OPEN ACCESS

Volume: 11

Special Issue: 1

Month: July

Year: 2023

E-ISSN: 2582-0397

P-ISSN: 2321-788X

Impact Factor: 3.025

Received: 08.05.2023

Accepted:13.06.2023

Published: 01.07.2023

Citation:
Gudada, Priyanka V, and HN Tilak. "E-Puncture." *Shanlax International Journal of Arts, Science and Humanities*, vol. 11, no. S1, 2023, pp. 257–62.

DOI:
https://doi.org/10.34293/sijash.v11iS1-July.6348

E-Puncture

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Abstract

E-Puncture is an android application. It provides puncture service in a reliable and efficient way. While travelling, when people's vehicle gets punctured (especially in an unknown place) it will be very difficult to overcome that situation i.e., to get their vehicle repaired in the meantime. Issues faced by them are lack of knowledge of nearby garages, surrounding area unknown to them, breakdown in deserted area, issue of reliable mechanic (expertise level). To overcome this problem, we have come up with an Android application E-Puncture which uses GPS to locate traveler's location and accordingly show all nearby garages. Users can select their issue of breakdown on the application. Accordingly, one of the garages would take the job and go to the traveler's location and repair their automobile. The project is developed using Android Studio and google cloud Firebase which includes a variety of custom tools and libraries helpful to develop Android based mobile/tablet applications such as database (Fire- store NOSQL), Google maps support, rich GUI and UI components, etc.

Keywords: Global Positioning System, NOSQL Database, Fire-Base, Android.

Introduction

Almost every man now owns a vehicle and there are always chances for something going wrong with the vehicle which results in a breakdown. These days, the services accessed from location-based applications are one of the most relevant and commonly explored. There are numerous applications available that make use of google maps and GPS to explore the neighborhood and give services to the consumers, e.g., Food- delivery, Grocery shopping, etc. But only a handful of applications exist, and limited systems are available to solve addressing the issue of vehicle breakdown. In this project We are embarking on the development of a system to overcome this problem in an effective manner. To do this we are developing an Android based application which will help people easily, effectively and in a minimum amount of time. In this application, garages are used, searching by radius. The user will search for nearby garages to his location. The garages will store their shop's location in the database. Google Maps API will be used for working on the project.

Literature survey

The paper by Prof. Shilpa Chavan focuses on the need for a management system for automobile service centers. The current system is described as manual, involving excessive paperwork, leading to errors and delays for both customers and employees. The paper highlights the advantages of a new system, including improved efficiency through automation, faster repair turnaround times, and the ability for employees to prioritize other tasks. Additionally, the new system could enhance customer satisfaction by providing more information about their cars and allowing them to track repair progress. Despite challenges such as implementation costs and training requirements, the paper concludes that the benefits outweigh the obstacles.

The paper by B. Y. Reddy et al. presents an Android application for tracking automobile service centers, aiming to address the difficulties customers face in finding and engaging with service providers. The application offers benefits such as improved efficiency through online appointment booking and proximity-based search for service centers. It also enhances customer satisfaction by providing service information and repair progress tracking.

The paper Ankita Choudhari et al. introduces an Android application for vehicle repair and puncture services. The current process is deemed inefficient and time-consuming. The application aims to enhance efficiency by enabling online bookings and offering service providers a centralized platform. It also focuses on improving customer satisfaction through increased service information and repair progress tracking. Despite challenges, the authors emphasize the application's benefits outweighing the obstacles, making it a valuable tool in the industry.

The paper by G. Rajalakshami and Y. jeya Singh introduces a car service recommendation application based on Android. It addresses the difficulties users face when seeking car services in unknown locations. The proposed system enables users to easily locate nearby authorized service centers or pre-owned mechanic shops through a mobile application. The application facilitates online appointment booking and parts replacement, reducing the user's time spent on car services. It also includes features such as employee location tracking and assignment, ensuring efficient and timely service. The system aims to improve customer satisfaction and provide convenient car services in unfamiliar areas.

The paper presents an "Online Management System for Automobile Services" to address the complexities and time constraints associated with car servicing and maintenance. The system is a web application that enables users to locate and communicate with nearby mechanics, request pickup services, and find nearby hospitals. It utilizes Firebase for storage and hosting, Angular2 for front-end development, and incorporates GPS for real-time tracking. The system aims to improve accessibility, provide 24x7 repair and towing services, and create opportunities for local mechanics.

The paper "Android Application for Auto-mobile Repair Services" by Atharv Jangam, et al. presents the development of an Android application for booking auto-mobile repair services. It addresses the limitations of existing applications and focuses on features such as shop search, profile viewing, appointment booking, appointment tracking, and feedback provision. The application follows the MVC architectural pattern, utilizing Java and Android Studio for development. A user study involving 20 participants demonstrates satisfaction with the application's functionality and user-friendliness. The article concludes by discussing future improvements, including the addition of payment functionality. The comprehensive literature survey and detailed design and development discussions contribute to the article's value, making it an informative and well-executed research paper.

Existing System

Based on an analysis of previous research papers and surveys conducted at garages and repair stations, we have identified a lack of Android applications catering to vehicle services. While a web application exists, it lacks a billing module for users, which we aim to provide. Our module aims to simplify payments, save time, and eliminate the need to carry cash by enabling convenient cards and UPI payment options. This system addresses the shortcomings of the previous automobile servicing system, streamlining the process of finding garages during emergencies and enhancing service management. Our application facilitates easy location of nearby garages for vehicle owners in unknown locations, providing an optimal solution for efficient automobile servicing.

Proposed System

1. The development of an Android application based on GPS technology.
2. By leveraging the GPS system, the user's location is obtained, and nearby garages are displayed through a garage database.
3. The system is designed to enable users to make bookings from a list of available garages.
4. Once the service is provided to the user, including any additional work done on the vehicle, the system automatically generates a bill. Users can easily view the updated amount for payment, and a variety of payment options are provided for their convenience.

System Architecture

The system mainly consists of a three-part customer side, a garage side and one admin side. Whenever user needs assistance then using google map API location his/her request gets into our fire-base cloud. By utilizing the Service Request Manager and Real-Time database of fire-base cloud user will get the list of nearby garages and he can choose any one of them. Garage will get the request if user demands. If garage owner accepts the request, then they can communicate through message or via call. After providing the service the employee can update the final amount that the customer can refer to for the payment. Admin will be the monitoring body. He will do the update, delete, create operations according to the needs.

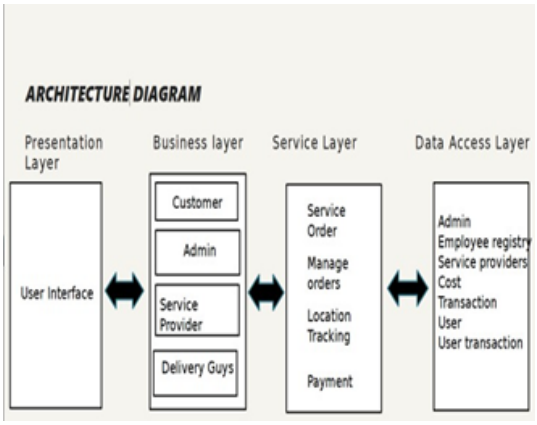

Figure 1 Architecture Diagram

The architecture diagram (Figure 1) consists of three layers: Presentation Layer, Business Layer, and Data Access Layer. At the Presentation Layer, users interact with the system interface. The Business Layer involves Customers and Admins, with Customers placing orders and managing transactions, and Admins overseeing operations. The Service Layer handles core functionalities

like order processing and management. The Data Access Layer manages data storage and retrieval, including entities like Admin, Employee Registry, Service Providers, Cost, Transaction, User, User Transaction, Service Provider, Delivery Guys, Location Tracking, and Payment. Admins manage accounts and configurations, while Service Providers offer services. Location Tracking ensures accurate tracking, and Payment handles transactions. This architecture enables users to access services efficiently while facilitating effective management and data storage.

Implementation

It comprises of four modules namely Administrator Module, User Module, Shop Owner Module, and Employee module.

Administrator Module

Admin is monitoring body here he will be handling the CRUD operation on the database. Only if necessary, then only he will interfere with the system. He will monitor the billing transaction which is going to handle by the cloud.

User Module

The User module allows users to sign up, log in, search for nearby garages, select a preferred garage, and choose desired services. The development of this module involves utilizing Firebase and Android Studio, where JSON is employed to establish connections between Firebase and the User module. Upon signing up, users will be prompted to grant permission for location access to enable tracking. Whenever the application is used, it establishes a connection with service centers stored in the Firebase storage based on the user's geolocation. The application utilizes the Google Maps API to locate nearby registered service centers within the user's specified radius. These service centers, along with their detailed services, are already stored in our database. Users can choose their desired service center and the specific services they require. Location-based applications are currently in trend, and our application aims to save users' time and effort, especially in unfamiliar areas. Users can access services anywhere and anytime as per their needs. Obtaining details about car services becomes effortless through our application. For example, if a user wants to get their vehicle washed, they can simply select the washing service in the dashboard, and available service providers will be fetched from our Firebase database, presenting the relevant results. The user can then proceed to request the selected service center.

Garage/Shop Owner Module

The Garage Owner module facilitates garage owners to sign up, log in, enter garage details, and view customer requests and locations. It is developed using Firebase and Android Studio, with JSON managing the connections between Firebase and the Garage Owner module. The registered owner's location details are recorded and updated in the database on a daily basis. This ensures that the database contains the latest location data for each registered owner. An admin is responsible for managing the service centers' information, including adding, deleting, or modifying details. When a user sends a query within the radius of a service center's site, the relevant information stored in Firebase storage is readily available for display.

Employee Module

The Employee module within the system enables employees to sign up, log in, deliver services, and update service charges. Using Firebase and Android Studio, the module is developed, and JSON is utilized to handle the connections between the Employee module and Firebase. Once the

shop owner accepts a request, it will be assigned to one of the employees of the shop who will be responsible for providing the service.

Results

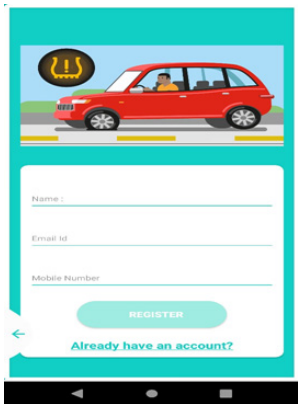

Figure 1 Registration/Login

Figure 2 Home Screen

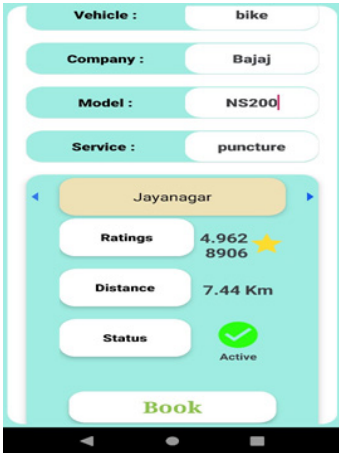

Figure 3 Service Booking

Figure 4 Payment

Conclusion

This project successfully enhances the efficiency of car and automobile servicing systems compared to existing methods. The current service center management systems have certain drawbacks, which this Automobile Repair Services application overcomes. Moreover, this application is designed to be easily accessible to everyone, addressing the challenges faced by individuals in conveniently seeking assistance or locating service centers during vehicle breakdowns or emergencies. The proposed Android vehicle repair application intends to facilitate people in fulfilling their requirements conveniently and effectively.

Future Work

In future, we hope this system helps users to easily find nearby garages for Automobile repair services.

This work can be extended by adding functionality such as:

Vehicle Health Monitoring System

In the future, we can incorporate a vehicle health monitoring system into the application, enabling users to conveniently assess the condition of their vehicles. This feature will help users identify any minor issues promptly, thereby saving their time and effort.

Marketing Platform

Like well-known e-commerce platforms such as Amazon and Flipkart, we can expand our services by creating marketing platforms specifically designed for retailers and automobile parts providers. This initiative would empower these businesses to directly sell or purchase automobile parts, effectively widening their customer base and streamlining transactions within the automotive industry.

Toying Providers

At present, the app does not incorporate towing services. However, there are ongoing plans to collaborate with towing service providers in the future. This integration will enable users to conveniently request emergency assistance directly through the app when required.

Medical Help

In the event of accidents, the app will offer nearby hospital contacts based on the user's location, facilitating prompt access to medical assistance. This feature is designed to assist vehicle owners in quickly seeking medical help, thereby improving safety and reducing response time in critical situations.

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