GROUP SHARING INFORMATION FOR CAR POOLING SERVICE PROBLEMS BASED ON GENETIC ALGORITHM IN CLOUD ENVIRONMENT

J. Naveena Princy[1], S. Ramesh [2]

[1]PG SCHOLAR, Anna University Regional Campus, Madurai, India
[2]PROFESSOR/CSE, Anna University Regional Campus, Madurai, India
naveenajesuraj@gmail.com, rameshcse@autmdu.ac.in

Abstract- the Cloud computing it is a type of computing which involves sharing of computer resources rather than using local servers or dedicated devices for processing Various services like servers, storage and applications are provided to the user's computing devices via Internet. Google and Drop box these are the some real world applications of cloud computing. Recent growth in the development of heavy occupancy vehicle in the road results in traffic development. To overcome this problem a carpooling technique is introduced. The number of vehicle on the road can be cut down, in case of fewer numbers of vehicles results in the lesser number of polluting gases. It also helps in the reduction of maintenance cost. Fewer cars on the road it means reduction in oil usage and dependency on fuel usage. It provides a great flexibility by providing same schedule and drive route on the days you need to ride. In this paper we apply the algorithm to propose the Genetic based carpool route and matching algorithm for optimization problem. It can be further improved by a RSA algorithm.

Keywords— Carpool, Genetic based carpool route and matching algorithm, optimization, RSA algorithm.

I. INTRODUCTION

The Cloud computing is a kind of computing which involves the distribution of workstation possessions. Possession distribution in a untainted plug and take part in representation that radically simplifies the infrastructure forecast is the assure of cloud computing. The benefits of cloud computing are user friendliness and cost-effectiveness. Cloud computing is a computing criterion, where an enormous pool of systems are associated in private or public networks, to make available animatedly scalable infrastructure for an application, information and file storage. A pool of inattentive, vastly scalable, and managed calculate infrastructure competent of hosting end client applications and to be paid by expenditure. Enterprises are able to desire to set up applications on Public, Private and Hybrid clouds. Cloud Integrators be capable of take part in a fundamental measurement in decisive the precise cloud path for every organization. Public clouds are retained and governed by third parties they distribute better-quality economies of scale to consumers, as the infrastructure expenditure are spread along with the mix of users, charitable every individual consumer an attractive low-cost this is based on Pay-as-you-go model. Private clouds are built utterly for a particular endeavor.

During the previous decades, universal road traffic stupidity has been mounting year after year. Traffic assimilation is one of the major cause of traffic jam. Thus the traffic congestion has been a severe problem in many metropolitan areas around the globe. Rigorous traffic jamming can have various harmful belongings, such as time slaughter, air contamination, and augmented fuel expenditure, in hefty cities the order of forty percent of fuel expenditure is correlated to transportation. A perceptible quantity of fuel is shattered caused by traffic obstruction in peak hours. This case has led to the reality that at present, motorway traffic congestions are one of the most universal phenomena with the intention of motorists have to countenance in their trips not together from being a somewhat traumatic know how for current drivers, they also have a pessimistic impact on the surroundings and the economy. Environmentalist and health officials have elongated been concerned with the possessions of air contamination on air eminence, but only in recent times has there been a foremost shift in spotlight to the transportation zone. Public transportation systems have the capability to reduce traffic congestion but proffer less litheness, soothe, and freedom than can personal vehicle, so personal vehicles are by far the trendiest way to travel.

An efficient solution to traffic jamming is carpooling that emphasize on a shared make use of personal cars. Carpooling is an effective means of reducing traffic. Carpooling is a promising substitute transportation mode that is eco-friendly and imperishable as it facilitate straphanger to save time, voyage resource, reduce ejaculation and traffic jamming. In this paper an advanced carpool scheme is illustrated in detail, which contributes carpoolers capitalize of the carpool assistance via an elegant application anywhere and at any time. Carpooling is a well environmentally sound pattern of freightage in which vacant seats are obtainable to added passengers and has been found to be one of the best solutions to traffic congestion. Carpooling consists of sharing one's personal vehicles with

one or considerable commuters in which the related commuters shares the related costs. One of the major factors to be examined in carpooling assistance is the prior agreement or connection between the car owner and the other passengers having same journey route. 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 an application people can share the campaign expenditure, make new acquaintances by finding other people travelling through similar covet route. Drivers share their cars with one or more people who have similar freightage routes. By abbreviating the number of empty seats in these vehicles, occupancy rates are incomparably elevated. Therefore fewer vehicles would be mandatory to transport the same abundance of commuters to their corresponding destinations, resulting in considerably fewer cars on the road. The carpool service agency in the Intelligent Carpool System is integrated with an abundant geographical, traffic, and societal information and used to manage requests. The work commute travel has long been known to be a belittling element of freightage planning, and the most extrusive contributor to traffic congestion. Since most commuters travel at usual times of day, this frequently leads to the morning and evening rush hours. Carpooling is something else an adequate means of traffic management, throughout the direct diminution of the amount of vehicles an associate with in the freightage system. Carpooling is roughly defined as an assistance of two or more persons with respects to the use of a single vehicle to expedient their bilateral commuting obligation. In annexation to an amusing assistance outlined beyond there are conceivable assistances to the individuals who take part in the carpool. A screening positioned carpool coordinating system is desired to assist commuters create a carpooling squad with least commute direction costs.

The rest of this paper is standardized as follows: section 2 discloses the related work of the project. Chapter 3 deliberates the proposed work. Chapter 4 provides the simulation results of the Carpool. Chapter 5 concludes the project with future work.

II.   RELATED WORK

According to prose review, the agent based facsimile along with worn in non computing associated scientific domain and can afford precious information on civilization and the outcome of societal proceedings or phenomenon. A meticulous prose review focus on the progress of carpooling sustains systems, and pragmatic,

interrelationships among willingness to carpool as well as socio-economic attribute of carpooling is obtainable.

Brendan Tran Morris has elucidated it has turn into progressively more significant to scrutinize the condition of roadways in order to improved handle traffic jamming. Refined traffic administration systems are in enlargement to practice both the stagnant and movable sensor statistics that offer traffic information intended for the road network.

Alan Erera has anticipated the Smartphone expertise enables vibrant ride-sharing system that brings in concert people with analogous itinerary and instance schedule to allocate rides on petite notice, the crisis of harmonizing drivers along with riders in this vibrant scenery. We build up the optimization base approaches that endeavor at reducing the entire system ample vehicle miles incur by scheme users, and their individual journey expenses

Knapen present a computerized, Global Car Pooling Matching Service (GCPMS), optional overhaul to match commute expedition by carpooling, wherever the candidate preserve chronicle for their individual outline and a rest of occasionally chronic trips. The prospect principles are intended from beginning to end an erudition method, diverge in excess of instance due to rhythmic implementation, on the basis of individual outline and jaunt distinctiveness and the conciliation criticism. Authors propose to an agent-based representation simulate the consumer collective to facilitate implement GCPMS for testing along with validation.

III.   PROPOSED WORK

Now, we commenced a cloud computing stationed carpool method framework described as ICS, as exposed in Fig 1. The ICS method is assembled by the collection of the network application fusion and is based on service direction. It comprises the client unit, cloud carpool service unit, AES and RSA algorithm. Communication can be recognized among the client unit and the CCS unit by using the network HTTP protocol through the mobile communication network

A.   Client Unit

In order to furnish system consumer the chance to acquire carpool concurs everywhere and at every time, drivers and commuters similar can utilize the client unit to carry out carpool actions (e.g., seeking and assisting rides) via their strategy. The client unit is a network application build on a highly developed operating organism such as windows. It

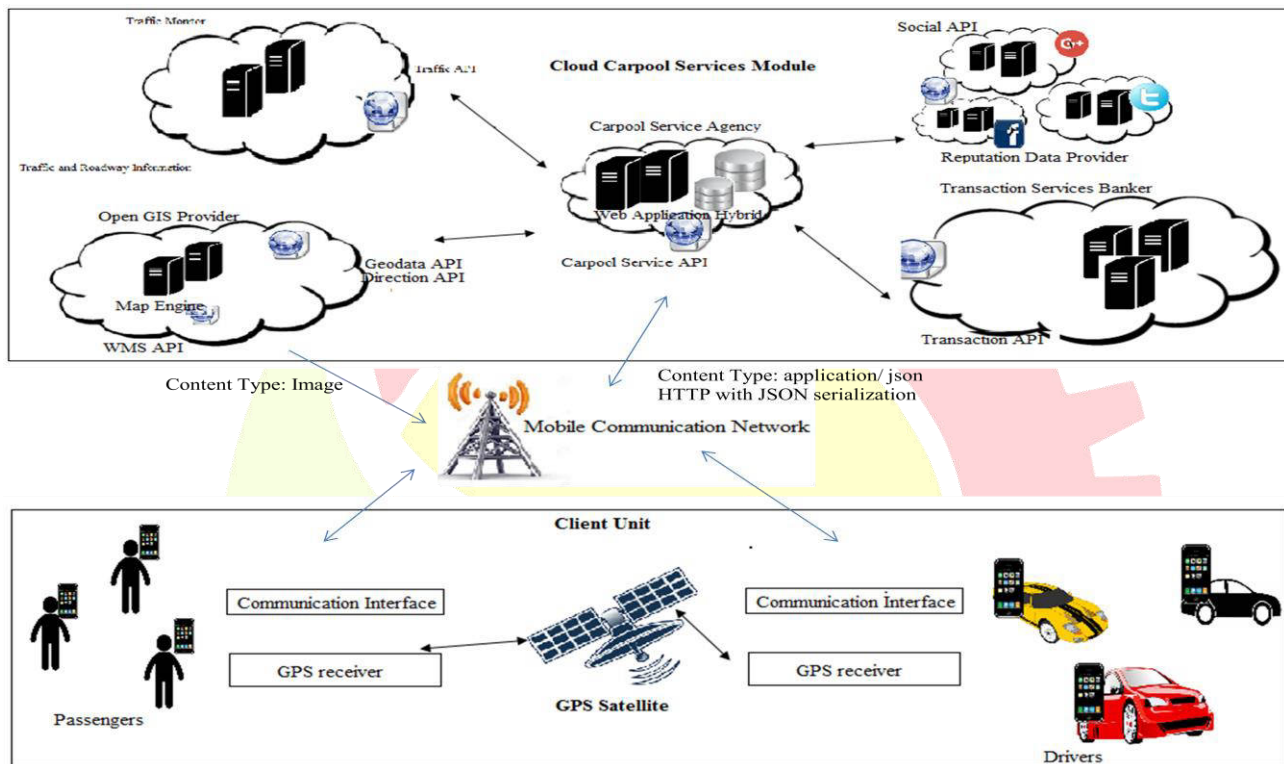countenances incorporated GPS receiver and competence for communicate   .

Fig.1 Framework of the cloud-computing-based carpool system in service orientation.

For the reason that the user can attain knowledge regarding their contemporary location by routinely access the GPS beacon of satellites and preserve also recover geo source map metaphors in excess of the Web Map Service (WMS) and application programming interface (API) to exactly pinpoint their lift up and target locations.

Using the client unit, consumers can equally tender carpool ride as drivers and propel carpool desires as passenger. While drivers and passengers are in the similar provincial range, a sequence of consumers' offer and desires will assist them discover appropriate carpool cronies. Drivers can hoist assign passengers since their exodus location and crumb them off at target position if the carpool concurs are acknowledged and permitted by consumers. Conclusion announcement is send to every consumer after every journey, as well as both the driver along with the passenger

has the choice of ranking their personal experience with apiece other, which are observable to prospect possible carpool partners.

B.   CCS Unit

To facilitate universal accomplishment of the ICS on fractious platform strategy, the CCS unit grants the network overhaul relevance interface to hold up interoperability among the client unit. The CCS use mash up progress to flawlessly combined an immense amount of influential network overhaul applications, together with 1) an Open GIS contributor, 2) a traffic check, 3) a reputation data contributor and 4) a transaction services, to augment the function and capability of the ICS method

The Open GIS contributor facilitates the appliance of the client unit throughout the proclaimed WMS API. Furthermore the Open GIS contributor is worn to provide digital boulevard information concerning intricate countenances aforesaid as one way street, two way street, and so on. It dynamically contributes to direction-finding process as one of the corresponding optimization algorithms is practical to the method.Traffic condition is usually monitored by a sector within the administration. For deliberation of instantaneous traffic factor, the CCS part incorporates Open GIS pleased with the traffic API available by the traffic scrutinize, in that wayreorganize traffic data and ornamental path and match estimation.

89

C. Data Flow Diagram

In this data flow diagram we can represent a carpool method. Here, both driver and passenger can communicate using this carpool. Once passenger can login into the ICS they can update their source and destination details. At the same time driver can also using this scheme he can update his details of the route. If it is match with that details the transaction will make and book for carpool service.
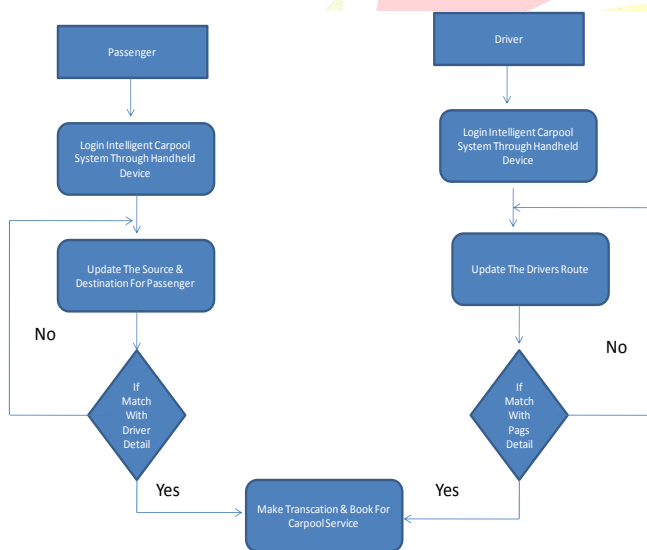

Figure 2 Flow of carpool service

IV.   EXPERIMENTAL RESULTS

At this point, the anticipated algorithm is correlated among the random assignment hill climbing algorithm and the greedy assignment hill climbing algorithm. The enforcement of every algorithm is appraised through the anticipated benchmarks counterfeit actual outline.
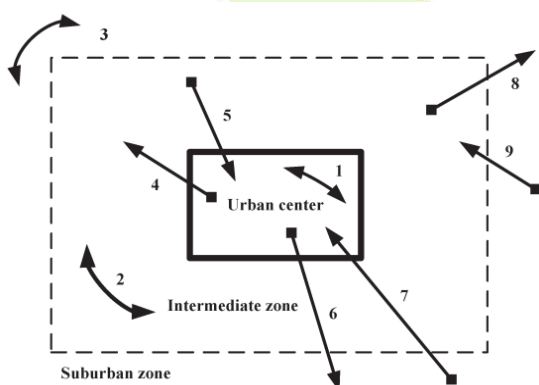

Figure 3 Nine transitive modes of spatial movement within a metropolitan area

A. Simulating the tangible Environment with tentative Benchmarks

In harmony with sociological study that illustrate human existence and communication in metropolitan environment, we evaluated transportation faction observances through a widespread association model to articulate dissimilar scenario regularly encountered in the actual World.

Comprehensive representation of urban faction: The enlargement of the anticipated faction representation is based on inhabitant commuting observances as exposed in Fig; it delineates the three regions of the urban area: 1) the urban center; 2) the intermediate zone; and 3) the suburban zone. Also incorporated is the spatial evolution unruffled of three bidirectional arrows and six directional arrows as follows: 1) inner movement flow; 2) intermediate movement flow; 3) outer movement flow; 4) outbound from the urban center to the intermediate zone; 5) inbound from the intermediate zone to the urban center; 6) outbound from the urban center to the suburban zone; 7) inbound from the suburban zone to the urban center; 8) outbound from the intermediate zone to the suburban zone; and 9) inbound from the suburban zone to the intermediate zone.

B. Comparison and analysis of GCRMA, GHCA, and RHCA

We first estimate the individual optimization abilities of all compared methods in regard to the primary and secondary objectives of CSP and then analyze the search behavior of our GCRMA. Finally, we demonstrate the impact of the proposed early stop option on the reduction of computational cost for real-time carpool service.

1) Analysis of the First Optimal Objective: As previously mentioned in the problem definition section, the first objective is to maximize the number of matched passengers (NM) and total credit scores (TC) of all carpool groups.

The results displayed in the performance of the GCRMA were superior to the other compared algorithms in terms of NM and TC.

The $R\%$ in represents the ratio of NM of each of the other compared methods to our GCRMA. In regard to the test scenarios with lower variances of seat number, the $R\%$ values of both the GHCA and the RHCA are quite close to 0.

In other words, the other compared algorithms exhibited nearly identical performances in terms of NM. However, the GCRMA outperformed the other algorithms to obtain the highest NM value for the set of test scenarios featuring varying numbers of seats (i.e., a high variance of seat number). Naturally, the

TC of all test scenarios solved by the GCRMA should result in comprehensive outperformance of the others.

The test scenarios with varying seat parameters caused complication in the search space. Under such circumstances, a hill climbing method such as the GHCA and the RHCA could easily become stuck in a local search region. In contrast, the GCRMA utilizes the population information to maintain diversity in the solution space, thereby exhibiting more efficiency at optimizing NM and TC.

2) Analysis of the Second finest Objective: There is an irreconcilable conflict between the first and second

90

objectives of the CSP: the AWD and ATD of a passenger increase when optimizing to obtain a larger NM value.

Comparison of the GCRMA, the GHCA, and the RHCA in regard to the second objective was accomplished via the same test scenarios. For this particular evaluation, we conducted a comparison via a subset of the test scenarios in

which solutions featured an $R\%$ of less than 0.05. Consequently, as shown in Table IV, CI325V2, CL326V1, CL428V2, CL396V3, CO354V2, and CO364V3 are marked in respect to their previous $R\%$ values in Table III. It is clear that the GCRMA was more effective at producing
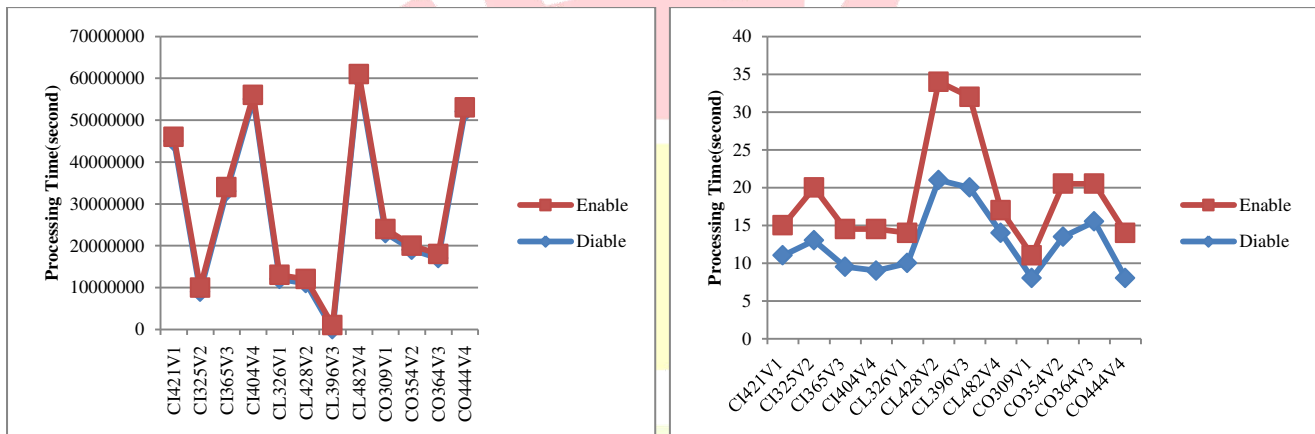

Fig. 4. Early stop enabled and disabled in regard to the (a) processing time and (b) fitness value of implementing the GCRMA.

Prominent distance results than the others in regard to AWD and ATD while achieving an NM value close to those of the other compared algorithms. In addition, it can be observed that the GCRMA provides a shorter AD (i.e., average distance of driver) than either the GHCA or the RHCA.

On the other hand, although the GHCA generates an NM value equivalent to the RHCA, but indicates that the GHCA reduces the distance criteria of AD, AWD, and ATD in contrast to the RHCA. It is important to note that the GHCA's application of the proposed distance-based greedy heuristic instead of random initialization is a successful way to improve upon the RHCA in terms of distance considerations.

3) Investigational substantiation of the Evolutionary Process: It is known that the processing time can be unlimited if the number of generations is amplified. Thus, the mechanics of efficient evolution is essential for returning the match response to the user request in a short time as shown in the experimental results displayed in the varying number of seats is the dominant factor complicating the CSP problem considerably.

In order to appraise the search process of our anticipated GCRMA, a supplementary and more tricky test scenario was used as the baseline for analysis, the requirements of which include the following: seat average was 3.0, seat variance was 2.5, score average was 3.0, score variance was 2.5, the amount of consumers was 500, and the pattern was the outward radiating movement. This test was conducted to estimate the GCRMA in observe to all desired objectives. As shown in the first process of evolution involved searching for the primary objective by which to optimize NM and TC.

In particular, the anticipated genetic maneuver in each creation maximized the total amount of matched consumers to speed up the optimization of NM. After penetrating out the most striking NM and TC values, the GCRMA proceed to the next step in fruition, i.e., guiding the optimization for the resulting objective. It can be observed in that the AD, AWD, and ATD values decrease radically. Ultimately, a visual graphic of the evolution process reveals that the search practice of our GCRMA is competent of effectively optimizing the multiple objectives.

4) Comparison of Enabling and Disabling the Early Stop: In this final part, we compare the results obtained from the GCRMA applied both with and without the early stop option. Fig. 4 shows the processing time of the GCRMA implemented with and without the early stop option of evolution.

By comparing the results, we can observe that processing time was markedly reduced when the option was enabled. Fig. 4 compares the fitness associated with the GCRMA when implemented with and without the early stop option. As shown in the figure, fitness is not significantly affected by the early stop option, with almost identical results achieved. The fallout has probably considerable corollaries for the instantiation of an actual globe carpool harmonizing system. The corollaries depend on the coercions in which the carpool harmonizing must activate. At last, in the occurrences where superior carpools are preferred, and the resolution instance is an anxiety; the heuristic access are the only choice. Their hasty resolution instance allows for the close to instant fortitude of the carpool persons and path, allow for scheduling for the next day's travel. All compared algorithms were implemented in Java, platform JDK 1.6,

91

Tool NETBEANS 8 under Microsoft Windows NT 4.0 or Windows 2000 or XP, via a server with Pentium III 733 MHz processor, 120 MB RAM, 10GB Hard Drive. All scenarios were respectively and independently tested 30 times to acquire the average performance of each method.

V.   CONCLUSION

Increasing traffic pour is one of the precedence aspirations of moving establishment. This dissertation has obtainable scheme to elucidating one of the main cause of blockage in metropolitan environments. In this paper, the general structural design of the carpooling configuration is explained, which affords an atmosphere in which car owners and further passengers can effortlessly discover carpool matches at every time and in every place. Ridesharing building the exploit of carpool competence on the on a daily basis residence exertion-residence travel can outcome in inferior expenditure of fuel and other vehicle associated expenses. It also reduces traffic and contamination in the city. The urbanized Carpool scheme would facilitate its consumer a harmless and protected manner to share cars. This might contain both petite daily journey aforesaid as departing to place of work within the town and also elongated intercity expeditions. Finally dispersed solutions will be estimated to take recital issues.

. REFERENCES

[1] N, Erera A. L, Savelsbergh M.W. P, and Wang X, "Optimization for dynamic ridesharing: A review", Eur. J. Oper. Res., vol. 223, no. 2, pp. 295–303, Dec. 2012.

[2] Agatz N, Erera A. L, Savelsbergh M.W. P, and Wang X,"Dynamic ridesharing: A simulation study in metro Atlanta", Transp. Res. B, Methodol., vol. 45, no. 9, pp. 1450–1464, Nov. 2011.

[3] Ahn C. W and Ramakrishna R. S,"A genetic algorithm for shortest path routing problem and the sizing of populations", IEEE Trans. Evol. Compute. vol. 6, no. 6, pp. 566–579, Dec. 2002.

[4] Asikhia M. O and Nkeki N. F., "Polycentric employment growth and the commuting behavior in Benin metropolitan region", Nigeria, J. Geogr. Geol., vol.5, no. 2, pp. 1–17, 2013.

[5] Baldacci R, Maniezzo V, and Mingozzi A, "An exact method for the car pooling problem based on Lagrangean column generation", J. Oper. Res., vol. 52, no. 3, pp. 422–439, Jun. 2004.

[6] Bianco P, Kotermanski R, and Merson P,"Evaluating a Service-Oriented Architecture", Software Engineering Institute, Pittsburgh, PA, USA, CMU/SEI-2007-TR-015, Sep. 2007.

[7] Fagin.R and. Williams. J. H, "A fair carpool scheduling algorithm", IBM J. Res. Develop., vol. 27, no. 2, pp. 133–139, Mar. 1983.

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

[9] Herbawi W. M and Weber M, "A genetic and insertion heuristic algorithm for solving the dynamic ride matching problem with time windows," in Proc. ACM Int. Conf. Genetic Evol. Comput. 2012, pp. 385–392.

[10] Hu X. B and Paolo E. Di, "Binary-representation-based genetic algorithm for aircraft arrival sequencing and scheduling", IEEE Trans. Intell. Transp. Syst., vol. 9, no. 2, pp. 301–310, Jun.

2008.

[11] Lau H. C. W, Chan T. M, Tsui W. T, and Pang W. K, "Application of genetic algorithms to solve the multidepot vehicle routing problem", IEEE Trans. Autom. Sci. Eng., vol. 7, no. 2, pp. 383–392, Apr. 2010.

[12] Mega lingam R.K , Nair,V,Radhakrishnan R.N , and Vidyapeetham A.V.   "Automated wireless carpooling system for an eco-friendly travel",