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Car Rental Service

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Abstract*— The world has evolved into a place of rapid technological advancement, with basically everything done physically being converted into a computerized form. In recent years, people's jobs have been replaced by computer-assisted jobs. In accordance with these advancements, transportation services have also become a fundamental part of our lifestyles. Not everyone is capable of owning a car. Even if a person owns a car, they use a rental vehicle for extended trips, making the rental car system unavoidable. Some people prefer to rent a car because they don't want to deal with the responsibilities of owning a car, such as maintenance, road taxes, and vehicle insurance. As a result, in everyday living, a rental car service is necessary. The proposed system has taken the place of the conventional car rental system. The prototype allows the user to select the vehicle of their choice as well as the features using the mobile application that will be required during the trip. The app is designed in such a way it provides information of the car as well as the location. Therefore, people from anywhere in the world can avail this service.

Keywords - Rental car system, features, mobile application

I. INTRODUCTION

People's daily life have changed considerably during the last few decades. The spread of information has been assisted by advances in information technology, particularly the Internet. Technology is becoming increasingly crucial in how people conduct business. They're all looking for a car to rent. If someone needs to hire a car, they should traditionally call the rental service owner's mobile number (if one exists) and go to the store to look for vehicles on their own. This methodology can now be completed with just a few mobile taps, according to the latest trend. Information technology will assist you in obtaining reliable information about several car models available, costing based on necessary features, and the vehicle's location. Observations show that some small businesses already have a car rental system that isn't a web-based application. Some people also make use of phone call reservations, which have less functionality than a web-based solution. For instance, a client may make a phone booking for a particular car, but when it comes time to pick it up, he or she may not like it; it could be due to the client's inability to view a sample picture of the car as well as the features available. Implementing an application-based system with the functionality required for this type of service or business is the most preferred approach to this challenge. Customers will be able to make their preferred decision more freely and interactively as a result of this. This also allows the company to provide its services to the general public over the internet.

This concept provides a mobile application called CAR RENTAL, which can be used to assist users find and book cars ranging from high to low, and pay for them based on the features they utilize. It addresses the drawbacks of the current vehicle rental system, in which car rentals are only predicated on car models. The purpose of this paper is to expand the range of online vehicle rental services.

II. METHODOLOGY

The state of information technology is rapidly improving. From the era of Computer applications to the era of web applications, an increasing number of individuals are now using mobile applications. Mobile apps have the advantage of being able to run from everywhere. Prior to this study, information technology was used in car rental applications. However, there are still a few drawbacks to the current online car rental system. Limitations such as vehicle type and designations have remained unsolved to this day.

In this proposed system a car can be hired for a specific period of time. The list of cars available will be displayed on the homepage of the app. The list consists of cars from low-end models to high end. The car’s location can be found with the help of GPS. The exact location of the available car will be pinned on the map. Following this, the QR code can be scanned to view the list of features available in the car. This includes Traction Control Unit, Sunroof, Fog lamps etc. We will be able to select the features according to our desire and need. The payment can be done immediately after selecting the features. Those features will be enabled throughout the trip. Therefore, everybody can experience a luxury car without paying a hefty amount of rent.

III. PROPOSED MODEL

A. Operational Framework:

This section is to determine the operational framework of the implementation of the rental car booking system using the flowchart shown.

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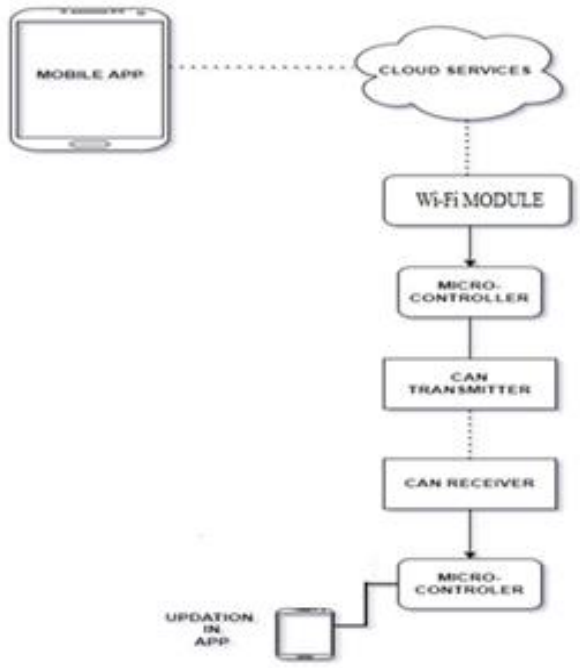

Figure1: Flow Chart of car rental system

B. Hardware Design:

The car rental prototype involves both hardware and software. The application has been carefully designed to make it as simple as possible for consumers to use. When using the app, customers may browse through the vehicle rental list and verify the availability of a certain car before making a reservation. Users will be able to effortlessly explore through the full app owing to the app's simple interface.

The below figure shows the interface between each component.

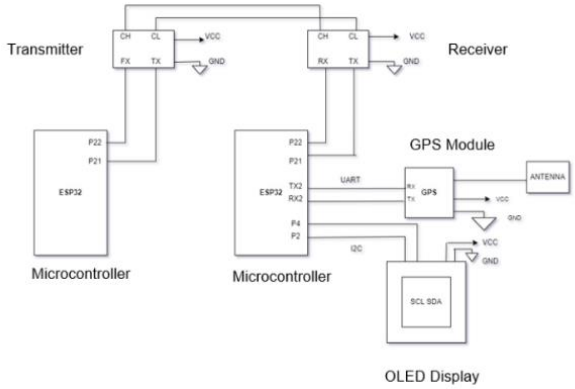

Figure 2: Hardware Block Diagram

The hardware setup consists of two microcontrollers. ESP32 with integrated Wi-Fi and Bluetooth module is used as Telematics ECU and Controller ECU. Once the power supply is given to the controllers, the GPS module sends latitude and longitude data which is fed into the controller ECU. UART communication is established between the GPS module and controller ECU. Universal Asynchronous Receiver Transmitter (UART) is a form of device-to-device digital communication. Latitude and longitude data is sent to the Telematics ECU, where communication CAN is used to transfer the data. The CAN protocol is a standard design that allows the microcontroller and other devices to communicate with each other without any host computer. The data is sent to the cloud and the updated location can be seen in the mobile application after which the customer can locate the available vehicle. Once the vehicle is booked by scanning the QR code, the features selected by the customers will be displayed on the OLED display. This is to indicate that those features are enabled throughout the travel. Here, CAN communication is used to transfer the data. Therefore, the concept of multi-master and multi-slave is used.

C. Mobile Application:

The user interface of the mobile application is advanced. The user utilises this application to hire a vehicle, and it can display a variety of options that the user can choose from depending on their needs. This assures the passengers' safety. The key benefit of this software is that it shows the location of the vehicle in real time.The application consists of four modules.

Figure 3: Software Flow Diagram

1. Home page – The first page of the application is the Home page. This page displays the image of various cars with its name. The list shows a variety of cars available. The Map location and the QR scanner can also be accessed from the home page

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2. Google Maps Page – GPS module updates the location in the App through cloud service. After selecting the Location icon from the home page it will redirect to Google maps and the exact location of the desired car will be pinned on the map. It also provides the latitude and longitude information of the car's location. Using these we can find the car's location and further reach them for booking.
3. QR code page – After reaching the location with the help of the map, we will be able to access the QR code which can be found in the car. QR code can be scanned using the mobile app and the features of that particular car will be available from which we can select the desired feature and go for a payment.
4. Payment page – After selecting the features required for our travel, the app shows the total amount to be paid and once we are done with the payment every feature selecting option goes disabled and updates the status as "Connected". The cancel booking option is shown and can be preferred if the car needs to change.

IV. RESULT AND ANALYSIS

The experimental findings section provides experimental results and evaluations of the smartphone application of car rental system which is based on each of the introduction's objectives.

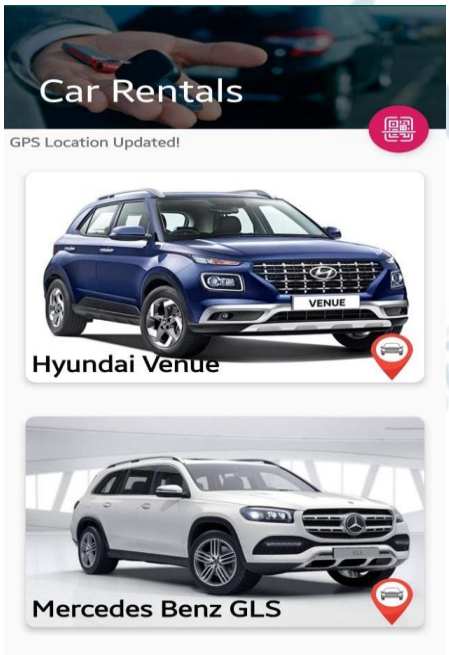

Figure 4: Main menu page of mobile application

Figure 4 depicts the mobile application's main menu page, from which users can rent any of the available cars.Map option is provided to each ear so that the location of the car can be seen on Google maps. Once the user reaches the desired vehicle, the QR code is available in the car. Once scanned the code from the car, the application will redirect the user to the vehicle page.

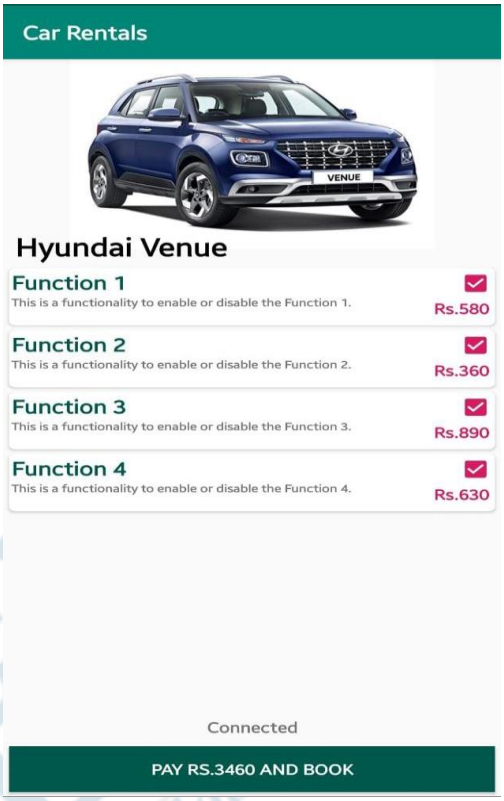

Figure 5: Features of Hyundai venue car

Figure 5 shows the features for example sunroof, high-end audio system, ventilated seats, etc., provided in that specific car. The user is required to select the features and once it is done the calculated total amount of the booking option is available at the end. Cancel booking can also be done when the user is not satisfied.

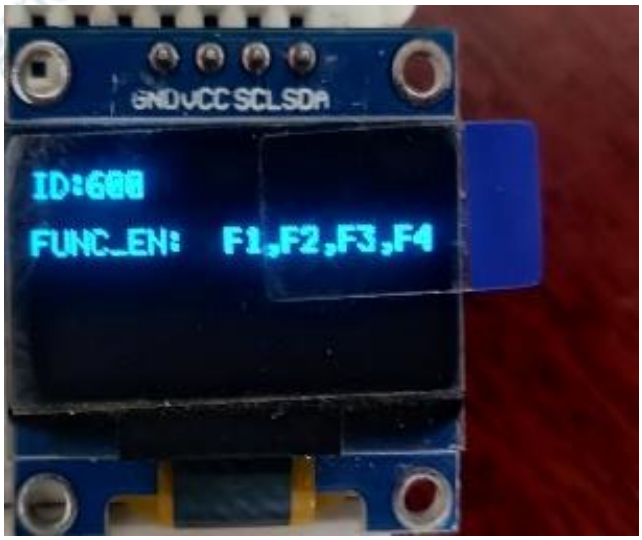

Figure 6: Features enabled are displayed

Figure 6 shows the features selected by the customer while booking. This is to indicate that those features are enabled and are working throughout the trip. When the car is not hired, the OLED displays "Not Booked".

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V. CONCLUSION

Finally, the CAR RENTAL smartphone application has demonstrated that it will significantly improve the current vehicle rental system. This is essentially to provide a platform for travelers to rent a range of cars at varied costs, as well as to make renting cars across the region simple and economical. Furthermore, users who rent cars have the option of renting a high-model car and just paying for the features they utilize.

This research has explained how CAR RENTALS work and how they will contribute positively. CAR RENTAL aspires to benefit both the vehicle rental company and the clients that will use the service. Customers would be able to deal with the problem of having to search and visit physical car rental companies in order to rent at their selected locations, and vehicle rental providers would have more opportunities and publicity to sell their services. The online vehicle rental system's mobile application gives both customers and providers an advantage in effectively running the market and addressing client requests with a tap of a button.

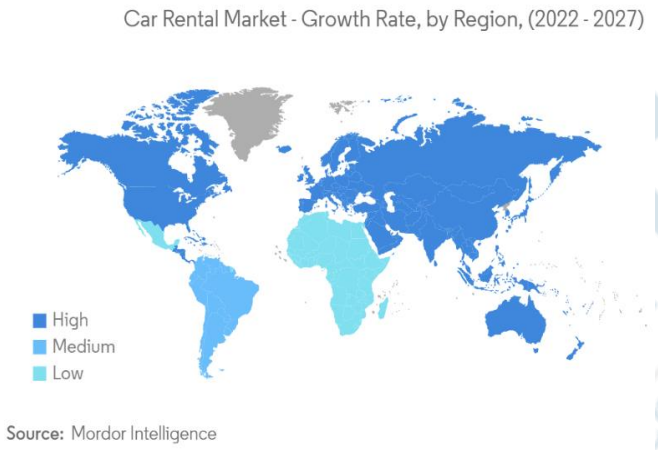

Figure 7

Figure7: This picture shows the development of car rental services worldwide. Since the growth is very high in India definitely this Car rentals will have a great future, mainly as a result of fuel hikes and increasing price rises of cars.

VI. FUTURE SCOPE

As the average Indian gets more aware, search for better services at lower prices grows. As people purchase more and more cars, self-propelled car rental is becoming increasingly popular. This service allows you to rent an automobile of any model or kind and utilise it according to your own preferences and budget. The allure is being able to drive high-end cars for a low price while eliminating the headaches of coping with a driver and paying extra fees. Cab services and car rentals are becoming increasingly popular and cost-effective. Some people, living in busy cities, prefer rentals thanks to lack of sufficient parking spaces and rushing through their day with little or no time on their hands makes life a lot more comfortable. Car rental provides affordable services to their customers which makes it easy to rent a car from the perspective of the wallet.

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