MOVMAX CAR RENTAL SYSTEM FOR OWNERS, CUSTOMERS, DRIVERS AND REPAIRMEN

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Abstract: - We propose a new Car rental system called MOVMAX which could benefit both the customers who borrow cars and the car owners who lend cars through an online Portal. Car owners can lend their cars to the customers through the organisation thus putting their unused car to use and earn profits. The customers can borrow various types of cars for specified period of time by paying an advance amount. After the travel the right amount is settled. Customers can borrow cars with or without driver facility. They can also get info about nearest Repair centres in case of breakdown through the portal. Anti-theft system is installed to ensure security of the cars along with GPS-tracking system.

Keywords: car rental organisation, online rental, anti-theft system, GPS-tracking, UML diagrams.

1. Introduction

With ultra-speed development of transportation all over the world, the current conventional car rental system does not have enough features and advancements. The car rental system proposed, has some auxiliary features that delight all the participants involved, namely car owner, customer, driver, repairman and the management. In this system, customers can not only rent cars of the organization, but also rent cars from the car owners through the organization indirectly thus offering a wide variety of cars to the customers. This makes the organization prosper with less investment and more profit. The proposed system provides the customers a choice for cars with organization drivers or self-driving facility.

Repair services are provided by the organization based on the location of the car rented by the customer in case of any repair or breakdown. Any type of services mainly wheel alignment service, car body repair, engine repair, brake repair, cleaning and washing, road side assistance and puncture works can be provided to the customers and car owners as required. This may be conducive in case of emergency or when the customer's car breaks down in some non-urban areas with no repair services nearby, thereby leaving the customer stranded. To improve safety and assurance, pre-payment and deposit is made mandatory to rent cars. An anti-theft system is developed to prevent illegitimate usage of car by individuals other than the registered and authorized customers and to prevent larceny by verification with the database as the customer places his/her original driving license to be read by 'DUPLEX Driver

License scanner and reader' fixed in the car. GPS-tracking system is implicitly available but utilized only in case of any illicit moves and not at all times just to ensure that the customers enjoy privacy [6].

2. Comparison with current system

In the current system, only the cars owned by the organization are offered to the customers. In contrast to this, Movmax allows common people to offer their cars for rent and earn money. Hence, the customers are acquainted to a variety of cars to try depending on the type (hatchbacks, sedans, SUVs, MUVs), model, fee, etc. Thus, Movmax serves as an intermediary between the customers and car owners. It also offers self-driving facility, if the customer prefers it instead of paying extra amount to the drivers. Anti-theft system is introduced to provide security to the car owners. If a person rents a car from the organization, he/she has to register using his driving license. Each time the user starts the engine, he/she has to tap the license on the card reader installed in the car. Only after verification, the engine starts, thus blocking unauthorized seizure of the car and at the same time allows only those who own a license to drive. A fair amount of money is collected as advance from the customer as a precautionary measure. The proposed system fixes the pay only based on the period of rent (in terms of hours) rather than counting on the total kilometres travelled, thus bestowing the advantage of unlimited kilometres to the customers. The advance amount paid is returned as such to the customer only when he/she hands over the rented car to the organization without any detriment. The system is designed to provide employment opportunities to several drivers and repairmen. Thus, the organization plays a major role in introducing and recommending affordable chauffeur services and reachable repair services to its customers, which most of the current systems fail to do.

3. System Model

The use case diagram (Figure 2), class diagram (Figure 3) and activity diagram (Figure 4) of the proposed model are drawn along with the state diagram (Figure 5) for the anti-theft system. Each of these UML models provide a profound understanding about the concept. The use case diagram (Figure 2) depicts the customer and the car as the primary actors, and the drivers, repairmen, manager and employee as the secondary actors. Before using the portal, both the customer and the car owner should register themselves in it. The customer is also prompted to upload his/her license, while the car owner is prompted to upload the RC book of his/her vehicle.

After logging in, the customer can choose the type of car by specifying the details like preferred fee, seater, model etc. to arrive at their perfect match and then book the car with or without the driver option. In case the customer chooses any of the driver services, the respective driver is intimated about it through the online portal. The car owners are also informed about the booking and they can add or delete their cars anytime if it is not under use. The uploaded documents are verified by the employee. Regular reports are sent to the manager by the employee. The driver also has a separate login where he can see all the bookings allocated to him.

If a repairman is interested, he could register in the portal and annunciate himself to captivate more customers. During booking, an initial advance amount is collected from the customer to ensure that the customer hands over the rented car safely without any damages. Certain amount may be deducted from the advance in accordance with the damages incurred. Online booking and online mode of payment are also available. The system is modelled using HTML, CSS, JavaScript, AJAX for front end and PHP as the backend combined with MySQL database.
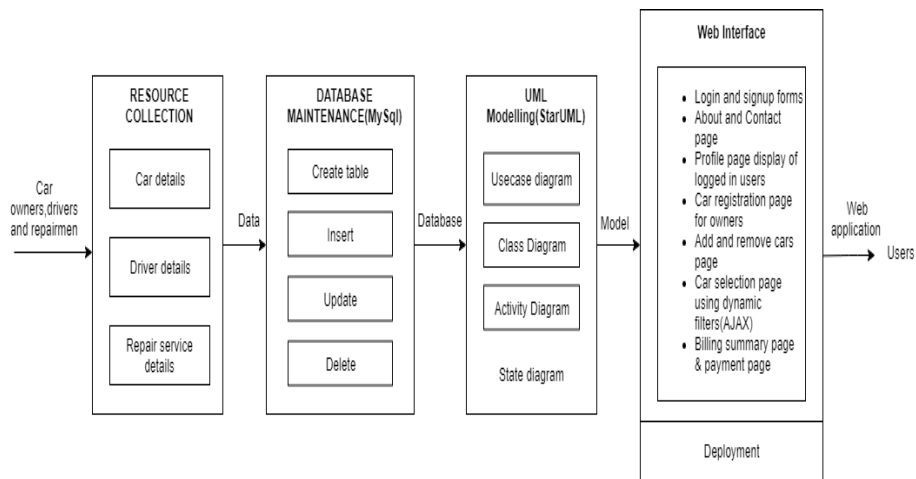
3.1. System Architecture

Figure 1: Car rental management system block diagram
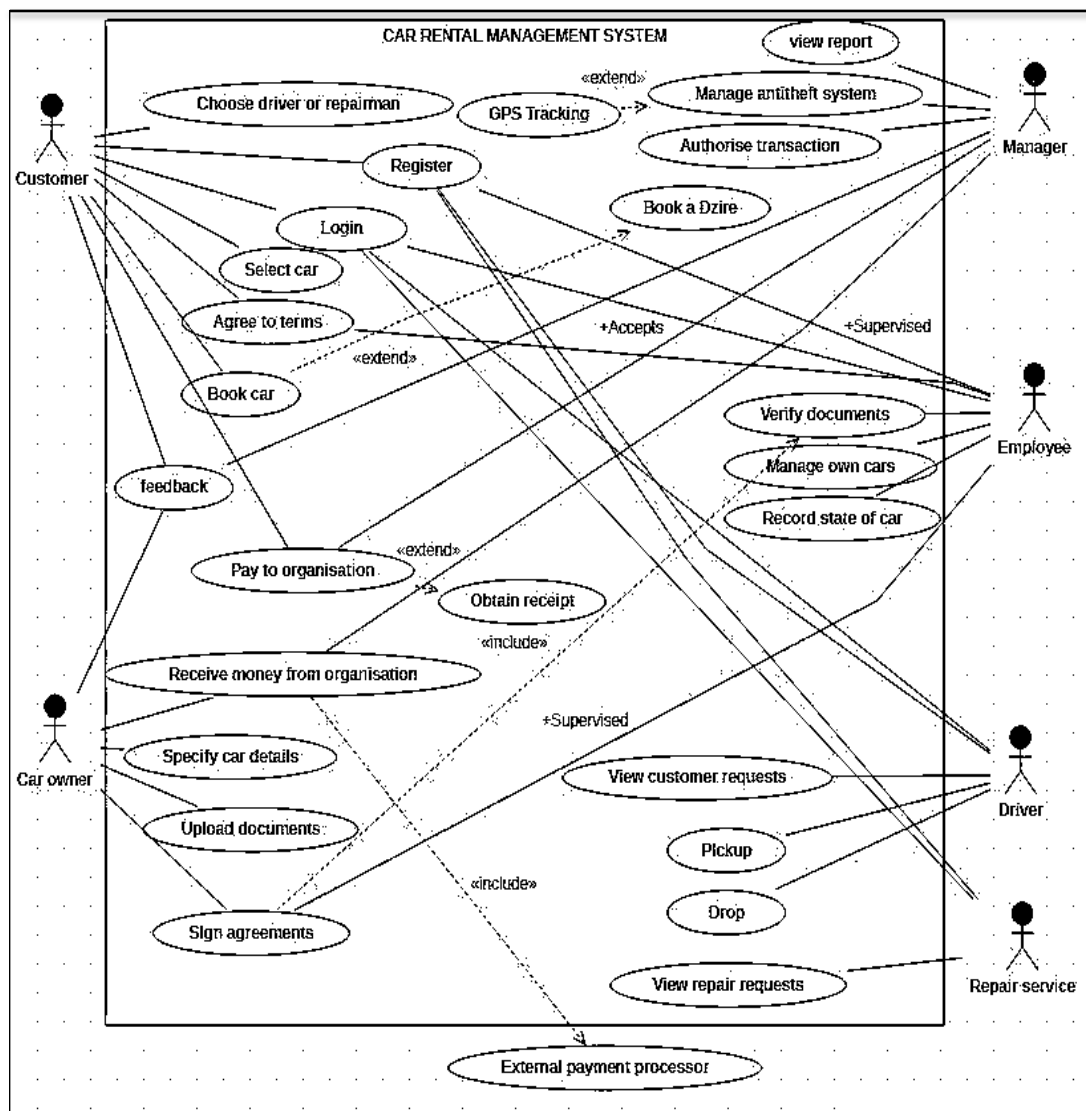
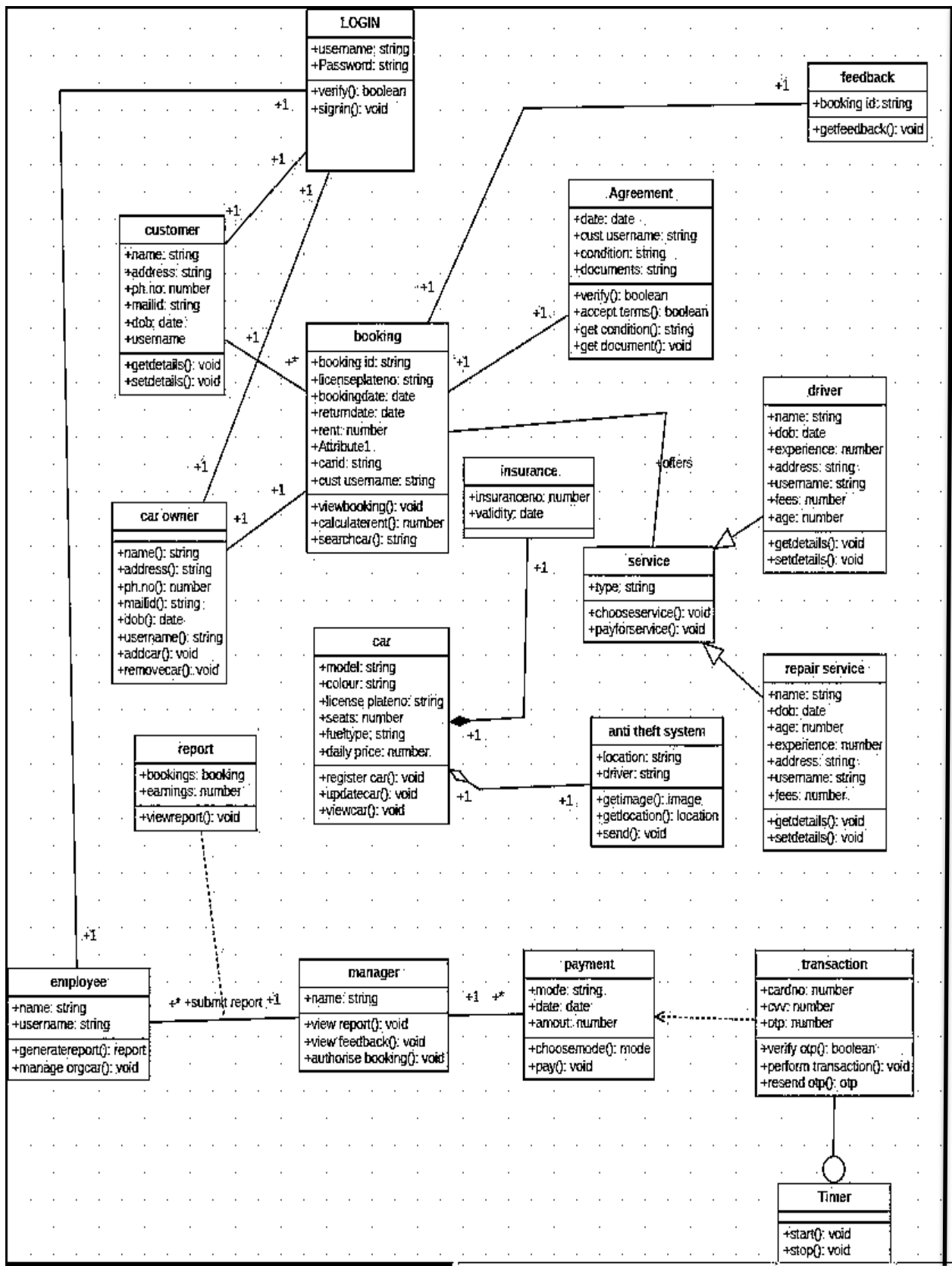### 3.2.UML-Modelling

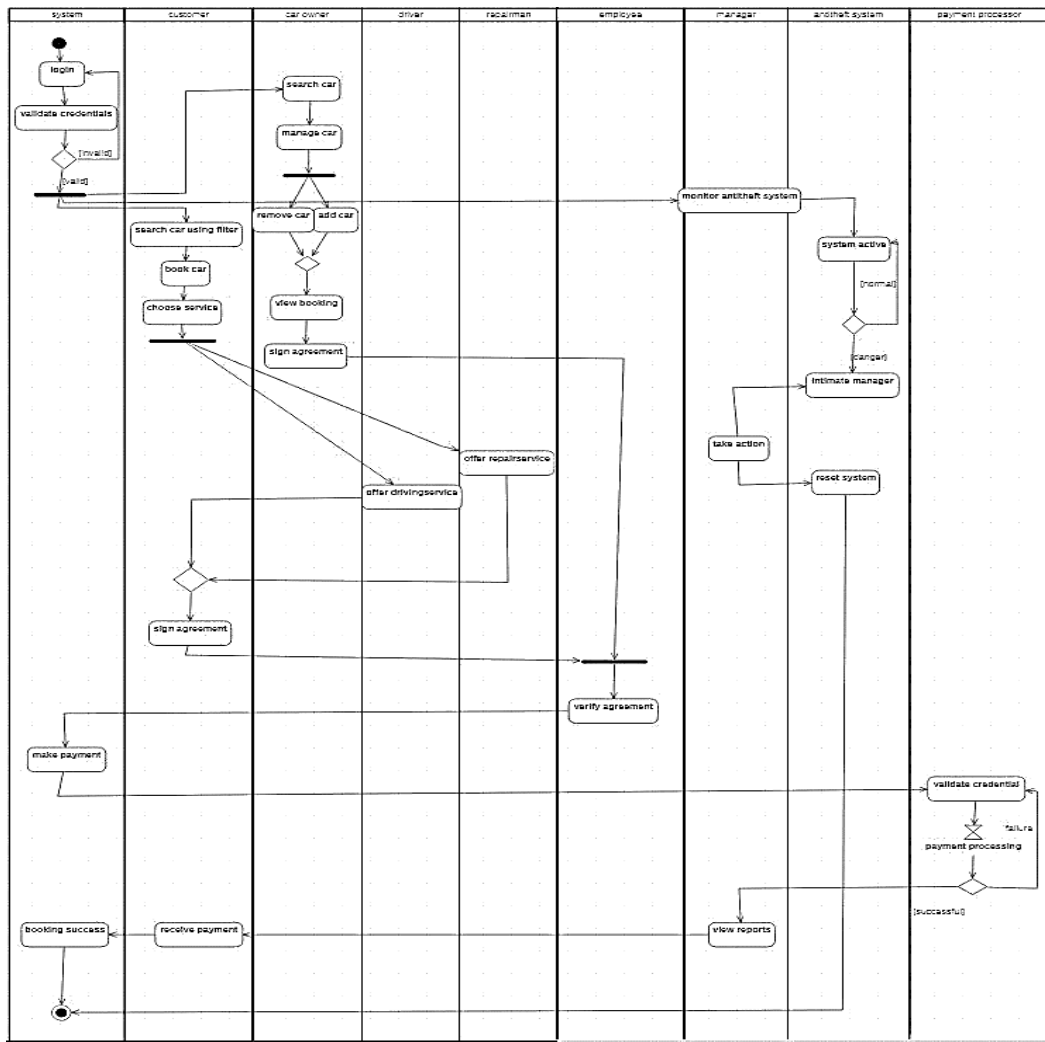**Figure 2: Use case diagram**

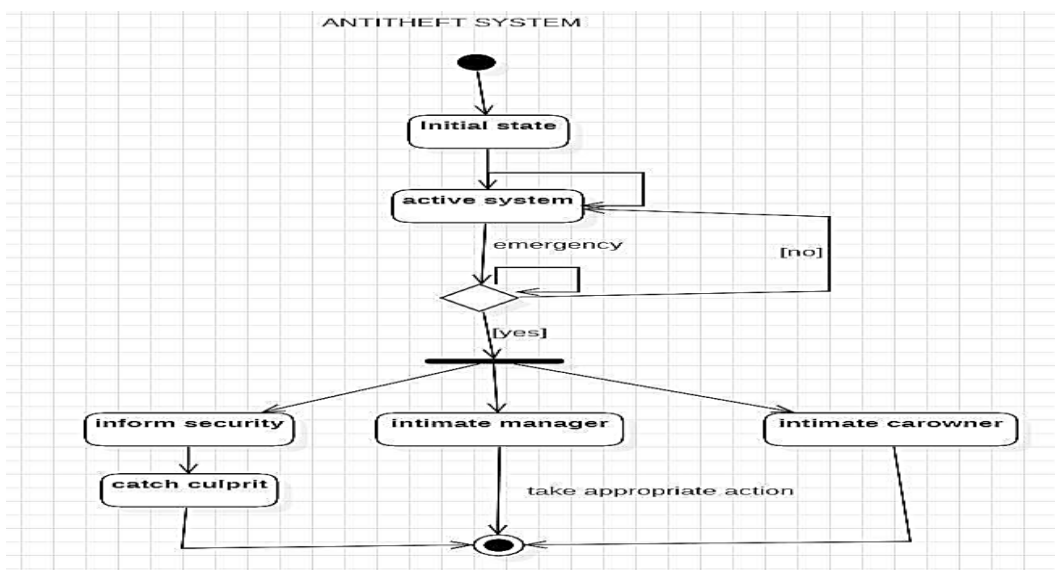Figure 3: Class Diagram

Figure 4: Activity Diagram

Figure 5: State diagram - Antitheft system
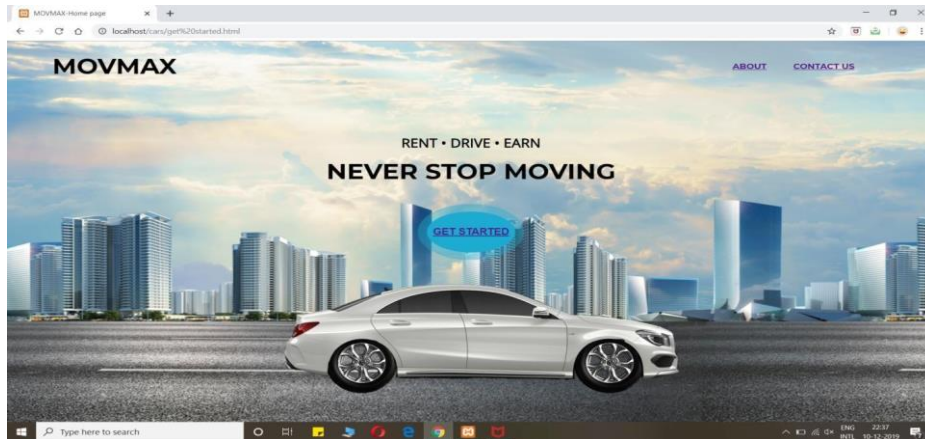
4. Implementation

Figure 6: Login choice based on the user[2]

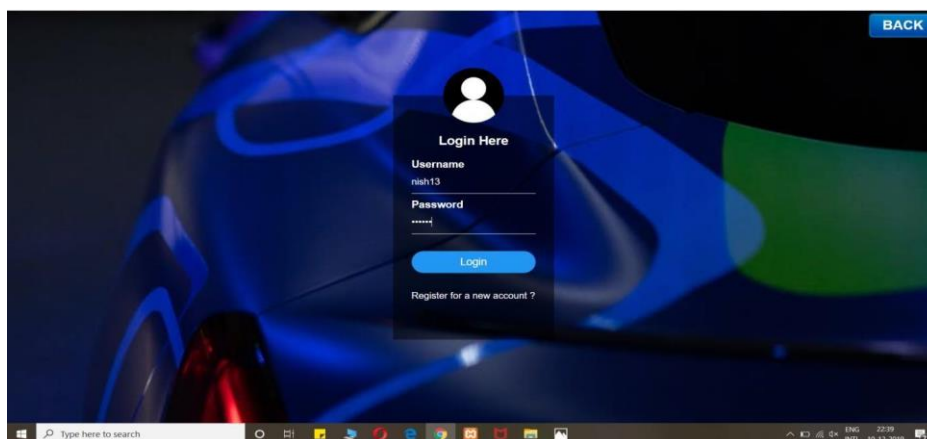**Figure 7: Login page for registered users**

Figure 8: Registration page for customers where they provide their personal details including their photo and license in case of self-driving
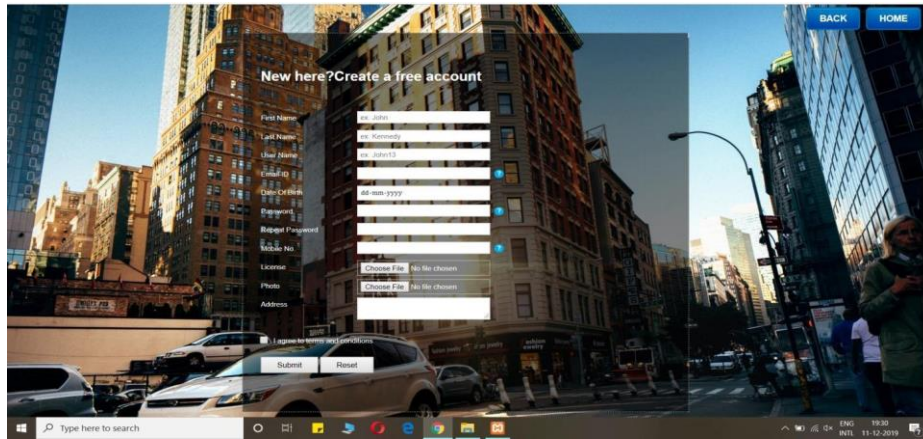
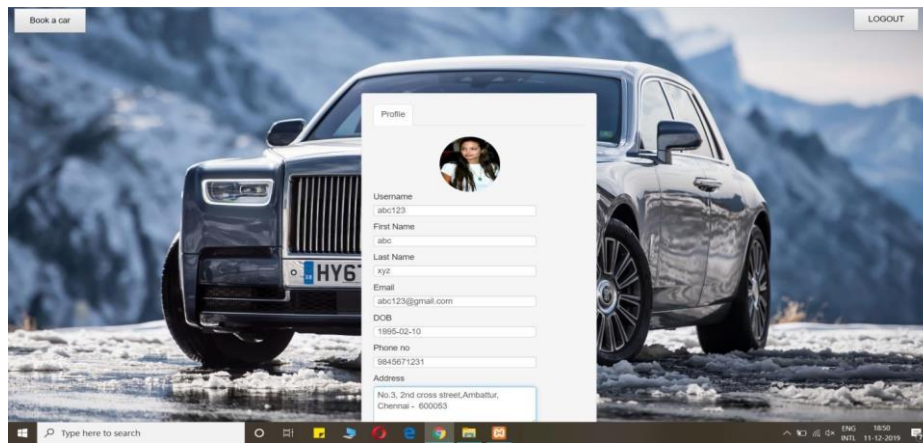**Figure 9: Profile page of the customer who has logged in currently**

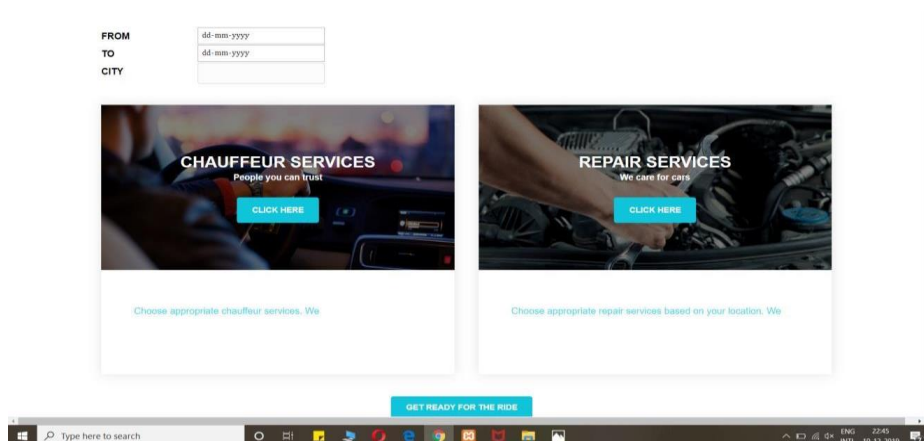**Figure 10: Customers can choose their preferences based on their need (say drivers, repairmen)**

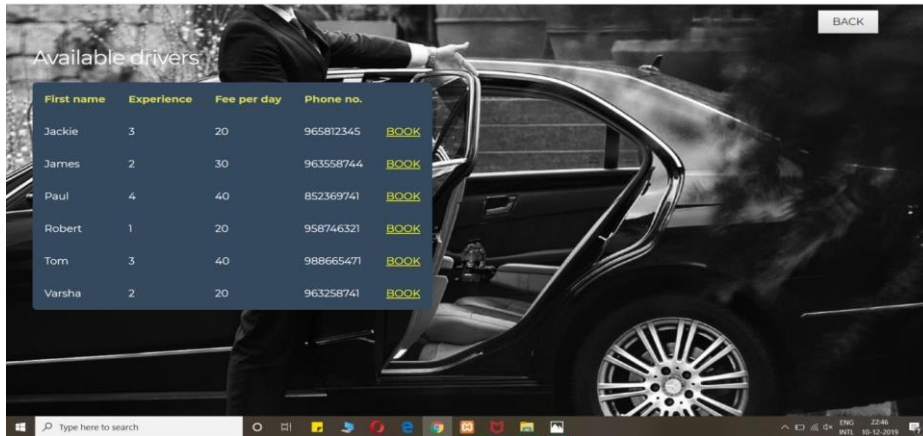**Figure 11: Display of the period and place of services**

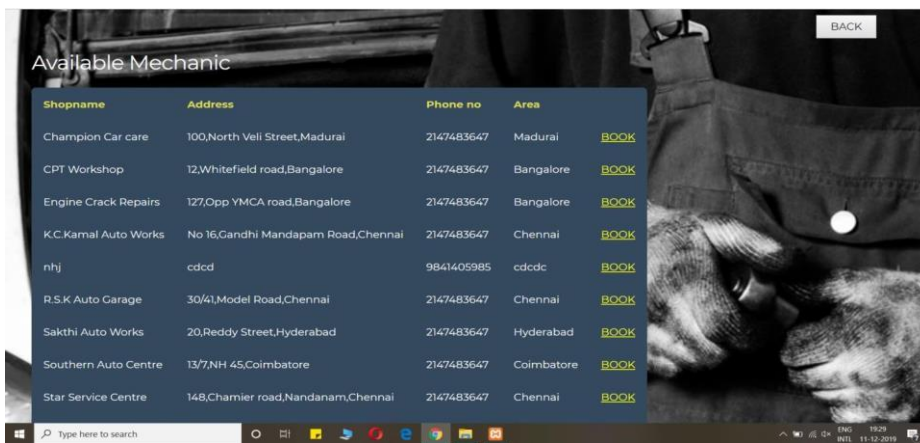**Figure 12: Display of the list of available drivers with their contact details**

Figure 13: Display of the list of available repair services with their contact details
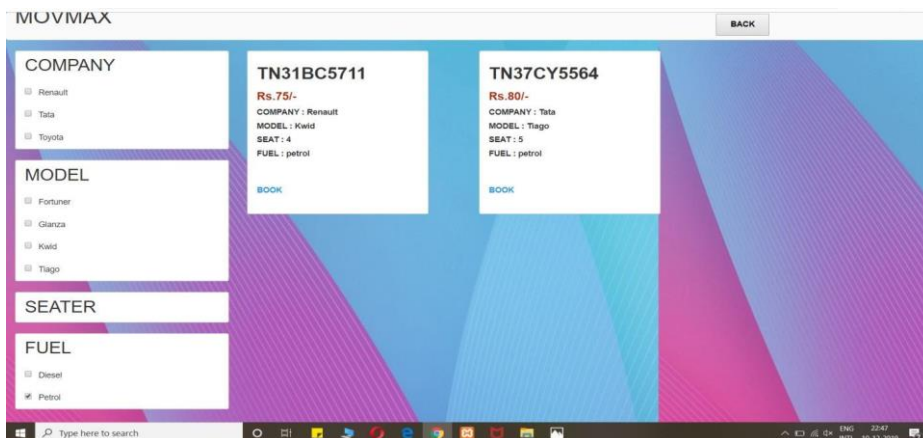

Figure 14: Display of a variety of cars available with their details namely company, model, seater, fuel and price where the customer can arrive at their perfect match using the filters
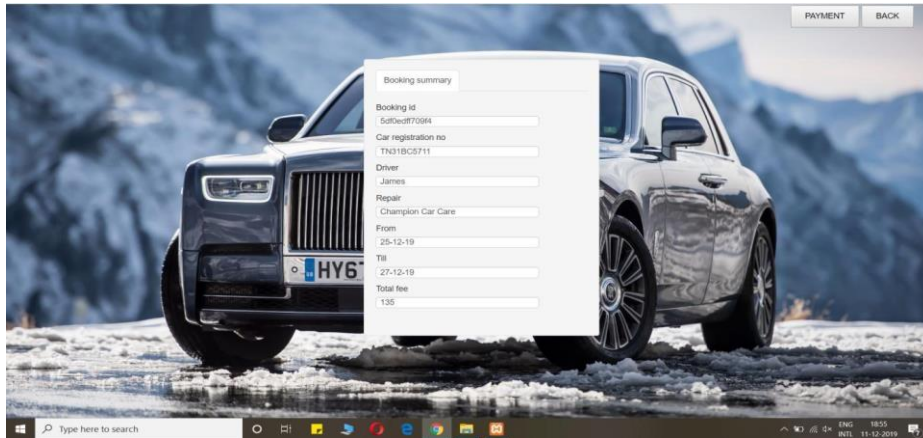
Figure 15:   Display of booking details (period, fee, repair service or driving facility) - Unique booking id is assigned to each booking
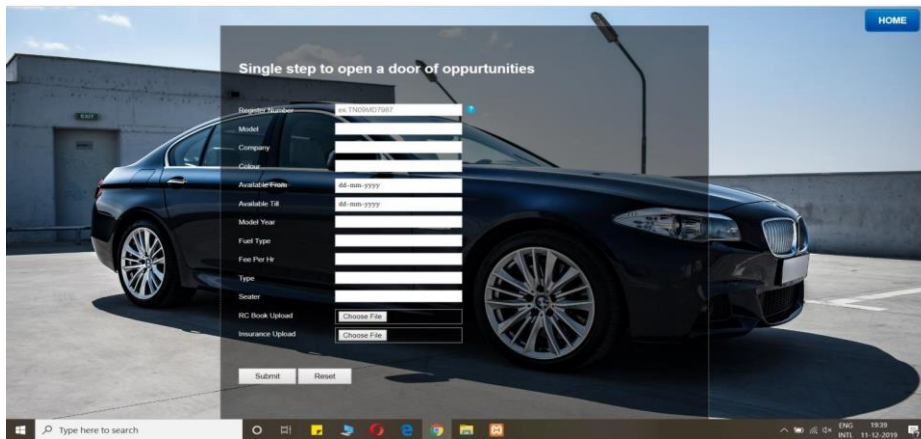

Figure 16: Car owner can offer a car for rental by filling out the following form requiring details about car, period of availability, RC book and insurance
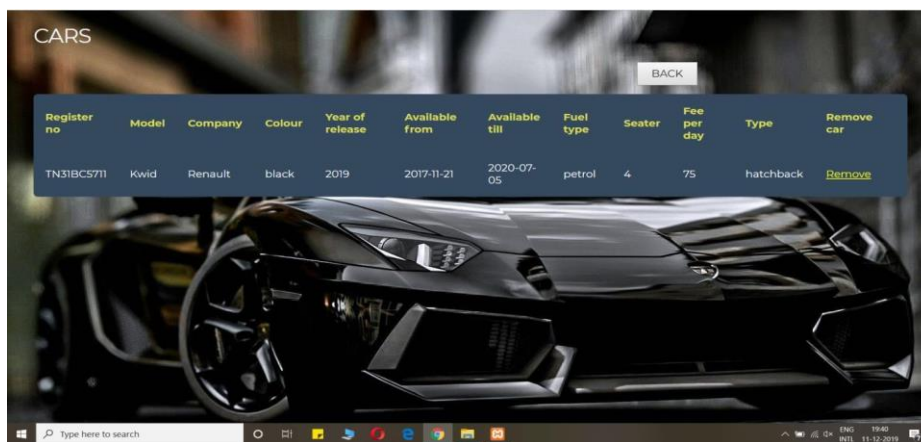

Figure 17: Car owner can view a list of cars that he had previously added and also remove them if he no longer wishes to make the car available for rent

5. Testing and Evaluation

Table 1: Car rental management system test results

S.No	Operations	Expected outcome	Result
1	Sign up	Acquired users' details by proper validation	success
2	Login	Access granted to the site's content by proper verification of credentials	success
3	Display user Profile	Retrieved user details acquired through sign up form from the database and displayed appropriately	success
4	Insertion and removal of car details	Stored the details into the database and deleted from the database as per the user's commands	success
5	Booking car	Choose a car by filtering based on seater, fuel, model etc and fill in duration of hire	success
6	Choose optional chauffeur and repair services	Choose additional services if needed at time of booking	success
7	Generate billing summary	Calculate and display total rental charges correctly and get confirmation to proceed to payment	
8	Payment	After booking confirmation auto directing to the payment portal	success
9	Logout	Redirected the user to login page by ending the users' session	success

6. Conclusion

The car rental system thus designed is user-friendly and thus easily accessible by all sectors of people. The system incites reuse of cars that have been kept latent for ages and transposes them into a source of income. By bringing in different cars from several car owners in addition to own cars, the organization hardly runs out of cars and also showcases a variety in their models. Cars, drivers and repair service if required - everything at one place making it more affordable, accessible to all and thus generates more employment opportunities. Online booking and payment are efficient in saving time and also any queries and feedback from the user can be collected through the portal for instant actions. Movmax could be further improved in the following ways:

- Drowsiness alert system - Embedded technologies could be used to alert the driver if he falls to sleep without his knowledge thereby avoiding accidents.[5]

- Biometric eyeball scanner - Though this method is expensive, it could provide a greater security. Each time the driver's eyeball is scanned and compared with that of the registered one at the time of borrow before allowing the engine to start.
- Breathalyzer test - When fitted inside the steering wheel of the car, it could put the car to a halt if

the alcohol level detected after the breath test is found dangerous to driving.

All of this seemingly expensive idea could become a reality in near future with the massive advancements in technology.

7. REFERENCES

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