and according to the project requirements [17].

An incremental model is used to develop this project, in which divided our work in multiple modules. All these modules are further divided into more easily managed modules which made up the actual implementation of the requirements.

A. Reason behind using this model

It is easy to test and debug the product during iterations. Software released in increments over time is more likely to satisfy changing user requirements than if it were planned as a single overall release at the end of the same period. Generates working software quickly and early during the software life cycle. This model is more flexible – less costly to change scope and requirements. It is easier to test and debug during a smaller iteration. In this model customer can respond to each built. Lowers initial delivery cost. Fig. 4 shows the incremental model [18].

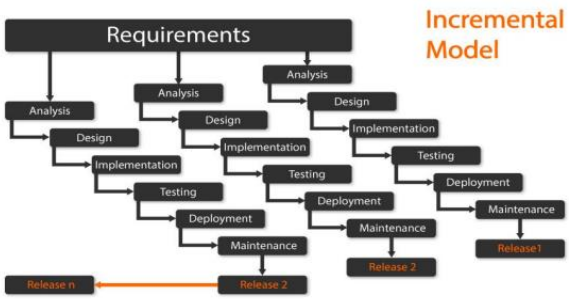

Figure 4. Adopted Methodology

VII. System Analysis & Design

For developing any project, the major problem is requirement gathering. Asking questions from clients is straight forward than collecting requirements. This paper will also focus on functional and non-functional requirements. The procedure for gathering requirements has its own defined procedure according to the complexity of the application. To define project schedule and processing, different models and techniques are also focused.

A. Activity Diagram

Activity diagram is basically a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system. The control flow is drawn from one operation to another. This flow can be sequential, branched, or concurrent. Activity diagrams deal with all type of flow control. Activity diagrams are graphical representations workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the UML, activity diagrams are intended to model both computational and organizational processes.

B. User Activity Diagram

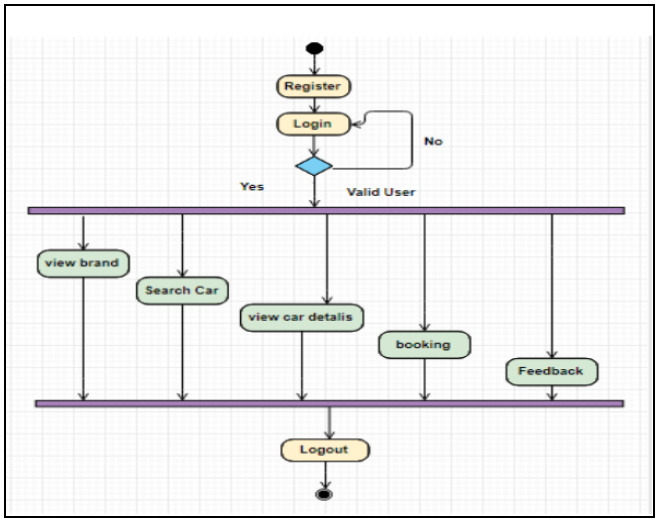

Figure 5. Activity Diagram

C. Admin Activity Diagram

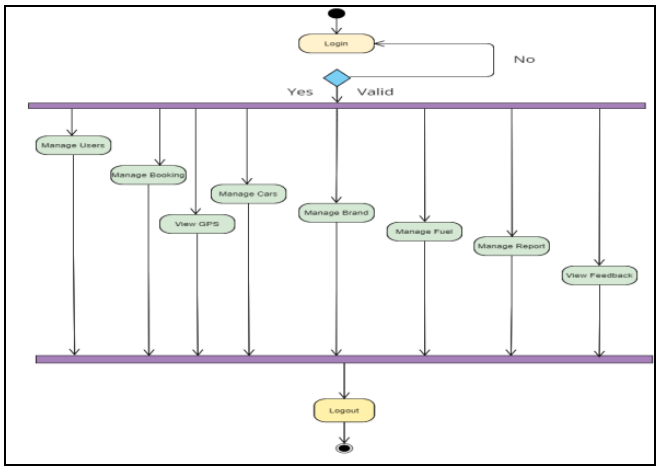

Figure 6. Admin Activity Diagram

VIII. USER INTERFACES OF THE PROPOSED METHOD

A. Signup Page

The signup/Registration page for making an account. Users give all information which is necessary for Registration as can be seen in Fig. 7.

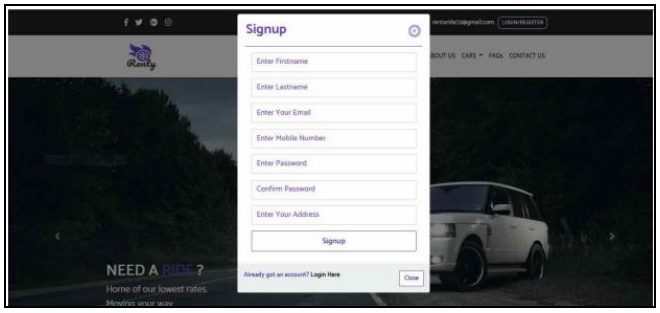

Figure 7. User Sign-up

B. Login Page

Fig. 8. shows the login page of the users. User need to enter correct username and password for login.

Figure 8. User Login

C. Car Detail's Page

If user wants to know about car details just simply click view details button and see that all the specifications of the car. User can view all the information of cars, e.g. brand, title, running, fuel-type, rent, overview etc.

D. Booking Details Page

Admin can view all the information details about booking and can also confirm or cancel or delete any booking as shown in Fig. 9.

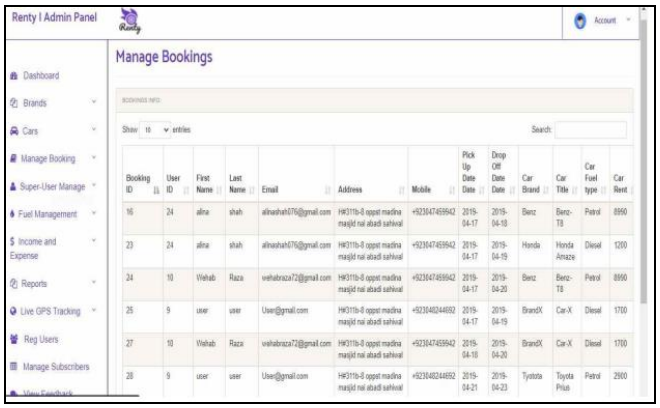

Figure 9. Booking Details

IX. SYSTEM TESTING

Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design and coding. In fact, testing is the one step in the software engineering process that could be viewed as destructive rather than constructive. A strategy for software testing integrates software test case design methods into a well-planned series of steps that result in the successful construction of software. Testing is the set of activities that can be planned and conducted systematically. The underlying motivation of program testing is to affirm software quality with methods that can economically and effectively apply to both strategic to both large and small-scale systems.

A. Unit Testing

Unit testing focuses verification effort on the smallest unit of software design, the module. Unit testing focuses first on modules, independently of one another, to locate errors. This enables, to detect errors in coding and logic that are contained within each module. This testing includes entering data and ascertaining if the value matches to the type and size supported by php. The various controls are tested to ensure that each performs its action as required. Commonly used method is White-Box Testing method. Every time a component of the program is changed, it can be run for testing that is the biggest and famous benefit of this testing phase. Issues that arise during this phase; allow to be resolved as quickly as possible. Unit testing is familiar by software developers. It allows them to test their application units before move them to testers for formal testing. This type of testing ensures that

- All independent paths have been exercised at least once
- All logical decisions have been exercised on their true and

false sides

- All loops are executed at their boundaries and within their operational bounds
- All internal data structures have been exercised to assure their validity.

B. User Acceptance Testing

User acceptance testing (UAT) is the last phase of the software testing process. During UAT, actual software users test the software to make sure it can handle required tasks in real-world scenarios, according to specifications.

X. TEST RESULTS

Table: Test Results

CRITERIA	Test Status	REMARKS
All the graphical user interface options display successfully.	Test successful	None
Enter valid login user email address and password and then press login	Test successful	None
Add, delete, update and view admin using database	Test successful	None
Admin view detail of users.	Test successful	None
User All details are shown against specific user's ID.	Test successful	None
Field Recommendation sent to user according to their interest.	Test successful	None
Run application in different platforms	Test successful	None

XI. CONCLUSION

This online system (Renty) helps the service providing company to manage their business remotely. Customers are finding everything in their car's with few clicks. This online system gives each and every service to customers at their door step. They can provide their feed to a higher authority. They can book, visit, and enjoy the travel. A new system provides features like time efficiency to show car details, user profiles and whatever the customer will give the feedback This application provides such environment this is more efficient and user friendly. It will improve the performance of such organization or business and allow to users chose car's desire. It is professionally useful.

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