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Smart City Carpooling Mobile Application Based on Intelligent Route

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Abstract: ***During high fuel cost and high pollution periods, making use of the carpooling system is an intelligent decision. Carpooling using GPS is a real time mobile based application that mainly aims at facilitating carpooling amongst users. It allows user to book their journey with the person travelling on the same route beforehand. It allows user to locate their travel partners on the map displayed on their mobile screen accordingly make changes in their itinerary. The proposed system is based on android based application that will allow our friends to collaborate with other colleagues and plan out their journey using the easy User Interface of the application after signing in to it.***

Keywords: Carpooling Service, intelligent rout merging, Global Positioning System, urban traffic management, Google map.

1. Introduction

TRAFFIC congestion has become a serious problem in large metropolitan areas. Due to increasing number of vehicles, problem of fuel combustion, pollution is increasing at an alarming rate. This will result Annoying traffic jams not only degrade quality of life but also negatively impact productivity, the economy, and the environment. in extinction of natural resources like petrol, diesel and also harming the environment by releasing the contents of carbon dioxide, and other harmful gases in surrounding. To overcome or to find accurate solution is a concept of carpooling comes into picture. A carpool is a system in which several people share rides to work school, organizations or other destinations. This system helps save money by dividing fuel costs among several individuals, instead of each person bearing the cost of his own fuel. It also reduces environmental pollution by limiting fuel consumption and reducing the number of vehicles on the road and subsequent emissions. Car-pooling is an android based application which will provide the advanced searching technique and provide most relevant result for the carpooling in the city. With the increase of environmental concerns and the congestion of roads, carpooling has gained a lot of popularity when it comes to environment-friendly and cheap ways of travelling. Carpooling is when two or more persons share a ride in one of their personal cars. The proposed system GPS-assisted mining approach to group riders with similar preferred routes to achieve efficient ridesharing to reduce traffic jams, save energy, and reduce transport costs carpooling reduces pollution since we have fewer cars on the road. It's also economic since the travel expenses are shared among the riders. Travelling alone may be stressful, so having other persons with you on a trip reduces the stress and is also the occasion to socialize and make the trip funnier. Finding people to share a ride with is the challenge of carpooling as it is difficult to find a person going to the same place as you at a given time. Many websites and applications have been developed to help people meet to share rides. Those applications enable users to create and share their trip and find passengers. The downside of those applications is that they are usually location limited: they are available on few languages and for a limited number of countries only. The purpose of this project is to develop an application that tries to overcome the disadvantages of the other available applications. We do not aim at the longest trip sequence in consideration of efficiency.

Based on the driver property and the vehicle use, three carpool models were suggested in the past. The proposed model Covers both company-supported and private carpool services within large metropolitan areas. The vehicle used sets a limit on the carpool size. Riders share their frequent routes to generate a commonly accepted route. The frequent route is generated under different transport modes, including a private car, a taxi, a bus, the subway, or simply walking. The routing optimization goal is to minimize the driving distance, reduce commute costs, protect the environment, and alleviate urban traffic problems.

2. Related Work and Proposed Approach

The research works in ridesharing can be classified into two categories: single-role participation and multi-role participation, distinguished by whether the user can change her/his role in ridesharing. In the category of single-role participation, the route of a driver can be either unchangeable or with detour. For both, the route of a driver is given in advance, while for the latter, it can be slightly modified in order to take passengers.

Among the studies of unchangeable route for single-role participation, propose a method to first find the set of drivers for a passenger to share rides. The departure or arrival of each driver must be located in the system-defined places (e.g., University of Pune). The drivers are then weighted based on one of the three factors: the difference between the time when the driver arrives at the place to take (or drop) the passenger and the time when the passenger wants to get on (or get off) the car; the time for the passenger to walk from the place s/he gets off the car to the destination; and the difference between the time when the passenger gets on the car and the time when s/he arrives the destination. Finally, the driver with the largest weight (the smallest difference or shortest time) would be chosen as the one to take the passenger. This is a trust-based recommendation mechanism for both drivers and passengers. Drivers and passengers can score each other after they share rides. The scores are then aggregated to identify good ridesharing participants.

In terms of detour, allow the driver to slightly change the route to accommodate more passengers who can share rides. The length of the resultant route must not exceed a predefined threshold. Differently, This propose a way to divide the trip of a passenger into two segments such that the passenger can have rides in different cars along the trip. All the above works only output a list of users who can share rides. As mentioned before, the users need to spend additional efforts to negotiate with each other for ridesharing.

3. OLA CAB Android Application

Finding a cab in any crowded city in one cast-iron bitch. However, with the Ola cabs app for Android, booking a taxi is now a matter of swiping a finger across your Smartphone. Not only can you book the closest cab registered with Ola cab, but the app also allows you to track its movement on a map, along with details such as booking confirmation, name of the cab driver, vehicle number, distance and time taken to reach the users location. Registered users can also maintain a credit balance with Ola cabs and use the service through the app as and when needed without having to pay for the trip. The cab driver knows exactly where to find you and you have a clearer estimate of when the cab will reach your location. Taxis affiliated with Ola cabs are outfitted with Android phones that provide navigation and serve as fare meters. Ola cabs is operational in Mumbai at the moment and will launch in Delhi and Bangalore later this year.

4. BLA BLA Android Application

Bla bla car is an easy way to avoid spending a lot of money or waiting for a long time in bus terminals, trains stations and airports. The app connects drivers and passengers with the same destination who want to share the price of gas, making the trip more enjoyable for both of them as they get to know each other. The service is accessible via the web, mobile and also via apps for iOS and Android. The person using this app uses his own car for carpooling but the passengers are unknown to each other.

5. JUGNOO Android Application

Jugnoo is an Indian auto rickshaw (popularly known as autos) which provides on demand transportation and logistics services across 32 cities in India. It develops and operates a mobile application which helps connect the user with the auto drivers in the area. The service can be availed on Android OS, Apple iOS and Windows mobile by downloading the application from the respective application store. once the app is install in user's phone, an auto rickshaw can be hired through the app. The user can choose to either pay in cash or go cashless via Paytm. The auto arrives at the required pick-up point and drops the user wherever required. Once the ride is complete a feedback is expected on the scale of 1 to 5 rating displayed on the app.

6. Proposed Methodologies

The reason behind choosing Android Operating System is that it is more popular among users and is less expensive. Name of the application for this project is "Pune Carpool" application. Pune Carpool is android based mobile application that works on all android enabled phones. As it is a mobile application it is easily portable and requires low maintenance. It mainly consists of multiple clients and single server. The client and server interact via internet. Users need to first register and create an account during which he needs to provide certain mandatory information. To overcome the drawback of previous system that is users are unaware of with whom they are travelling, so we proposed an application for android users where it will have Android OS as the front end also known users will be considered from our contact list like our friends, relatives or colleagues etc .for short daily journeys within the city. The application will be communicating with server module of existing application through Android application instead of website. It will have SMS Alert facility for notification purpose. The passengers can book the seats of the car by reviewing the history and then taking final decision of whether to carpool or not. The proposed system can be implemented using the mobile data services in smart phones.

Comparative Study

Table: Comparative Study

Application	Features				
	Flexibility	Security	Google Map	Contact List	Friendly
Ibibo	No	No	No	No	No
BlaBla	Yes	No	Yes	No	No
Ola	Yes	No	Yes	No	No
Uber	Yes	No	Yes	No	No
Lifto	No	No	Yes	No	No
GreenCar	No	No	Yes	No	No
Pune Carpool	Yes	Yes	Yes	Yes	Yes

7. System Architecture

Smart city Carpool application is android based mobile application that works on all android enabled phones. Proposed system architecture is the conceptual model that defines the structure, behavior, and more views of a system.

There are two actors in system. First one is passenger and second is driver. Any user of the application can act as

a) A driver is any person that owns a car and wants to go from one place to another and publishes his trip on the application in order to find passengers of their contacts which are his/her friends to share the ride with.

b) A passenger is any person that doesn't own a car and wants to join a driver in a trip he posted and agrees to all the conditions specified (price and general behavior).

8. Conclusion

The model effectively outlines the purpose and effectiveness of carpooling and also makes it more appealing by enabling users to share their ride with their friends and relatives and restricts others. This feature encourages carpooling in less developed areas of the world where possession of a car is not very common. It provide ample amount of data which can be used to identify college mates, colleagues, or even ex coworkers, or school friends.

9. Future Scope

The benefits of the system are enormous with reduction in traffic, fuel economy, reduction in pollution etc. to further promote pooling payment system or redeemable points system can be implemented in the future.

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