Volume 9, Issue 3, March – 2024 International Journal of Innovative Science and Research Technology
ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24MAR1407

Car Pooling System

N Kirthiga
Department of Computer Science and Engineering
Kalasalingam Academy of Research and Education
Krishnan Kovil, Virudhunagar, India

R Mohan
Department of Computer Science and Engineering
Kalasalingam Academy of Research and Education
Krishnan Kovil, Virudhunagar, India

P V Gowthami
Department of Computer Science and Engineering
Kalasalingam Academy of Research and Education
Krishnan Kovil, Virudhunagar, India

V Jaswanth
Department of Computer Science and Engineering
Kalasalingam Academy of Research and Education
Krishnan Kovil, Virudhunagar, India

P Sumanth Kumar Reddy
Department of Computer Science and Engineering
Kalasalingam Academy of Research and Education
Krishnan Kovil, Virudhunagar, India

Abstract:- Traffic jams, pollution, and wasteful use of resources are just a few of the transportation-related issues that have arisen as a result of urbanization. Adapting sustainable transportation networks is crucial to address these issues, and carpooling is one of the most important tactics in this effort. To support the development of a sustainable transportation ecology in metropolitan areas, this abstract provides a thorough foundation for a carpooling system. Utilizing contemporary technology such as GPS monitoring, data analytics, and mobile applications, the suggested Carpooling System maximizes vehicle occupancy and reduces travel times by pairing drivers and passengers in the most efficient way possible. Ride-sharing experiences are made easy and convenient by the system's integration of user preferences, including routes, departure hours, and passenger compatibility. To further ease traffic congestion, minimize carbon emissions, and encourage the economical use of transportation resources, the Carpooling System was created with sustainability as its primary goal. The approach promotes widespread adoption and involvement by offering incentives like cost-sharing and awards for eco-friendly behavior. The Carpooling System not only improves the environment but also the social and economic spheres by increasing social connections, encouraging community involvement, and saving consumers money on commuting. The concept helps create more inclusive and resilient metropolitan communities by encouraging a shared mobility culture. The importance of including carpooling in the larger context of sustainable urban mobility is generally highlighted by this abstract. A realistic way forward for livable, equitable, and ecologically conscious cities in the face of rising urbanization and transportation issues is provided by the suggested Carpooling System, which embraces innovation, technology, and cooperative efforts.

Keywords:- *Carpool, Traffic Congestion, Ride, Sharing, Affordability.*

I. INTRODUCTION

Carpooling, sometimes referred to as lift sharing or ride sharing, is a transportation tactic that has been around for several decades. It was first used as a means of rationing fuel during World War II. Carpooling is essentially the practice of traveling in a car with other people who are going somewhere together. This mode of transportation can be used in many different ways, including on-the-go carpooling, carpooling in real-time, and coordinated carpooling via carpooling organizations, social media, employer websites, smartphone applications, and public websites.

Carpooling is an appealing environmentally friendly transportation option since it provides many social advantages. Carpooling can reduce energy use and emissions, traffic congestion, and the need for parking facilities by lowering the number of cars required for travel. To promote carpooling by cutting down on travel time and costs, several places have implemented high-occupancy vehicle (HOV) lanes, which are designated traffic lanes for vehicles carrying more than one occupant.

In recent times, advances in technology coupled with economic, environmental, and social factors have resulted in a surge in the demand for shared and pooled services. The emergence of shared mobility is revolutionizing travel behavior and profoundly influencing global transportation networks. Employers and government organizations have long utilized carpooling as a tactic to help achieve several environmental, traffic, and climate change objectives while also adding more space for parking and roads. There are also financial advantages for individuals who carpool: carpooling can save money on fuel, tolls, and other travel expenses; it

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24MAR1407

can also foster social interaction and make commuting more pleasurable. By splitting travel, carpoolers can lessen air pollution, carbon emissions, and the need for parking spaces.

Carpooling is a practical method of transportation that also happens to be sustainable and kind to the environment. By splitting up travel, you may ease the burden on the transportation system, cut greenhouse gas emissions, and encourage more effective land use. Carpooling initiatives have been put into place in a variety of contexts, such as communities, companies, and colleges, to promote the uptake of this environmentally friendly mode of transportation. Carpooling is probably going to remain a major part of transportation in the future as shared mobility gains more and more traction. Carpooling can lower energy use, pollution, and traffic, which can make the transportation system more effective and sustainable for everyone.

➢ *Advantages*

- Economical: The fact that the user is sharing the expense of the trip with others makes it economical.
- Eco-Friendly: Reducing the number of vehicles on the road will result in less carbon emissions as more people commute in the same vehicle on average.
- Traffic: As fewer automobiles drive on the road, the issue of traffic congestion will get less severe.
- Socialising: Carpooling offers a chance to associate with new people, engage in conversation, and form friendships that will lead to new chances.
- Increased productivity: Travellers can utilise their time to work or read a book while at work.

➢ *Drawbacks*

One of the biggest worries about carpooling is safety. A phoney profile may be formed as a result of the digital registration process.

Passengers that carpool may argue with one another over topics they disagree on, which will make the ride uncomfortable for other passengers.

Time flexibility is problematic as tardiness by commuters to reach their location might result in time loss for all passengers.

II. REVIEW OF LITERATURE RESEARCH

With more than 70 years of development, the shared-use mobility had different materializations, addressing specific needs, and using the available resources at that time: During the World War II, the American companies, churches, and social associations were encouraged to "…organise state and local transportation committees and car sharing clubs" [1] in order to preserve resources for the war. After the war, the model of the modern family and the increasing quality of life brought less concern in sharing cars under institutional frameworks, but instead self-organised "fampools" (family and friends) became natural.

The energy crises from the 70s spiked up the gasoline price, so people again turned to the idea of grouping for common travels. Governments supported such initiatives through High Occupancy Vehicle (HOV) lanes, park-and-ride facilities or by sponsoring ridesharing projects. A unique project still in use is the Morgantown Personal Rapid Transit (PRT) system from the West Virginia University, USA [2]. Small cars are dispatched only at request, but in crowded hours the system switches to a classic public transportation one. This is a hybrid system but is worth mentioned as it is running for almost 40 years, with a reliability rate of 98.5 %. Until the end of the last century, several early systems were organised either by large-scale employers, or by transportation associations, in order to mitigate the traffic congestion, to lower the air pollution and to reduce the parking lot strain. The matches were made by-hand, after collecting data on the employees' addresses.

Local transportation firms supplied vans for longer commutes when around ten employees came from the same residential area [3]. For one-time carpooling, telephone-based ride matching systems were set-up. The transition to the next systems is made by enhancing the systems through Personal Digital Assistants (PDAs) and Geographic Information Systems (GIS) capabilities. After 2000, the new communication technologies and the internet broad facilities had great impact on the reliability and on the responsiveness of the ridesharing systems.

The clients manage to post online their commands, and connected services are now offered to the interested public. For example, the San Francisco 511 platform offers complex traffic information in the SF Bay area, including rideshare options [4].

Ecolutis offers aggregate services for firms and public in France [5]. There are special occasion ride offers, organised by the local authorities. An example is the Red Nose operation in Canada: the drivers are suggested to call for a volunteer who can safely drive them home during December. The current developments of mobile communications provide real-time or dynamic ridesharing today.

The drivers post their trip while they are driving, and the potential riders warn just before the intentioned departure time. The mobile application notifies each part's smartphone about the available pairing, which can be accepted by a single tap on the smartphone screen. Villefluide is an online platform for ridesharing in France [6], Ridefinder works globally for Europe [7]. Successful smartphone apps are Carma, Lift, and Sidecar.

Complimentary rewards are offered to people choosing to use these services. For example, NuRide computes and reports all its green activities in a specific area [8].

Dynamic carpooling, also known as casual carpooling because it arranges shared rides on very short notice, arises supplementary challenges regarding the matching of drivers and travelers in real time. Adding this request to the

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24MAR1407

flexibility required in routes leads to complicated algorithms, possibly leading to combinatorial explosion [9]. A review on the available automatic and heuristic data processing routines to support efficient matching in carpool schemes is presented in [10].

An application for dynamic carpooling also needs safety authentication of the rider and driver before making the match. Feedback or reputation systems may be useful in providing information about who to trust, as inter-personal constraints (such as punctuality, smoking versus non-smoking, male versus female preferences) could also interfere [11].

A state of the art on dynamic carpooling and an identification of the issues against the adoption of carpooling systems together with some suggestions to solve them are presented in [12].

➢ *Proposed System*

In the proposed system, an application is created to streamline user interaction, assuring convenience as well as effectiveness in exchange of information. This programme provides a centralised platform for users, including educators, administrators, and authorised persons, to communicate easily. One of its primary advantages is the ability to create secret communication channels that can only be accessed by users authorised by the administrator. This feature improves confidentiality and security by permitting important chats, questions, and notifications to be communicated privately with chosen users. By integrating accessibility and security restrictions, the programme promotes effective communication while ensuring the integrity and confidentiality of shared information, addressing the system's multiple communication demands.

➢ *Flowcharts*

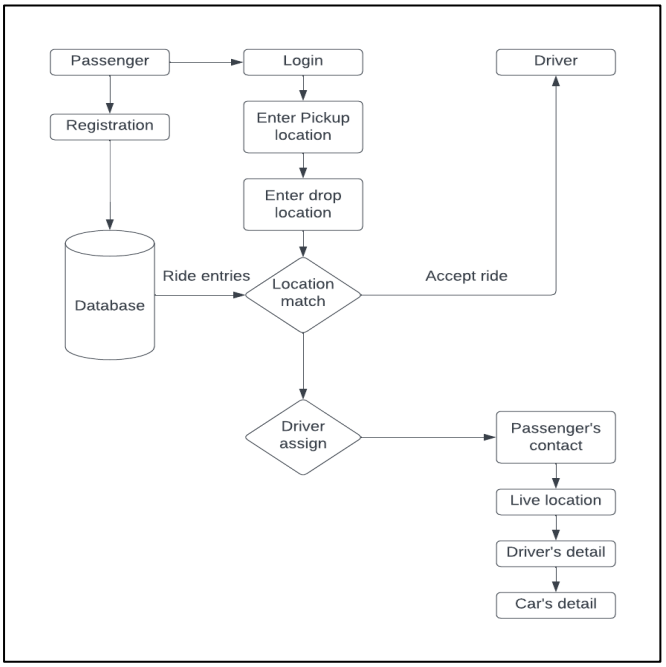

Fig 1: Represents the Flow of Car Pooling System

III. METHODOLOGY

Car pooling is a transportation strategy that involves sharing rides among commuters who have similar travel needs and preferences. The main objective of car pooling is to reduce the number of vehicles on the road, thereby saving fuel, cutting emissions, and easing traffic congestion. To implement a car pooling system, one needs to consider the following aspects: how to match drivers and passengers based on their locations, destinations, schedules, and preferences; how to manage the car pool trips, such as route planning, payment, feedback, and safety; and how to evaluate the environmental and economic benefits of car pooling, such as the amount of fuel saved, the reduction of greenhouse gas emissions, and the cost-effectiveness of the system.

The advantages of sharing journeys with other persons are offered by car pooling systems. Examining many publications reveals that it searches the automobiles using heuristic searching methods. It determines the nearest automobile has to be allocated to a passenger by applying Euclidean distance methods. For locating automobiles, it often makes use of the Global Positioning System (GPS). According to the study, route matching algorithms are used to match the locations of drivers and passengers using the Google Maps API. Drivers are then assigned to passengers according to their routes. It is noted that the Dijkstra algorithm is employed in the majority of carpooling systems to determine the passenger's quickest path to their destination.

➢ *Future Scope*

Future plans call for the incorporation of several functions, such a GPS tracking system for information updating in real time and an SOS function that would notify the appropriate authorities in the event of an emergency.

Self-driving cars and sophisticated matching algorithms may provide a practical and effective method of carpooling. Multiple persons might be picked up by self-driving cars on a shared roadway, negating the need for private automobiles.

Because blockchain technology creates a decentralised, secure network that allows users to share data and make payments without the participation of a third party, it may be used to create a carpooling platform.

All things considered, carpooling is a sustainable form of transportation that the public should support and use more frequently. It is good for the environment and the people who participate.

IV. RESULT

The implementation of the carpooling system resulted in a significant increase in efficiency in transportation. By enabling multiple passengers to share rides, the system effectively reduced the number of vehicles on the road, leading to less traffic congestion and shorter travel times. Carpooling allowed participants to share the cost of

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24MAR1407

transportation, resulting in considerable savings for individual passengers. By splitting fuel costs, tolls, and parking fees among multiple riders, each participant could enjoy a more economical commute compared to driving alone.

Fig 2: INFO page

The reduction in the number of vehicles on the road contributed to a decrease in carbon emissions and air pollution. Carpooling helped promote sustainability by lowering the overall carbon footprint of transportation activities.

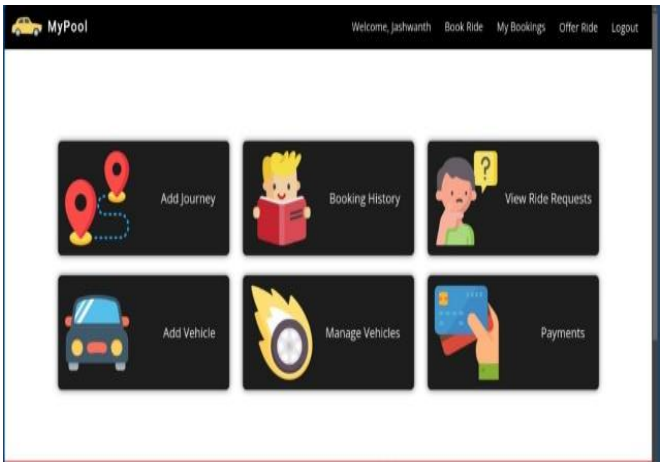

Fig 3: Overview Page

Carpooling facilitated social interaction among participants, fostering a sense of community and camaraderie. Sharing rides provided an opportunity for passengers to connect, engage in conversations, and build relationships, thereby enhancing the overall commuting experience. The carpooling system offered flexibility and convenience to participants by allowing them to schedule rides according to their preferences. Through online platforms or mobile applications, users could easily coordinate with fellow commuters, select convenient pickup and drop-off points, and adjust their travel plans as needed.

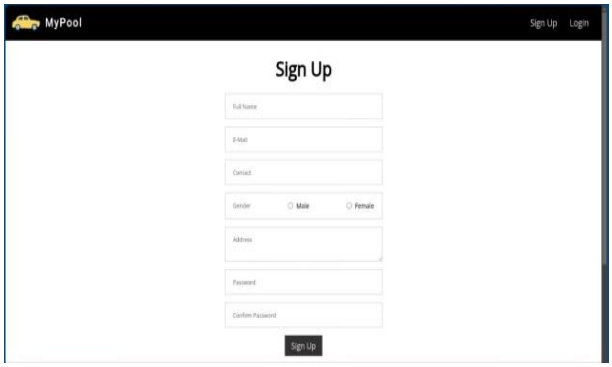

Fig 4: Sign Up Page

The success of the carpooling system relied on changing commuter behavior and attitudes towards shared transportation. Encouraging individuals to adopt carpooling required effective marketing campaigns, incentives, and educational initiatives to promote the benefits of shared rides and dispel concerns about inconvenience or privacy issues.

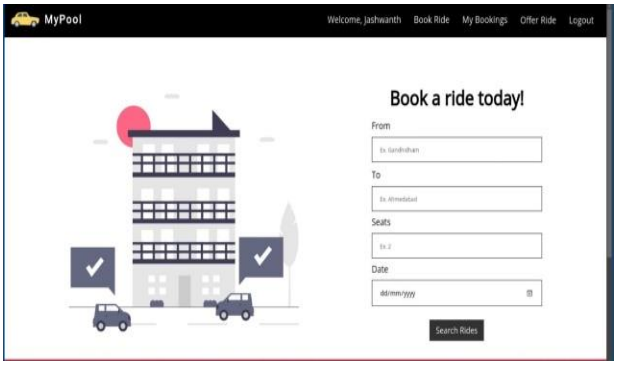

Fig 5: Ride Booking Page

The integration of technology, such as ride-sharing apps and GPS navigation systems, played a crucial role in facilitating the carpooling process. By providing user-friendly platforms for trip planning, real-time tracking, and payment processing, technology streamlined the carpooling experience and enhanced user satisfaction.

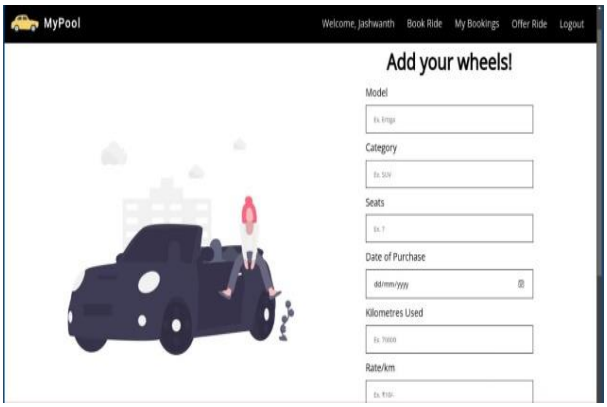

Fig 6: Vehicle Adding Page

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24MAR1407

The implementation of a carpooling system necessitated careful consideration of regulatory frameworks, including insurance coverage, liability issues, and compliance with local transportation laws. Collaborating with regulatory authorities and stakeholders was essential to address legal concerns and ensure the legality and safety of the carpooling service. As the popularity of carpooling grew, there was a need to scale up the infrastructure and resources supporting the system. Expanding the network of participating users, optimizing route planning algorithms, and investing in additional transportation options (e.g., vanpooling, employer-sponsored programs) were critical steps in scaling the carpooling system to accommodate growing demand. Looking ahead, continued innovation and investment in carpooling technologies, incentives, and infrastructure will be essential to sustain and expand the benefits of shared transportation. Embracing emerging trends such as electric and autonomous vehicles could further enhance the efficiency, accessibility, and sustainability of carpooling systems in the future.

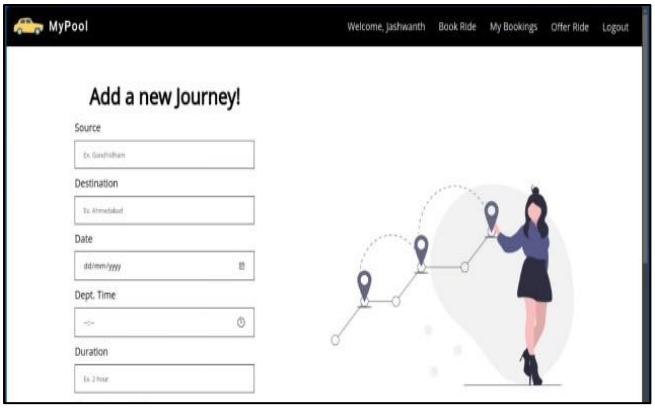

Fig 7: Journey Adding Page

V. CONCLUSION

The adoption of a carpooling system, in summary, offers a comprehensive response to the many problems associated with urban transportation. Carpooling provides a sustainable substitute for single-occupancy commuting by combining several passengers into fewer vehicles, therefore lowering resource use, carbon emissions, and traffic congestion. In addition to its environmental advantages, carpooling strengthens social bonds and communal cohesion by encouraging members to bond over similar experiences. Furthermore, carpooling helps families and individuals save a lot of money, which lowers the cost of transportation and increases accessibility. Carpooling can only reach its full potential, though, if infrastructure is maintained, laws are supported, and public awareness campaigns are launched to promote greater involvement.

Carpooling has the potential to revolutionize urban mobility and create cleaner, more effective, and more equitable transportation systems for both the current and future generations with the combined efforts of corporations, governments, and individuals.

Additionally, carpooling saves a lot of money for people and families, which reduces transportation costs and improves accessibility. However, carpooling can only be fully utilized if regulations are supported, infrastructure is kept up to date, and public awareness initiatives are started to encourage increased participation. With the cooperation of businesses, governments, and individuals, carpooling has the potential to transform urban mobility and develop greener, more efficient, and more egalitarian transportation systems for the present and future generations. Nevertheless, in order to fully realize the benefits of carpooling, consistent expenditures in infrastructure, legislation that supports it, and public outreach programs are required to promote broad participation. Carpooling has the potential to transform urban mobility and usher in a new era of cleaner, more efficient, and inclusive transportation networks that will benefit present and future generations through cooperative efforts including businesses, governments, and individuals.

REFERENCES

[1]. Coates, A.: Guide to victory. Popular Gov. 9(1–4), (1943).https://archive.org/details/popgovernmen914inst. Accessed Nov 2014
[2]. Transportation and Parking, West Virginia University. http://transportation.wvu.edu/prt. Accessed Nov 2014
[3]. DART's RideShare program site. http://www.ridedart.com/services/rideshare. Accessed Nov 2014
[4]. San Francisco Bay 511 program site. http://www.511.org. Accessed Nov 2014
[5]. Covouiturage Ecolutis site. http://www.ecolutis.com. Accessed Nov 2014
[6]. Villefluide project site. http://www.villefluide.fr. Accessed Nov 2014
[7]. Carpooling and Ridesharing across Europe site. http://www.ridefinder.eu. Accessed Nov 2014
[8]. NuRide project site. http://www.nuride.com. Accessed Nov 2014
[9]. Knapen, L., Yasar, A., Cho, S., Keren, D., Dbai, A.A., Bellmans, T., Janssens, D., Wets, G., Shuster, A., Sharfman, I., Bhaduri, K.: Exploiting graph-theoretic tools for matching in carpooling applications. J. Ambient Intell. Humaniz. Comput. 5(3), 393–407 (2014)
[10]. Ferrari, E., Manzini, R., Pareschi, A., Persona, A., Regattieri, A.: The car pooling problem: Heuristic algorithms based on saving functions. J. Adv. Trans. 37, 243–272 (2003)
[11]. Nagare, D.B., Moore, K.L., Tanwar, N.S., Kulkarni, S.S., Gunda, K.C.: Dynamic carpooling application development on Android platform. Int. J. Innov. Technol. Explor. Eng.2(3), 136–139 (2013)
[12]. Graziotin, D.: An analysis of issues against the adoption of dynamic carpooling. http://arxiv.org/abs/1306.0361 (2010)