

Take Me With You : A smart car pooling app using Genetic Algorithm

^{#1}Sneha Menon, ^{#2}Shruti Maheshwari, ^{#3}Ankeet Anand, ^{#4}Rushikesh Tajnekar, ^{#5}Prof. Pallavi Yevale

¹snehamenon391@gmail.com

^{#12345}Department of Computer Engineering, SKN-SITS, Lonavala, Savitribai Phule Pune University, India



ABSTRACT

Increasing traffic congestion and the associated externalities require the study of alternative measures to reduce the number of automobiles travelling every day, specifically single-occupant vehicles. Carpooling is a system by which a person offers his or her private vehicle to one or more people who have similar destinations. From single-occupant commutertrips and using slotted wheel selection based on statistical data, one aims to replicate the behaviour of potential carpooling users. This system focuses on the construction process of a Logic Flow Diagram that translates the proposed methodology, allowing organization of different activities, input parameters and discrete events in a formation that can be used to study any given urban area. The increasing number of cars is an important issue for big cities administrations and many problems are related to this event, such as air pollution, traffic jams, drivers stress and so on. A spirit solution for this problem is the usage of car pooling systems, which support the task of car sharing among users. However, present systems only work as a passage where providers and consumers can arrange shared cars for public transit. This effort extends this idea through the use of DARP (Dial-a-Ride Problem) and meta-heuristic concepts so that allocating rides can be carried out in an dynamic way. The main motive of this approach is to enhance and make easier the sharing process of personal cars, so that the number of vehicles in the roads can be decreased together with all the problems that such vehicles lift on.

Keywords: Simulation, Conceptual model, Carpooling, Genetic algorithm

ARTICLE INFO

Article History

Received :4th May 2016

Received in revised form :
6th May 2016

Accepted : 8th May 2016

Published online :

10th May 2016

I. INTRODUCTION

The massive Economic Development in recent years has led to industrialization and Urbanization, the number of automobiles on the roads has risen very fastly, making traffic congestion an increasingly serious problem has occurred in large cities all over the world. Thus empowered by constantly evolving information technologies, particularly the mobile technology, internet search engines have been both an information-seeking vehicle and a versatile online marketing instrument of all kinds of business. Severe traffic congestion causes various negative effects including polluted environment, loss of time, fuel consumption, and so on. Public transport systems can reduce traffic congestion effects but unfortunately it cannot provide as much flexibility, comfort, and freedom as a private vehicle. For this reason, private vehicles are far and away to the dominant

commuting method. There are two main types of online marketing services associated with search engine marketing: Paid Search Marketing (PSM) by search engine providers (SEP) and search Engine Optimization (SEO) by the third party. Since the Traffic Congestion has become a serious problem in large metropolitan areas which not only annoys the traffic jams degrades quality of life but also impact productivity in a negative way to the economy and the environment as well. To alleviate this problem, one can provide optimal routing through carpool practices. We use a GPS-assisted mining approach to the group riders with similar preferred routes to achieve efficient ride sharing to reduce traffic jams, save energy, and reduce transport costs.

II. RELATED WORK

The authors, Shih- Chia Huang, Ming-Kai Jiau, and Chih-Husiang Lin, in the following paper [1] has been implemented the entire framework of ICS which provides an environment in which the drivers and passengers can get carpool matches easily at any time and in any place. The ICS system is built with various web applications and is based on service orientation. It comprises of two primary modules: A Mobile Client (MC) Module and A Cloud global carpool services (CGCS) Module. MC and CGCS module communicates with each other through mobile communication network. Also it addresses CSP definition for application of system. CSP problems are solved by GCRMA, which is based on genetic approach which also have two modules: EI and GE where EI module initializes chromosome representation and greedy population initialization effectively generate initial solutions to CSP problem. GE module accurately determines optimum solutions to the CSP. The early stop option is added to facilitate the improvement of processing time. GCRMA results were compared with other algorithms through the use of several test scenarios and analysis shows that it provides optimum performance for objectives of this paper.

The authors Shangyao Yan, Chun-Ying Chen, and Sheng-Chieh Chang, [2]. The following paper describes the network flow to develop a carpooling model and mathematical programming method for stochastic vehicle. Multiple vehicle-flow networks, passenger-flow networks, and a set of side constraints towards the far side of the networks are included in this model. To solve this problem, a heuristic algorithm is developed. A number of cases were tested to evaluate the performance of solution method. Solution method could efficiently resolve large problems as the tests gave good results. Only one stochastic model is considered in this model. It could be improved by considering multiple stochastic factors.

III. IMPLEMENTATION

In the proposed system we have implemented genetic algorithm to make it convenient for the users to find the optimized journey.

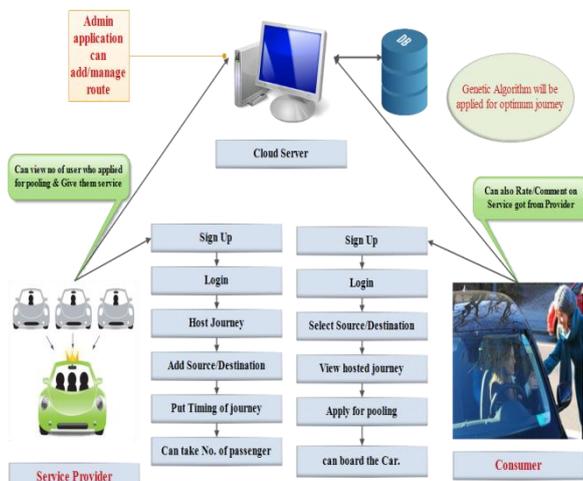


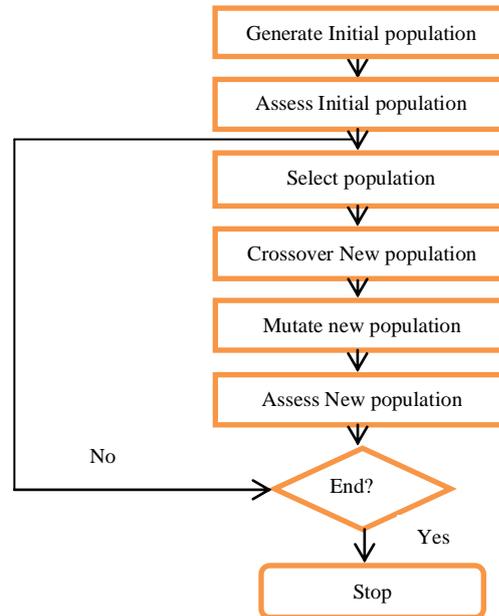
Fig 1 : Architecture

The above figure describes the working of our system. There are 3 modules in our system :

1. Service provider
2. Cloud server

3. Consumer

Working of Genetic Algorithm :



GA's are characterized by 5 basic parts as follow:

- 1) Representation of chromosome for the feasible solutions to the optimization problem.
- 2) Opening population of the feasible solutions.
- 3) A fitness function that evaluates each solution.
- 4) Genetic operators that produces a new population from the existing population.
- 5) Control parameters such as population size, likelihood of genetic operators, numberof generation etc.

The Genetic Algorithm helps the consumer to find the optimized journey. By the use of genetic algorithm, our smart phone application will automatically display the optimized journeys relevant for the consumer.

IV. CONCLUSION AND FUTURE SCOPE

In this system, we have extended the compact Genetic Algorithm (cGA) to rapidly solve the carpool services problem by acquiring high-quality matching results while requiring low memory expenditure. The future of this technology and system can be put together to implement it on the BIKE pooling facility which will be beneficial for each and every person travelling long distances on motorbikes and security for the female community as well as the male community will be maintained.

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", IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, 1524-9050 © 2014 IEEE.

- [2]. Shangyao Yan, Chun-Ying Chen, and Sheng-Chieh Chang, "A Car Pooling Model and Solution Method With Stochastic Vehicle Travel Times", IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 15, NO. 1, FEBRUARY 2014.
- [3]. Tommy Carpenter, Srinivasan Keshav, Johnny Wong, "Sizing Finite-Population Vehicle Pools", IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 15, NO. 3, JUNE 2014.
- [4]. Ming-Kia Jiau and Shih-Chia Huang, "Services-Oriented Computing Using the Compact Genetic Algorithm for Solving the Carpool Services Problem", IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, 1524-9050 © 2015 IEEE.
- [5]. Wen He, Kai Hwang, Life Fellow, IEEE, and Deyi Li, "Intelligent Carpool Routing for Urban Ridesharing by Mining GPS Trajectories", IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 15, NO. 5, OCTOBER 2014.
- [6]. Shih-Chia Huang, Ming-Kai Jiau, and Chih-Hsiang Lin, "Optimization of the Carpool Service Problem via a Fuzzy Controlled Genetic Algorithm", IEEE TRANSACTIONS ON FUZZY SYSTEMS, 1063-6706 (c) 2013 IEEE.