

Optimizing the Carpool Service Problem with Genetic Algorithm in Service-based Computing

Aakanksha Dabhade¹ Priyanka Deolankar² Pooja Desai³ Prof.Sunil Sangve⁴

⁴Head of Department

^{1,2,3,4}Department of Computer Engineering

^{1,2,3,4}DCOER

Abstract— In today’s world due to industrialization number of cars on roadways increased which causes traffic problems and fuel consumption increases. Carpooling System helps to reduce these problems. Carpooling System is based on artificial intelligence and cloud computing .We are going to implement this system for reducing traffic congestion problem. It is also known as BlueNet which consist of two modules Mobile Client Module and Cloud Carpool Service Module. In Mobile Client Module we are using android based phones so users can submit the carpool request through the handheld devices. In Cloud Global Carpool Service module, we are using Genetic Based Carpool Route and Matching Algorithm to match the requests. This Genetic Based Carpool Route and Matching Algorithm require less time to match large number of users as compare to other systems. It operates with less computational complexity therefore required less computing time.

Key words: BlueNet, Carpool, Service-based Computing

I. INTRODUCTION

There is public transportation system are available which may be helpful to reduce the traffic but they do not provide degree of comfort liberty and flexibility as do private vehicles, therefore most of the people prefer their own private vehicles. Due to this number of vehicle increases which causes traffic congestion problems.

In Carpooling System, Drivers can share their vehicles with other persons whose destinations are same. It increases the occupancy rate by reducing number of empty seats. Our system has service oriented architecture (SOA) which uses GIS and GPS to create carpool service to operate in real time.

Carpool Service System

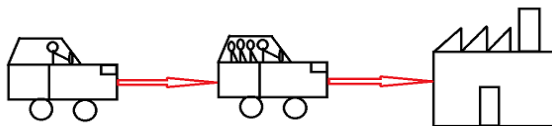


Fig. 1: Overview of Carpool Service System

II. EXISTING SYSTEM

There are some existing systems like Carpool Global and Share Your Ride.

In carpool Global system, users can search for requests and get the appropriate matching output. But this system cannot work on Geographical Information System (GIS). So it cannot provide real time location.

Share Your Ride uses map based interface to accept requests from user and provide digital GIS support in order to match requests. It doesn’t make use of Global Positioning System

(GPS) handheld devices due to which it cannot provide instant services to get information regarding user locations.

III. PROPOSED SYSTEM

The proposed system consist two modules such as Mobile Client Module and Cloud Global Carpool Service Module. Both modules communicate with each other through HTTP protocol with the help of Web Services.

A. Mobile Client Module

Users can submit the requests for carpooling and get matching results through Mobile Client Module (MC) at any time and location. This module works on mobile communication network and users personal phone devices which should be Android base. The advantage of this module is it contain GPS technology, it helps to get current location of user. In this way it supports to Intelligent Carpool System.

B. Cloud Global Carpool Service Module

Cloud Global Carpool Service Module (CGCS) takes the information from MC module to match the requests for carpool service. CGCS module consist open GIS system. GIS is Geographical Information System which consist global geographical information include Google Maps, Bing Maps etc. This module work on Genetic Based Carpool Route and Matching algorithm (GCRM) provides optimum solutions in minimum time.

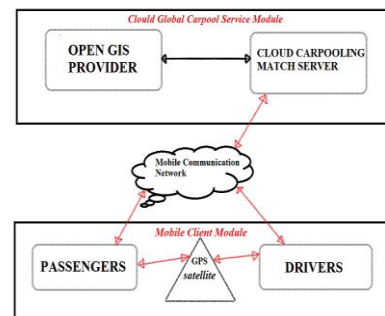


Fig. 2: The Framework of Intelligent Carpool Service System

IV. METHODOLOGY

In Genetic Based Carpool Route and Matching algorithm, consist of two modules such as:

- 1) Evolution Initialization Module (EI)
- 2) Genetic Evolution Module (GE)

A. Evolution Initialization Module

It is used to initialize the chromosomes, assigning number of passengers to particular drivers. It consists of two procedures Chromosome Representation and Population Initialization

1) Chromosome Representation

It provides solution to the Carpool Service Problem (CSP) according to the requirements of drivers and passengers.

2) Population Initialization

It matches the candidates of Initial Population pool feasibly, which are randomly generated

B. Genetic Evolution Module

This module use to find optimal solution by taking the output of EI module as input. It consists of four procedures such as (1) Chromosome Evaluation (2) Chromosome Selection (3) Chromosome Crossover (4) Chromosome Mutation

Chromosome Evaluation procedure calculates the fitness value to determine the quality of each chromosome. Fitness value calculated by finding most efficient route for picking up and dropping off passengers for each corresponding drivers. Chromosome Selection procedure selects chromosome for next generation according to fitness value. Chromosome Crossover is utilized to recombine the chromosomes of selected parents thus generate a more suitable carpool match. Chromosome Mutation is used to maintain population genetic diversity which lessens the chances of getting stuck in local optimum.

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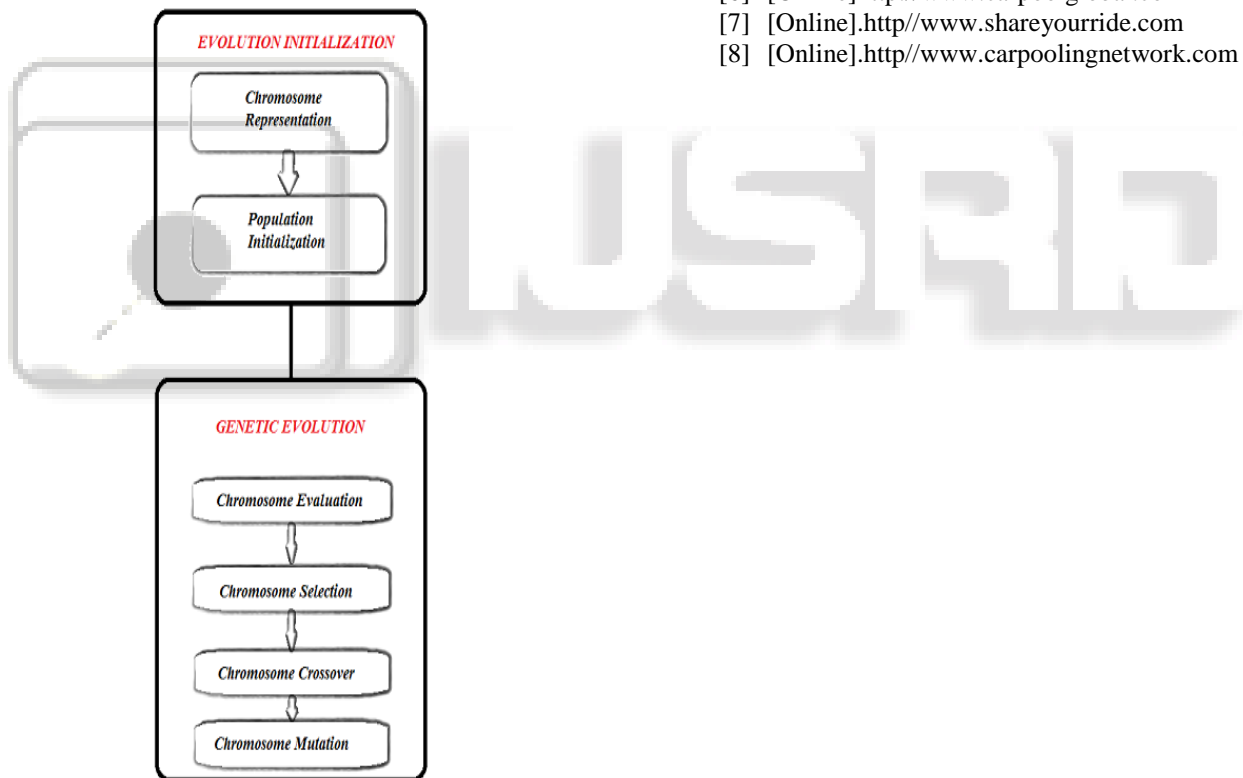


Fig. 3: Genetic Based Carpool Route and Matching Algorithm

V. CONCLUSION

We have proposed an intelligent Carpool System which provides an environment, in which user can readily search for and locate carpooling alternatives in any location and at any time. Carpooling helps to reduce stress levels as you can escape from driving in high traffic situation.