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Car-Pooling System (CapX)

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Abstract: *With traffic congestion and environmental concerns on the rise, carpooling systems have become increasingly popular. This paper proposes a carpooling system that matches drivers and riders based on their travel preferences and routes using an advanced algorithm. The system considers factors such as pickup and drop-off locations, preferred departure time, and route to find the most compatible matches. Additionally, real-time updates are provided on the driver's location and the rider's estimated time of arrival. This carpooling system not only reduces traffic congestion but also lowers carbon emissions, promoting environmental sustainability. It also offers a safe and reliable alternative for individuals without access to private transportation or public transit. The proposed carpooling system has the potential to transform commuting, providing a practical solution for a more sustainable future.*

Keywords: Carpool, Traffic, Route, Travel, Private, Public, Location.

I. INTRODUCTION

Welcome to our web-based carpooling project! Our goal is to offer those who want to commute to work or travel in a more sustainable fashion a convenient and affordable transportation option. We want to make transportation cheaper for everyone while reducing traffic jams and carbon emissions by carpooling with other travelers.However, with increased traffic congestion and environmental concerns, it is more crucial than ever to develop sustainable transportation solutions. By offering a platform that links drivers and passengers for shared trips, our carpooling web app project seeks to address these challenges and enable users to save money, lower their carbon footprint, and enjoy a stress-free commute.

The goal of this project is to create a web application that makes travel easier, more economical, and ecologically beneficial. The Car-Pooling System enables those who rely on public transportation locate drivers who are travelling in the same direction by connecting them with drivers who commute alone with passengers wishing to share a trip. Users can access available automobiles through this system and schedule rides according to their availability and schedule.

Carpooling involves sharing a car journey with others, thereby reducing the number of cars on the road and avoiding the need for everyone to drive separately. Typically, carpoolers split the cost of travel equally among themselves, including expenses such as fuel, tolls, and parking fees. The driver does not aim to make money from carpooling, but instead aims to share the cost of a trip that they would have taken anyway.

Carpooling is particularly popular among those who work in areas with many job opportunities nearby and live in densely-populated areas. It is also linked to lower transport operating costs, as well as shorter commute times and distances.

By encouraging more people to share a ride in one vehicle, carpooling can significantly reduce travel costs, lower carbon emissions and air pollution, and ease traffic congestion on the roads. Additionally, it can help minimize the need for parking spaces, making it a more sustainable form of transportation. Drivers who are going in the same direction. This system allows users to access available cars and arrange rides that suit their schedule and capacity.

II. RELATED WORK

Carpooling is the sharing of a commute by commuters going to the same place or on their way there. Although it refers to ridesharing, carpooling, and other terms, the fundamental philosophy is the same. The majority of applications are accessible through web and mobile platforms. Systems like lift sharing, national car sharing in the UK, and transportation in the USA. There are parallels between Uber, Sidecar, Lyft, Taxi Magic, Ground Link, and other

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services. This initiative is being effectively implemented at Monash University under the name "Carpooling - Rideshare"; it is a means to socialize, protect the environment, and park more affordably.

The major discoveries of these systems are:

- Stations with a focus on a particular location.
- The same locations for pickup and drop-off.
- Mileage and time-based fees.
- Information given without a direct match.
- Hardware-based and communication-based strategies.

III. LITERATURE REVIEW

RazaHasan, Abdul hadi Bhatti, Syed imranali and Abeerjavedsyed [1] proposed a Smart peer carpooling system. In which they proposed a smart model for SPCPS based on sustainable mobility, which includes architecture and business model approaches. The government and institutions are encouraged to promote carpooling to increase high-occupancy vehicle lanes rather than individual commuters.

Nikhil Bacchav and PriyaMalode[2] proposed an application for carpooling.They used route matching in their paper, which can assist users in finding the most suitable rides for their journey. The application will compare the shortest path with already taken trips after taking into account the source and destination to construct the path. Additionally, the results will be ranked based on how closely the paths matched. They also used GPS and Google Maps to track where people were.

Alejandro Lugo, Nathalie Aquino, Magalí González, Luca Cernuzzi [3] proposed a UCarpooling: decongesting traffic through carpooling using automatic in which they focused on pairings which Both the back end and the front end are included in the design and modelling of such systems; however, in this study, we are primarily concentrating on the back end while leaving the front end for future work.make it easier for those who frequent the same institution or are coworkers to carpool.

RutujaPharande, Prof. Neha Sharma, ShubhangiGunjal and AbhishekMahale [4] proposed a Peer-to-Peer car sharing system in their paper they proposed a decentralized Peer-to-peer automobile sharing which is implemented to aid with transportation issues in urban areas by reducing traffic congestion. Two kinds of stakeholders are identified for this D-App i.e., the driver and the rider. Each user has different functions and responsibilities that are offered using various dashboards of the D-App.

YueshenXu, Yuqiao Liao, Jianbin Huang and Ying L [5] proposed a real-time demand-aware ridesharing service which is developed with the aim to give the quality-of-service. When users submit a request in devices, it will find a car on the user's way only. It is also made to find the most appropriate route.

Methodology

Users can use a web application or have our built Car sharing application loaded on their Android smartphones. The users' registration will start the carpooling procedure. After that, users can create and share rides. The processes for creating rides and finding rides involve the following actions.

1. Registration of Users

The user must fill up the app's registration form with information such as first and last names, usernames, email addresses, phone numbers, pin codes, and countries, states,
and cities.

2. Organising Carpools

Step 1: The source, destination, car information, date, time, and available seats will all be entered by the car owner into the car sharing application.

Step 2: The application server will receive this request to create a carpool.

Step 3: The server will now verify the other information entered and look up the existence of a route between the source and destination entered.

Step 4: A carpool has now been created, and anyone looking for rides can search and browse it.

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3. Look up Carpool

To search and browse for rides, the ride seeker must first enter the source and destination into the application.

Step 2: The carpool server will receive this search information.

Step 3: The server will now verify every input that the user has provided.

Step 4: The server will display available rides to the ride seeker after validation. Any of these ride makers may receive a request from a ride seeker.

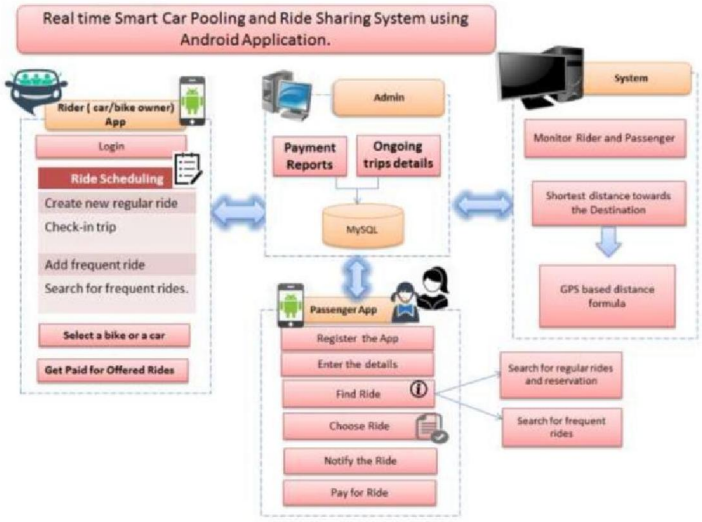

Figure: - Proposed System Architecture.

IV. CONCLUSION

In this study, we presented a useful web application for carpooling that tracks user location. In today's world, carpooling is much more effective because it can lessen traffic and environmental issues. By promoting car/bike sharing, this initiative, Car Pooling System, hopes to minimise traffic on the roads as well as the consumption of gasoline, our most important non-renewable resource. Therefore, it is a social application that is favorable to the environment and aids in reducing travel time. This application has successfully completed computation and testing using "test cases". It is user-friendly and has the necessary options that the user can use to carry out the desired activities. Express, React, Node.js, and MongoDB are used to create the application's front end and back end, respectively.

The web application succeeds in achieving the following objectives: Instant access. productivity gains. optimal use of the available resources. efficient record management. operations are made simpler. speedier information retrieval and processing. friendly to users. Scalable and portable for future improvement.

V. FUTURE WORK

The aforementioned design allows for the development of both web-based and mobile applications. The programme can leverage free APIs like Google Maps to direct the user. Having both drivers and passengers allows for at least two passenger to be carried in each vehicle. To motivate commuters, a system based on credit points could be implemented. This study can be improved further to pave the way for the future generation of vehicles and aid in the development of intelligent transportation systems.

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