IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 11, Issue 3, March 2023

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.379

International Journal of Innovative Research in Computer and Communication Engineering |

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 4, April 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1104169 |

Development of an Application for Carpooling & Ride Share Among Students

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ABSTRACT*:* Carpooling taxicab services hold the promise of providing additional transportation supply, especially in the extreme weather or rush hour when regular taxicab services are insufficient. Although many recommendation systems about regular taxicab services have been proposed recently, little research, if any, has been done to assist passengers to find a successful taxicab ride with carpooling. In this paper, we present a system for both the regular and carpooling services, called HOPIN , based on a data-driven approach. In response to a passenger's real-time request, HOPIN aims to recommend either: 1) a driver with a vacancy 2) or a rider who wants to carpool.

KEYWORDS: Carpool, Rideshare, Student

I. INTRODUCTION

Some students live within walking distance of the school, but some are not lucky enough to get to university without driving or using public transport. Students face different problems while going to university. For example, students who use public transportation can miss the bus or metro on their way to school.

HopIn is an android application to connect students within the community of their college students to share rides. This will help users share the cost of travel, reduce travel time, increase mobility and build communities. This application helps you travel with your friends and neighboring students making your commute economical, safe and a lot of fun.

Considering the number of hours a student spends only on traveling to college or back home in a year, sharing rides seems a good way to get out of it. As it's difficult for students to daily afford the increasing prices of petrol alone. This application helps students to reduce daily cost of travel by sharing and also reduces travel time and helps create a great communication between students.

"HopIn" helps the students to share rides and carpool with students who travel along the same route. Also, whenever there is an emergency situation like an accident or the vehicle stops working, this application helps the students by sharing their live location to college, family & friends and also the students who are nearby their current location. So, they get help as early as possible.

Goals or Objectives:

- To provide a direct bridge between students who need help and students who can help.
- To reduce time travel.
- To reduce travel expences.
- To provide a user-friendly application.

II. LITERATURE SURVEY

In this study by Kamaruddin and Rozlis, information about the mobile application called "UiTM Share Ride," which uses the ride-sharing approach to reduce the parking problem at the university, is given its technical details. When the data about the technical part of the application in this study is examined, it is examined that three-tier architecture consisting of a presentation layer, application layer, and data layer is used as application architecture. First, XML (Extensible Markup Language) displays information in the presentation layer. Secondly, Java Programming language is used in the application

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layer. Finally, Firebase, a real-time and NoSQL database type, stores and retrieves data in the data layer. In addition, this application is developed using Android Studio and Google Maps API for passenger pickup and destination locations (Kamaruddin ve Rozlis, 2019).

. In the study by (Antao, Correia, and Gonsalves, 2015), they mentioned the importance of Carpooling as a highly effective way to minimize pollution and traffic congestion. They thought that carpooling also gives one the chance to meet new individuals. The main reason for designing the carpooling application was to reduce the cost of travel for traveling people. The application will allow the user to select his/her role, i.e., driver or passenger. This app is being developed for ANDROID versions 3.0 and up. With the help of PHP, the program is connected to a MySQL database. When the application is installed, the route is determined by the driver.

The study of Amasyalı and Gül is about adding VoIP features for calls to the ride-sharing application TAG, working on Android and IOS mobile applications. As stated in the study, some users were concerned about phone number privacy. Therefore, VoIP has ensured that drivers and passengers can make voice calls. Thus, the phone number of the users remains confidential. Twilio framework uses cloud technology for VoIP calls on mobile applications. In addition, in this study, it is mentioned that while the driver and passenger once matched, a trust can be created by taking into account the Facebook friends of the users, their mobile phone connections, their colleagues and similar features. In the conclusion part of the study, it is reported that the VoIP-based communication system has been successfully added to the TAG application (Amasyalı & Gül, 2017).

It is seen that the Google Maps service is used in many applications. An example of this can be given in the "Yol Arkadasi" application. In the study conducted by Ilhan and Mutlu in 2014, the carpooling application developed for the Android OS named "Yol Arkadasi" was introduced. This application can work on Android 2.3.3 and newer Android versions. This study uses Google Maps API v2 for map services in the "Yol Arkadasi" application. In addition, MsSQL was used as the database system in this application, and the application was developed with the Java programming language. Another important point mentioned in this study is that there were no results for Turkish queries in mobile application markets for "carpooling" and "car-sharing" (İlhan & Mutlu, 2014). In the light of the literature, it was decided to use Google Maps API for map services in this study. Also, the Firebase platform is used to perform database operations of the application in real-time.

The whole system is divided into three modules. They are Admin, Students and Faculty. Passengers are one of the primary two users of the application. The application serves them by finding suitable routes and drivers on time they entered. Passengers must verify their accounts with mail sent to their university email addresses. They can register to the system, log in, log out, and change their profile information, address description, and course hours.

They can see drivers on the road route and share their location with the app. They can view the instant live location of drivers. They can send requests to drivers whose time and route are suitable for the route they will go and chat with them. Drivers are users who have a car(s) and can take passengers to their destination. Passengers who want to be a driver must have a driver's license for at least two years and one vehicle.

Drivers can create an account by entering car information into the system, and they must verify their accounts with a mail sent to their university email addresses. They can view, change and delete vehicle information at any time. Drivers can determine and save their travel routes on the map while sharing their instant location with the passengers. Drivers can see the passengers looking for a vehicle on the map and access their information about the passengers.

Drivers can accept or reject ride requests from passengers. If the driver accepts the incoming travel request, the driver can message the passenger who sent the request and see the passenger's information. When the driving process is completed,the driver can evaluate the passenger.

III. PROPOSED WORK

With our system, we strived to get the support and attention of areas that lack alternative transportation solutions, and universities that have an exceedingly high amount of traffic-related issues around their campus.

Our project encourages unification within college communities as they participate in a safe and convenient carpool system. Participating students also take part in maintaining the environment. By choosing to carpool together, rather than taking their own cars to the same destination, students are reducing their carbon dioxide emissions

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A. SYSTEM ARCHITECTURE :

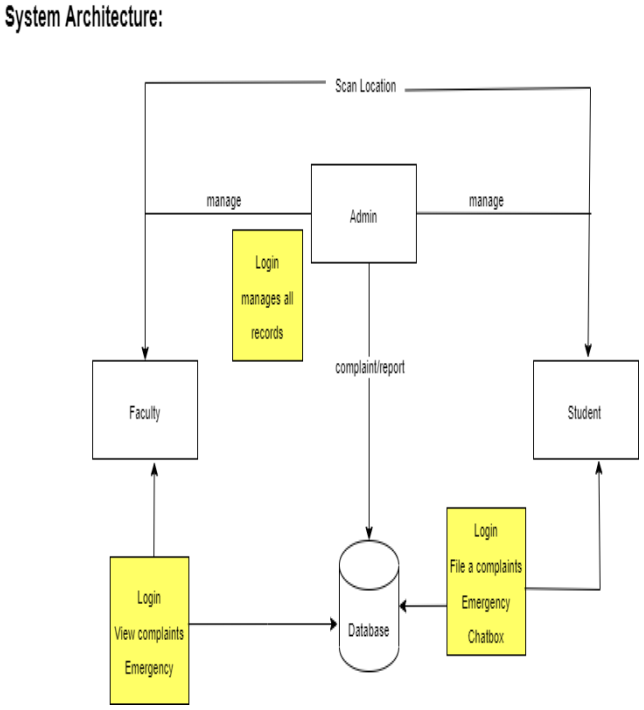

Fig.: 3.1 System Architecture for HopIn

The model components store the data that the application stores and accesses. This includes a database that the team will create and maintain, and will store the main application data such as data about user information, organization information, and trip data. The application will also rely heavily on route, traffic, and location data provided by the Google Maps Application Programming Interface (API).

B. FLOW OF THE SYSTEM :

In the above we have shown the flow of our project . If the admin / user want to access the application, they need to login or they need to sign up/ register by providing their credentials. Once the user successfully login, they will get to access the Admin panel. In this, the admin can manage the complains, view students and faculty. The admin can insert and update data. Admin can modify the information accordingly.

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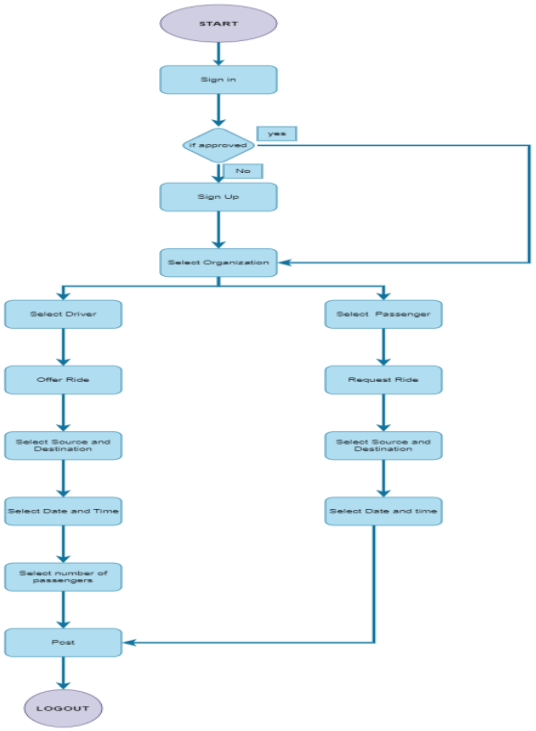

Fig.: 3.2 Flowchart for HopIn

C. FUNCTIONAL MODULES :

1) Sign Up:

Any user must be able to create an account. An email address and a password are required to create an account. An account is required to use most of the application features, including joining an organization. Membership to an organization is required to join a carpool.

2) Sign In:

The registered users must be able to sign into their account using their registered email address and password.

3) Join an organization:

A registered user for the app must be able to join an organization they belong to, such as a university or other organization. The user will be able to join the organization with their credentials for that organization.

4) Offer a ride:

A user must be able to post a drive offer post indicating that they are willing to be the driver in a carpool. The post must specify the source and destination locations, the date of the carpool, and the time the user needs to reach the destination by.

5) Request a ride:

A user must be able to post a ride request post indicating that they want to be a passenger in a carpool. The post must specify the destination location, the user's pickup location, the date of the carpool, and the time the user needs to reach the destination by.

IV. APPLICATION

1. **Society Impact :** Our project encourages unification within college communities as they participate in a safe and convenient carpool system. Participating students also take part in maintaining the environment. By choosing to carpool together, rather than taking their own cars to the same destination, students are reducing their carbon dioxide emissions.
2. **Academic Impact :** The mobile application component of our project utilizes a combination of existing APIs, and

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research findings to build an optimized carpool application. Meanwhile, the parking system component uses state-of-the-art IoT technologies that will contribute to the few existing parking solutions.

V. . RESULT

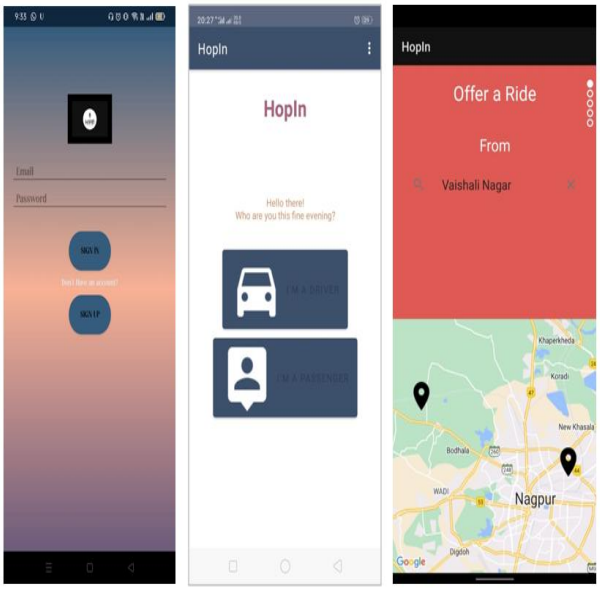

Fig.: 5.1 Home Page

Sign up - Any user must be able to create an account.An email address and a password are required to create an account.
Sign in - The registered users must be able to sihn into their registered email and password.
Add Organization- Driver and Passenger.
Offer a Ride – A user must be able to post a drive offer post indicating that they are willing to be driver in a ride sharing.
Request a Ride – A user must be able to post a ride request post indicating that they want to be a passenger in a ride sharing.

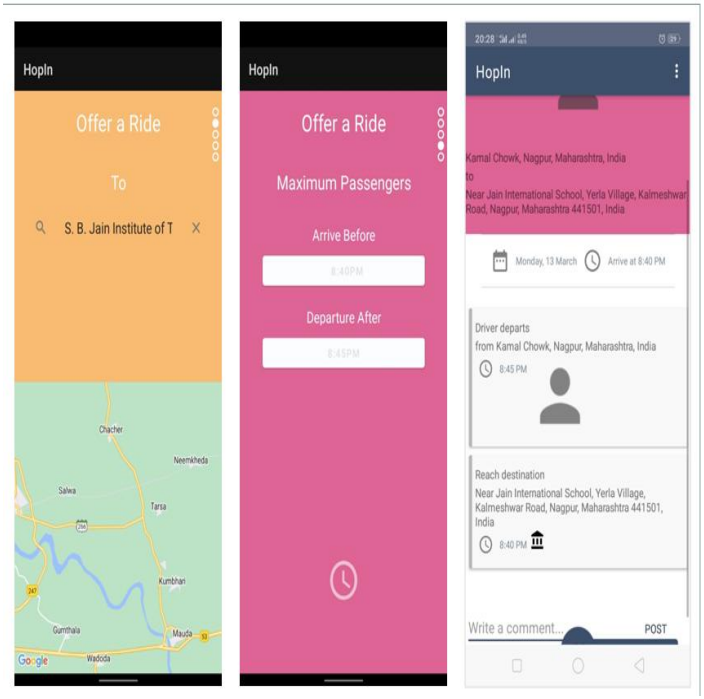

Fig. : 5.2 Offer/Request Page

The following screens: login page, home page, process to request a ride, viewing an existing carpool, and how the data captured

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by the sensors would be displayed on the application. To avoid redundancy, we have only included views of process to request a ride as it is similar to the process of offering a ride.

VI. CONCLUSION

This survey helps in developing an approach for Carpooling & Rideshare for Students. It has helped to explore the various approaches that have been previously developed. With this survey and study, we have proposed an efficient approach for Carpooling and Ridesharing using HOPIN from which students can save costs and lower environmental impact. Our approach helps members of an organization connect and form carpools & share rides to a common destination. The system incorporates a mobile application. The mobile application allows users to find matches for carpools & share rides with other people in their organization. This provides a strong incentive to participate in carpools & share rides in areas where parking space is an increasingly difficult problem. Promoting more carpooling & shared rides has various other benefits, such as saving costs and lowering environmental impact. An organization that wants to promote carpooling & share ride within their organization can use HopIn to provide a means for members to easily find potential carpool & ride share drivers or passengers and plan the trip and handle scheduling for them, HopIn solves traffic and parking space limitations by promoting carpooling & share rides to the campus and helping students.

VII. ACKNOWLEDGEMENT

We would like to express deep sense of gratitude to our Project Guide, Mrs. Sonali Zunke and Mr. Naresh Badve, Department of Computer Science & Engineering, for being the cornerstone of our project. It was their incessant motivation and guidance during periods of doubts and uncertainties that has helped us to carry on with this project.

We would like to thank Dr. Mrudula Nimbarte, Head of Department, Computer Science & Engineering for providing necessary guidance, support, motivation and inspiration without which this project would not have been possible.

We would like to extend our special thanks to Dr. S. L. Badjate, Principal of S.B. Jain Institute of Technology, Management & Research for his encouragement and best wishes.

We would like to extend our sincere thanks to the Management of S.B. Jain Institute of Technology, Management & Research for providing all the necessary infrastructure and laboratory facilities.

We also like to acknowledge the help extended by the faculty members and non- teaching staff of Computer Science & Engineering Department for successful completion of our project.

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INNO SPACE
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