International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 02 | Feb 2019 www.irjet.net p-ISSN: 2395-0072

Car Pooling: Real Time Ride Sharing

Bansikumar Trivedi[1], Sudhanshu Shukla[2], Bhavesh Amrutkar[3], Priyank Tiwary[4], Deepthi Oommen[5]

[1,2,3,4]BE Student, Computer Engineering, Terna Engineering College, Nerul, Maharashtra, India
[5]Professor, Dept. of Computer Engineering, Terna Engineering College, Nerul, Maharashtra, India

---

Abstract - *The rapidly increasing number of vehicles and commuters leads to an increase in traffic congestion and the problems associated with it. It requires the study of alternative measures to scale down the number of vehicles travelling daily, especially single-occupant vehicles. Several researches conducted revealed that carpooling can be an efficient solution to relieve the pressure due to traffic. The carpooling is a system by which a person offers his or her private vehicle to one or more commuters who have similar destinations or routes. Carpooling is effective solution to reduce the traffic. It consists of increasing the occupancy of vehicles by occupying empty seats in the vehicle effectively. The current system is not enough as far as small regions are considered and it has scalability issue. Our system will provide a secure interface for connecting drivers and commuters to share the ride wherein we are aiming to provide this service in small regions also so that daily commuters like office-goers and students can also be facilitated and can contribute in reducing traffic thus saving environment. We are using genetic algorithm which will help in coordinating ride matches via the carpool system.*

Key Words: **Carpool, Genetic Algorithm, Stochastic Time, Partition Merging, Traffic Congestion**

1. INTRODUCTION

In a heavily populated countries, traffic is one of the major concerning issue. Most of the households have more than one personal vehicle. This is one of the major issue as road traffic increases due to more vehicles plying on the road.

Majority of the vehicles running on the road are private ones. We can observe that due to large number of vehicles, traffic is worsening resulting in longer waiting hours on the road to move further. Owing to this, problems such as air pollution due to greenhouse gas (carbon) emissions, noise pollution, fuel loss etc. [5] We can improve the current scenario to a certain extent by introducing the usage of car-pooling services which encourages sharing of private cars among commuters going in the same direction [3].

Building a platform to establish the link between passengers and drivers is the primary goal. Therefore, a web based application has been developed through which people can share their ride with other passengers who have the same destination. Presently services like Ola, Uber, BlaBlaCar etc. are some of the options users have.

Our system has some added advantages to other models currently in use. Every user has their own profiles and they can have access with given password to the system. Passengers can communicate with the driver via the messaging system and choose their path as desired. After mutual agreement with each other, they provide the journey information to the system. At the end, users can assess each other via a feedback system. Also, the passengers will be able to search for a ride suitable to their location preference.

2. Drawbacks of the current system

The current & previous Carpooling system having some drawbacks which are as follows:

- Safety is the main issue that should be considered in cities. There are some crimes which happened while carpooling like robbery, kidnapping and missing cases.
- While carpooling, won't have much freedom or flexibility with schedule and activities as different people are travelling with each other. So if you have different plans after work, it will be more difficult to do these since you have a whole bunch of people to consider.
- Any member running late can effectively make all the other members behind time we well, since the carpool has to wait for the participant.
- When carpooling with different mindset people from the same organization, it often results in a lot of gossips and unpleasant experience for most of the people
- Due to some different behavior of people, it often results in quarrel between driver and passengers.

3. SUGGESTED IMPROVEMENS

- Generating e-pass (token) which acts like a security feature.
- Using localization of data.
- For security problems, use of various security measure like UID or any authorized id verification.

- Providing an option to female passengers to choose between male/female driver.

4. Proposed Methodology & Implementation

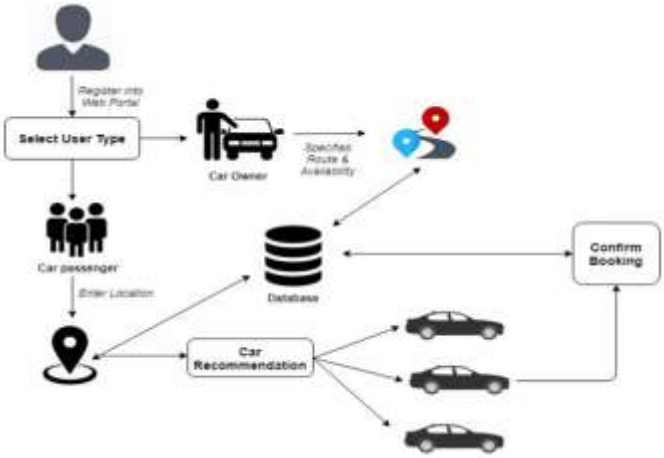

Fig -1: Architecture of System

The mechanism of system is divided into four modules:

1) User Registration:

The system will have two types of user, which are Driver and Passenger. The driver is one who owns the car and is travelling on a particular route, willing to share the ride and passenger is the one who wants to use the share ride service on a specified route.

During registration we are verifying both the types of user, drivers have to provide driving license, vehicle documents and the details of vehicle to be used. Both user will have to provide unique identification number which can be used for Identity authenticity.

Here, we are using Django framework which by default, prevents most common security issues such as XSS (cross-site scripting) protection, CSRF (cross site request forgery) protection, SQL injection protection, Clickjacking protection and Safe password hash etc. It is important to note that Django is implemented in Python which has excellent security track record.

2) Post route:

Driver will post the source and destination along with desired route. User(Passenger) will also put source and destination. Now, we will use genetic algorithm to match the ride for driver and passenger according to their preference and will provide the best route for the journey. Depending on this match both users can accept or decline the request, which will be used as feedback for genetic algorithm [1].

The passenger who is travelling will receive a special unique E-pass which will be helpful in solving legal issues as well as can be used as a token for verifying journey which will be useful for both the users as well as for the administration.

If user is an owner then the details of carpool will be filled and it will be stored in database. A car owner visits the system and uploads his/her car with its starting area and destination specified. He provides the list of checkpoints from where the car will navigate through, so that passengers can get to know from where they can pool the car. When passengers login into their account, they provide travel and location details from where they will use the service. Passenger gets a list of cars with the unique id where passenger can select a car to pool according to their comfort. A map is displayed with the respective car id showing the path of travel where passenger can choose its checkpoint to pool [2]. After selection and submission car owner gets the details about the passengers who have requested car and passengers confirm their location to pool.

3) Payment:

After completing the journey user will pay the amount for distance travelled. User can pay via credit/debit card or payment wallets or cash. For online wallet we will redirect user to trusted third party payment portal.

4) Feedback:

After completing the journey users can post feedback on various parameters. They can also post issues faced during travelling which need to be solved.

Software Development Paradigm:

This application can also make use of an algorithm to find the shortest path so that one spends minimum amount of fare and can also make use of messaging services to inform the passengers about the late arrival of car owner due to traffic or when car owner is not willing to go.

In our system we will use a genetic algorithm to make it convenient for the users to find the optimized journey. Using genetic algorithm, our web application will display the optimized journeys relevant to the consumer [1].

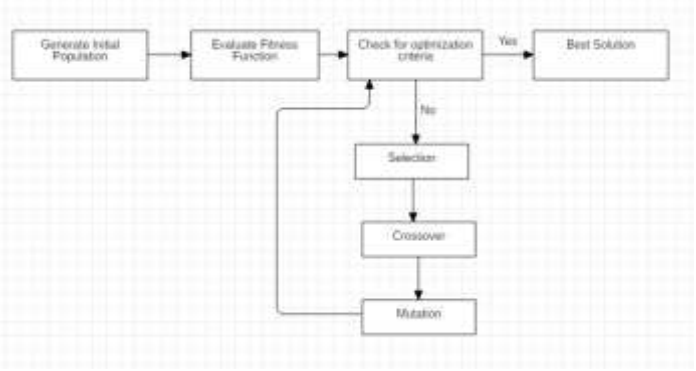

Fig -2: Genetic Algorithm

It has 5 steps:

- **Initial Population:** In the initialization procedure, each passenger is randomly chosen and assigned to a driver in the assignment layer of a chromosome. The chosen passenger is marked to prevent the passenger from being assigned twice.
- **Fitness:** To find the quality of the chromosomes in the population the fitness function is used to determine the travel cost for each driver. To calculate the fitness value, we need to find the most efficient route for picking-up and dropping off passengers for each corresponding driver.
- **Selection:** The first phase involves sorting the chromosomes into a descending order according to their fitness values, and selecting those with the highest values in the population. This provides individuals with the highest fitness values from one generation to the next.
- **Crossover:** After the optimal chromosomes have been selected, the chromosome crossover procedure is utilized to recombine the chromosomes of selected parents to simulate the natural process of evolution.
- **Mutation:** It is used to change the allocation of the passengers mutually.

5. ADDITIONAL FEATURE

This feature will try to help drivers and passengers reduce their journey fare .We have used Stochastic time which helps in getting the most approximate and efficient time duration for the journey. Partition merging has been used for getting the passengers which are in the same way as the drivers route which helps to reduce fuel price for the driver eventually decreasing travel cost for all passengers [3].

Most important is the use of Genetic algorithm which has helped abundantly in almost all perspective from finding the optimum carpool route and matching results both accurately and promptly in accordance with the optimization of all objectives [1]. Among that, the dynamic programming method is applied to promptly solve the origin–destination pair route problem within the evaluation process [4]. The option to choose multiple stops en route is additionally provided to facilitate the improvement of processing time.

6. CONCLUSIONS

Car-pooling is an emerging technology which must be provided extensive support by the government and even by the people. Today, as mankind is facing lots of serious environmental issues, even a small effort can provide significant changes. Hence, our project is an ideal solution for creating such impact. Here, we tried to propose a car-pooling model based upon the genetic algorithm and tried to minimize the routing issues while maximizing the effects of it, to affect and reap out all the benefits.

We have used genetic algorithm for optimizing the searching strategy and then we focused on improving the number of person which can be pooled through a single vehicle. We have given maximum priority on security. Using advanced frameworks like Django, we ensured a tightly secured system. We have emphasized on localization and regional-feel of the system to which people can connect to it while having an ease of access.

The current system is not satisfactory as far as small regions and developing countries like India is concerned which have very flexible and diverse geographical, cultural and economic conditions. Besides, security issues are also a matter of concern. Also, flexibility of system for providing solutions in large or small areas is also a problem.

As part of future work, inclusion of GPS system, new tracking and monitoring methodology along with various others algorithm for localization, stipulated journey time calculation and driver to user mapping can be performed.

REFERENCES

[1] Shih-Chia Huang, Ming-Kai Jiau, and Chih Hsiang Lin, “A genetic-algorithm-based approach to solve carpool service problems in cloud computing”.

[2] Dejan Dimitrijević, Nemanja Nedić, ”Real-time carpooling and ride-sharing: Position paper on design concepts, distribution and cloud computing strategies”, Faculty of Technical Sciences, Trg Dositeja Obradovića 6, 21000,Novi Sad, Serbia.

[3] Yubin Duan, Turash Mosharraf, Jie Wu, and Huanyang Zheng, “Optimizing carpool scheduling algorithm through partition merging”, Center for Networked Computing, Temple University, USA.

[4] Shangyao Yan, Chun- Ying Chen, and Sheng- Chieh Chang, “A Car Pooling Model and Solution Method with Stochastic Vehicle Travel Times”, IEEE transactions, vol.15, no.1, February 2014.

[5] J. G. Neoh, M. Chipulu, and A. Marshall, “What encourages people to carpool? An evaluation of factors with meta-analysis,” Transportation, vol. 44, no-2, 2017.