

Original Article

Real-Time Car Washing System

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Abstract - In the present fast-paced world, due to time constraints, it is difficult for common people to spend hours cleaning their vehicles. In opposite to it, all vehicles are parked for almost 8 hours in the parking of offices organizations. The idea of the system is to provide washing service at their location on demand. This paper introduces a comprehensive car washing booking system consisting of a user app and a worker app, aiming to streamline service operations. With the system, users can browse services, book appointments, and track workers in real-time, while service providers manage bookings, allocate workers, and navigate efficiently through user profiles, bookings, worker details, and services. The system is integrated with The Google Maps Geo Location API is integrated, enabling accurate location tracking, route optimization, and real-time navigation, enhancing user experience and operational efficiency. The real-time nature of this service enables users to schedule car washing for the next hour or plan ahead for the following day.

Keywords - Car washing System, home service, slot booking service, real-time tracking system, Google Maps Geo Location API.

1. Introduction

Car/ vehicle owners often face the challenge of finding the time for essential vehicle maintenance, including regular car washing. Recognizing this need for a seamless and time-saving car washing service, the system presented here provides a cutting-edge solution to revolutionize the way car owners maintain the cleanliness and aesthetics of their vehicles. A clean vehicle may reflect a clean personality for its owners and increase the age of the vehicle from rust due to acidity or acid rain [1]. However, time constraints for car owners and motorcycles make the lack of spare time just to do vehicle washing, so a lot of car and motorcycle owners think twice about washing or perform more important activities[2][3].

The system proposed provides a perfect solution that allows car and motorcycle owners to perform essential activities without wasting time going to a service center for vehicle washing. The idea is the design of a carwash system with a doorstep service. That is made to facilitate the washing of vehicles only by ordering a type of service through the web, either from a Personal Computer or a Gadget that supports browser applications [4][5]. Business in this field is also very profitable considering the vehicle is an object that is needed to facilitate everyone to transport anywhere. Because cars and motorcycles are things that are often used to transport, the vehicle will be dirty with the intensity of its use [6]. That is why business in this field is very promising.

2. Methodology

Developing the proposed system requires to analyze of the needs and problems in the existing systems [7]. Further, there is a need to develop a system within the given constraints. The methodology includes the following steps.

2.1. Market Research and Need Analysis

The step involves comprehensive market research to understand the needs and preferences of car and motorcycle owners. It further includes the study of the working of different washing services, their strengths, weaknesses, and gaps in the market [8].

2.2. Technology Integration

Develop a user-friendly web platform accessible via Personal Computers and mobile devices for seamless service booking. Implement real-time tracking and scheduling systems for efficient service management [8].

2.3. Service Design and Customization

Design a range of car washing packages tailored to different customer needs and budgets, including basic wash, premium detailing, and eco-friendly options. Customize service offerings for both cars and motorcycles, considering their unique cleaning requirements [9][10].

2.4. Operational Workflow

Establish a streamlined operational workflow from booking to service completion. Introduce a pick-up/doorstep



service option for customers who prefer convenience, ensuring timely collection and return of vehicles.

2.5. Quality Control and Assurance

Implement rigorous quality control measures to maintain service standards and customer satisfaction. Conduct regular training sessions for staff to ensure proper handling of vehicles and adherence to service protocols. Solicit feedback from customers to improve service quality and address any issues promptly and continuously.

3. Implementation

The system is implemented using Flutter, and MySQL [11] is used as a backend. It involves three basic modules [12].

3.1. User Application

This provides an interface for the user's interaction with the system. Users can book the service, see various offers available, track the service, etc, through the app.

3.2. Worker/Service Man Application

The same technology was used in this serviceman app for development. It allows the serviceman to connect with the customer. All the location-related and service-related information will be sent to the worker using this serviceman application.

3.3. User authentication

User Authentication can be implemented by taking the user information at the time of login sign up, if the same user will again come to the app, they get access to their profile. For user authentication, the system implements Oath In our App.

4. Result

The expected result of a Real-time Car Washing system is a fully functional. It allows users to book their services from any place, with real-time location sharing to delivery Persons. The application should be easy to use and reliable, with functions such as:

4.1. User Authentication and Registration

Users can create accounts or log in securely using their credentials. User data is encrypted and stored securely in the database.

4.2. Service Type Selection

Users can easily select the type of vehicle And Service Type they want to be washed (car, SUV, truck, etc.) from the menu of options.

4.3. Sub-Services And Addon Service Selection

Users can choose the type of washing service they desire (basic wash, interior cleaning, waxing, detailing, etc.) from a menu of services.

4.4. Time And Date Selection

Users can select best suitable time according to their needs and requirements. Users can select an appointment for post-dated washing services.

4.5. Booking Confirmation

Users See booking confirmation and acceptance status from the system automatically. Once the serviceman changes the status of the service from pending to accepted, the user can see all the details of the serviceman, such as name and mobile number.

4.6. Real-Time Location Tracking

User can send their live real-time location to the worker, and once the order is accepted, the worker can track the user's location and get a path from his current location to the user's location with the help of a Google Map API key.

The following figure represents screenshots of the implemented system. Figure 1 shows the login page through which users can sign in and log in to the app. Figure 2 shows the Google Map interface, where user can see the Google Map and select their location based on their current location. Whereas, Figure 3 shows all sub types of service. One service may include multiple sub-services and additional services.

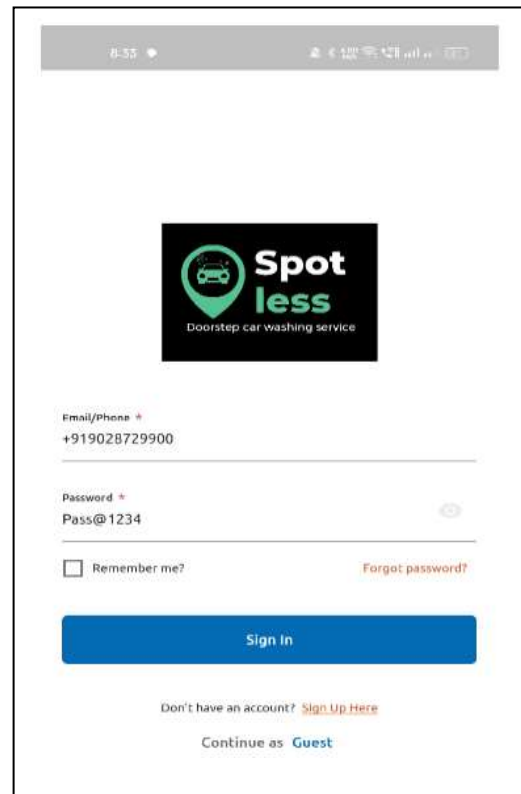


Fig. 1 Login page

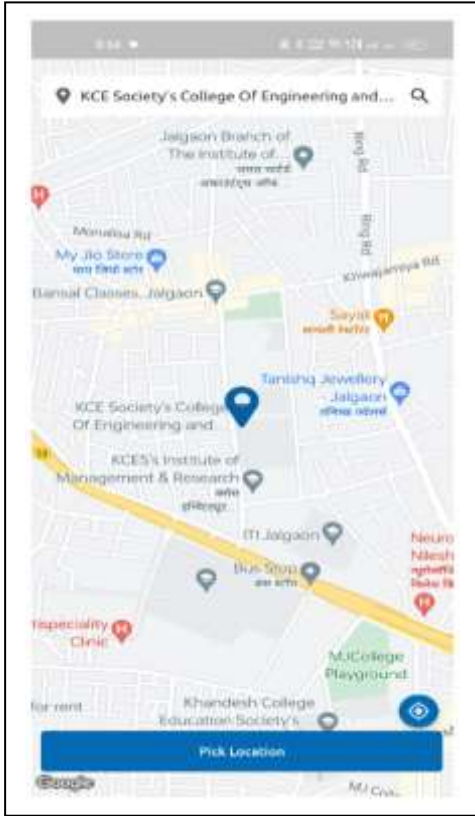


Fig. 2 Google map interface

Figure 4 shows a confirmation message after a successful payment.

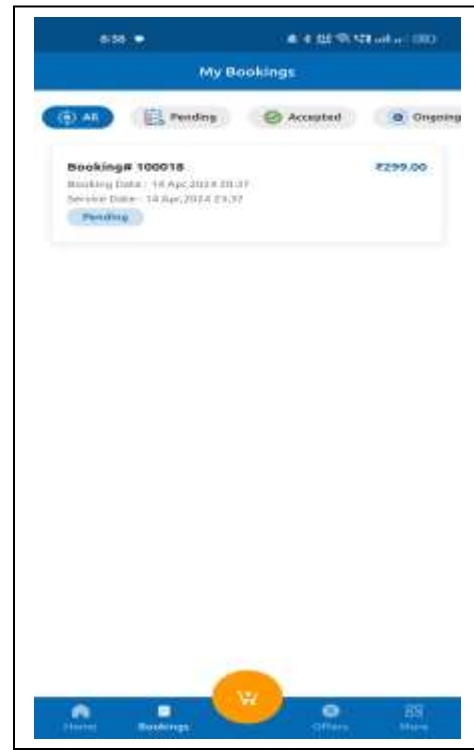


Fig. 4 Booking status

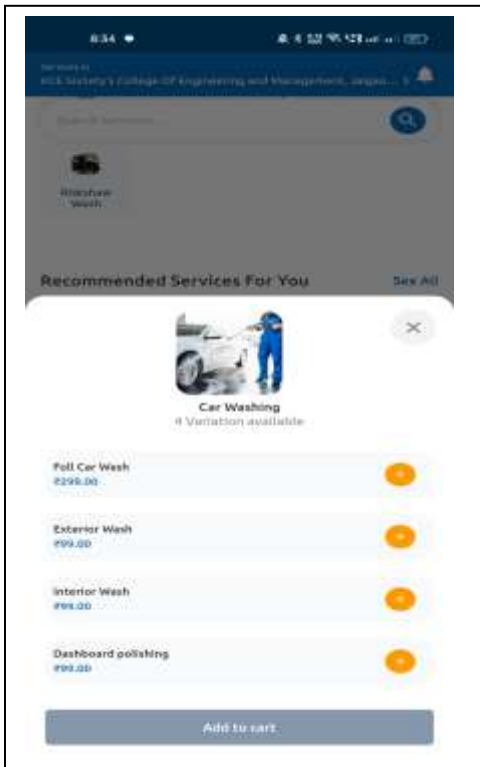


Fig. 3 Sub Services/Add-ons

5. Conclusion

The development of the Real-Time car washing system encompassing both the user app and worker app has greatly enhanced the efficiency and convenience of the service. The seamless integration of functionalities such as user bookings triggering notifications to service providers, worker allocation based on location, real-time tracking of worker's location, and user accessibility to worker details have significantly improved the user experience. Leveraging the Google Maps Geo Location API key has been instrumental in enabling accurate location tracking and facilitating smoother communication between users and service providers. Overall, the successful implementation of this system marks a significant step towards modernizing and optimizing car washing services, showcasing the potential of technology in enhancing service delivery and customer satisfaction.

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