AN EFFICIENT CAR POOLING SYSTEM FOR INTELLIGENT MANAGEMENT OF TRANSPORTATION PROBLEMS

Damini Nanaware[1], Pradnya Mahajan[2], Sopan Yadav[3] Jobanpreet Singh[4]

[1,2,3,4] *Sinhgad College of Engineering, Pune (India)*

ABSTRACT

In large cities approximately 40 percent of fuel consumption is related to transportation. A noticeable amount of fuel is wasted due to traffic congestion in peak hours. Transportation planners look for policies to reduce congestion to save fuel and increase energy efficiency. Thus traffic congestion has been a serious problem in many urban areas around the world. One of the effective solutions to traffic congestion is carpooling that emphasizes on a shared use of private cars. In this paper, an advanced carpool system is described in detail, which provides carpoolers the use of the carpool services via a smart application anywhere and at any time. The main aim of the system is to develop a web based application that enables people to use the facility of carpooling effectively. With the help of application, people can share the journey expense; make new connections by finding other people travelling through same desired route.

Keywords: Carpooling, Car-owner, Global Positioning System (GPS)

I. INTRODUCTION

The continuous rising of car use deriving from urban sprawl and car ownership growth is still making traffic congestion more frequent in urban areas. The majority of trips are single occupant vehicle trips resulting in more cars for the same number of persons. A rapid industrial growth and recent economic development in urban areas have resulted in increase in the number of vehicles on roadways and, thus, serious traffic congestion problems have evolved in large cities around the world. Traffic congestion further results into time loss, air pollution, and increased fuel consumption [1]-[3]. Though public transportation systems have the capacity to decrease traffic congestion but it offer less flexibility, comfort, and freedom as compared to personal vehicles. So many people prefer personal vehicles to commute. However, each personal car usually transports just one or two individuals, resulting in many empty seats.

Carpooling is a relatively environmentally sound system of transportation in which empty seats are offered to additional passengers and has been found to be one of the best solutions to traffic congestion [4], [5]. Drivers share their cars with one or more people who have similar transportation routes. By reducing the number of empty seats in these vehicles, occupancy rates are significantly increased. Consequently, fewer vehicles would be required to transport the same quantity of commuters to their respective destinations, resulting in substantially fewer cars on the road. Other carpooling benefits include reductions in travel cost, energy consumption, and vehicle emissions. Carpooling consists of sharing one's personal vehicles with one or several passengers in which the related passengers shares the related costs. One of the major factors to be considered in carpooling

service is the prior agreement or connection between the car owner and the other passengers having same journey route.

II. EXISTING SYSTEM

There are many existing systems or applications that make use of car pooling concept to increase the efficiency of transportation facility. Here we have discussed some of the existing systems.

The paper [6], proposes a system that provides an automatic service for matching commuting trips. Candidate carpoolers register their personal profile and a set of periodically recurring trips. The system advise the registered candidates on how to combine their commuting trips by using the concept carpooling. The system discussed in this paper works on nodes in a graph. The paper "A novel trust based algorithm for carpooling transportation systems" [7], have proposed to use the concept of car pooling to handle problems such as increased air pollution, noise pollution, excessive fuel consumption and many more. The increasing number of cars on road has led to higher congestion problems and heavy traffic in urban areas. Also to increase trust between two people, a trust based algorithm is proposed in this paper because generally people do not offer a lift to strangers. In paper [8], the proposed system is designed for private vehicle owners who commute individually from the workplace to home. The system makes use of pre registration method, by which only identified people get into the carpool vehicles so that crime can be reduced.
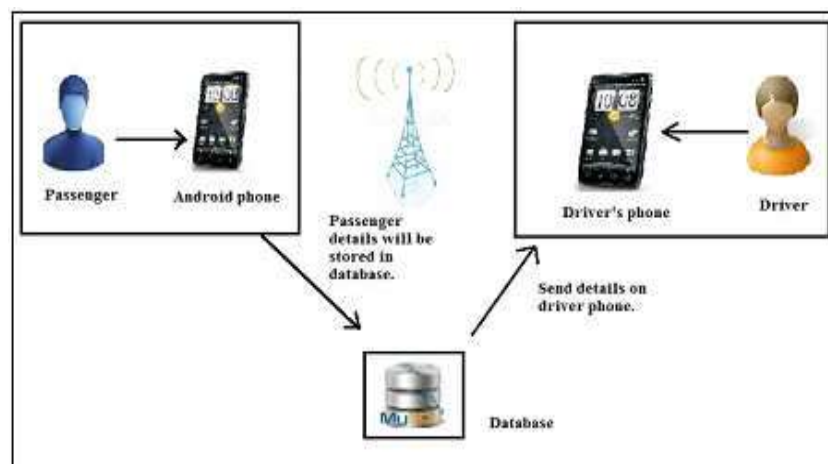
III. PROPOSED SYSTEM

Figure 1. System Architecture

In above figure 1, the architecture of proposed system is shown. The application will be running on passenger's android phone from where the passenger can request for the car service. During the request, passenger has to mention the pick-up point, and drop point, date, time, number of seats, etc. The details of the passenger will be stored in the database. The passenger details are send to car owner. The passenger can view details such as per head charge of the journey, number of available seats, midway stop points, route of the journey. The car owner can add the car to the system. All the users are provided with the services such as recharge an account, view pool requests, change password. All the users have to register to the system.

IV. SYSTEM RESULTS

Following are some of the screen shots of the application which we have implemented.
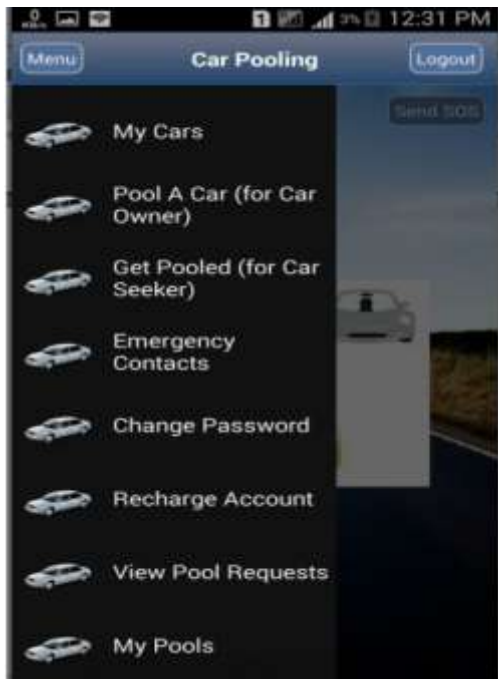
(1)

(2)

Fig. 2. Screen Showing Menu

For The Application

Fig.3. Service – "Pool A Car"

(For Car Seeker)

(3)

(4)

Figure 4. Service For Car Owner

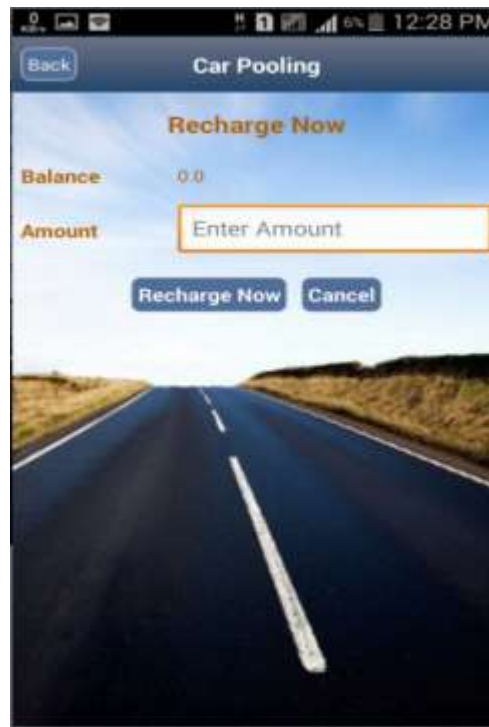**Figure 5. Service – "Join The Trip"**

(5)

Figure 6. Service – "Recharge Now"

V. CONCLUSION

In this paper, the overall architecture of the carpooling system is explained, which provides an environment in which car-owners and other passengers can easily find carpool matches at any time and in any place. Ride-sharing i.e. making the use of carpool facility on the daily home-work-home commute can result in lower consumption of fuels and other car-related costs. It also reduces traffic and pollution in the city. The developed Carpool system would enable its user a safe and secure way to share cars. This could include both short daily journeys such as going to workplace within the city and also long inter-city trips.

REFERENCES

[1] B. T. Morris, C. Tran, G. Scora, M. M. Trivedi, and M. J. Barth, "Real-time video-based traffic measurement and visualization system for energy/emissions," IEEE, Dec. 2012.

[2] F. Terroso-Saenz, M. Valdes-Vela, C. Sotomayor-Martinez, R. Toledo-Moreo, and A. F. Gomez-Skarmeta, "A cooperative approach to traffic congestion detection with complex event processing and VANET," IEEE, Jun. 2012.

[3] V.Milanes, J. Godoy, J. Villagra, and J. Perez, "Automated on-ramp merging system for congested traffic situations," IEEE, Jun. 2011.

[4] S. Hartwig and M. Buchmann, "Empty Seats Traveling," Nokia Research Center, Bochum, Germany, Feb. 2007.

[5] R. Fagin and J. H. Williams, "A fair carpool scheduling algorithm," IBM J. Res. Develop., Mar. 1983.

[6] LukKnapena, Daniel Keren, Ansar-Ul-HaqueYasar, Sungjin Cho, Tom Bellemans, Davy Janssens, Geert Wets " Estimating scalability issues while finding an optimal assignment for carpooling", Procedia Computer Science, 2013.

[7] Collotta, Giovanni Pau, Valerio Mario Salerno, Gianfranco Scat`a, Kore University of Enna, " A novel trust based algorithm for carpooling transportation systems", Italy, 2012.

[8] Rajesh Kannan Megalingam, Ramesh Nammily Nair, Vineeth Radhakrishnan. Amrita VishwaVidyapeetham, Amritapuri, Clappana P.O,"Automated Wireless Carpooling System for an Eco-Friendly Travel", Kerala, India, 2011.