Research Article

Carpooling Application in Android

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Abstract

Carpooling is one of the latest technologies discovered which has made travelling convenient and efficient to the common man. It also known as car-sharing in which one can travel to their destination while sharing the vehicle and the expenses incurred. Hence fuel costs, tolls and the stress of driving will be reduced when more people travel together in one vehicle. Carpooling is also an environment friendly app and we can save our mother nature by using this app. It also helps in reducing traffic congestion, and other poisonous gases in the air. We can save a lot of space in the Parking lot. During high fuel prices and high pollution periods, making use of the car pooling system is an intelligent decision. In our application, we will make an Android based application that will allow passengers to collaborate with other like-minded people and plan out their journey using the easy UI of the app after signing in to it. People will be able to share expenses and not worry about reaching late while making new connections

Keywords: Carpooling; Android; Ratings

1. Introduction

This document is a Android is one of the fast leading growing mobile platforms used today. It is also open source software and developers can avail of the android SDK for free. The minimal set up time and the number of tools available for android SDK to ease the development process allows the developers to concentrate on the design and implementation details of the application in the available time frame.

The main objective of this paper is to experience developing an android mobile application which is one of the booming trends in computing industry.

The carpooling application is intended to people travelling, to make it a cheaper affair. The application will allow the user to select his/her role i.e. driver or passenger. This will lead to the user to login to the app.

The passenger and the driver will enter his location, destination and time of travel. The passenger gets information about the drivers who travel along the same route. The passenger can confirm a particular driver and a message will be sent to the driver who also confirms the passenger and accordingly the seats will reduce.

2. Problem Definition

Carpooling is such a necessity in today's generation since the fuel prices are rising up and places to travel in a day are more than one. People who are rich and can

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afford a car on daily basis need not think twice before spending it. But common people like us need to save on the travel efforts. So our carpooling system will not only ensure your safe journey but will also give you an affordable ride anywhere and anytime in this city. Carpooling will help on fuel expenses to fall down and many more advantages.

3. Research

These are the statistics calculated when carpooling didn't exist.

Table 1 : Traffic Congestion On Selected Arterials In Delhi – A Review, Central Road Research Institute, New Delhi (Kum Kum Dewan *et al,* 2007).

Details	Amount Spent/Number of Cars
Average monthly expenditure on a vehicle	Rs.4065
Saving if carpooling is done with 1 person	Rs. 2033
Saving if carpooling is done with 2 persons	Rs. 2710
Saving if carpooling is done with 3 persons	Rs. 3049
No. of cars reduced on road if carpooling done with1person	181781 cars
No. of cars reduced on road if carpooling done with 2 persons	70478 cars
No. of cars reduced on road if carpooling done with 3 persons	148906
Saving of amount on petrol per year	Rs. 1310.98crore

After using this app there was a big difference in the calculations. The following table shows us the benefits of using car pooling.

4. Implementation

In this paper the user will be able to interact with the driver and book his seat easily. The user has to download this app and register themselves for carpooling. They will enter the source, destination and other details. These details will be stored in the database to maintain records. If he/she is a passenger they will be given options to select a driver of their choice. If he/she is a driver they need to provide a valid licence no. and their other details correctly.

This app is being developed for Android 3.0 and higher versions. The app is connected to a MySql database with the help of PHP.

The database table that we will use will consist of the following tables:

Table 2 : User Details

Id	Unique identification for every user.
Personal info (name, address, ph no, email id, gender, dob, photo)	The database will hold personal information of each user in case of any discrepancies.
Ratings	Every user will have a rating that will be given by other users depending on how good the service was. Accordingly new users can select the persons they wish to travel with.
No. Of ratings	The number of ratings each user has will be accounted in this column.

Create a Pool: A user who owns a vehicle can create a car pool with the following details. These details will be published on the app via which the passenger can select the appropriate driver for his/her travel.

Table 3: Details to be filled by the User

Event Id	A unique identification for each car pool event
Source	The start location needs to be added
Destination	The final destination needs to be added
Time	The time of departure from source
Vehicle details	The user will have to add his car number, car type and no.of seats available.

Join a Car Pool: A user who wishes to share a ride can enter his source and final destination along with time and he/she can select a particular car pool to join.

Table 4 : Abbreviations used

User ID	This is a foreign key which consists of user details
User_Source	Source pick up location of User
User_Destination	End destination of User
User_Time	Time of departure of user

The Login page of our application is displayed in Figure 3. We made use of Eclipse IDE and wrote the code in android.
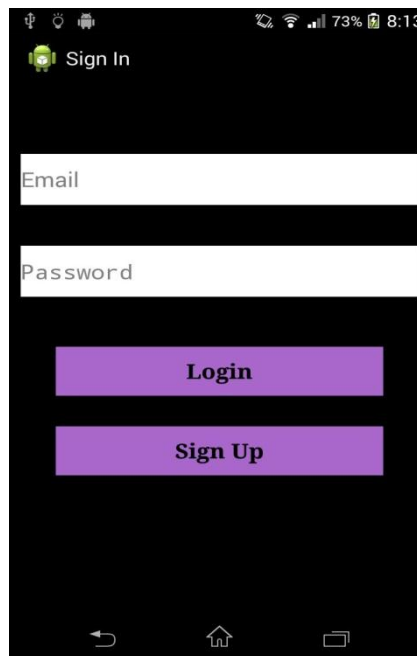

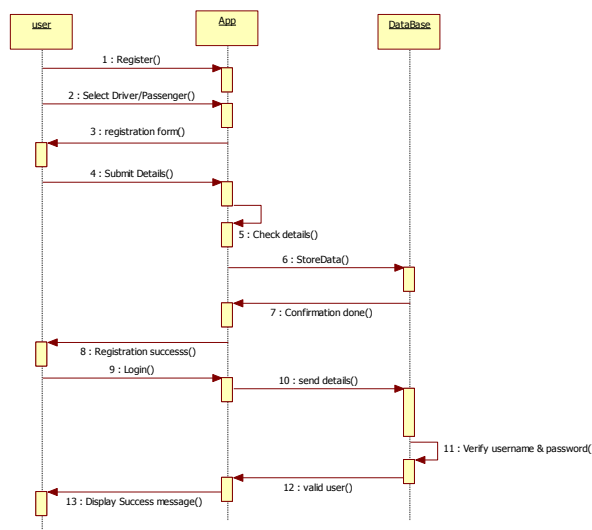**Figure 1**: Login Page

5. System Architecture

Figure 2: Sequence Diagram for Passenger and Driver Login

The users that have this application installed on their cell phones can use this application as either initiators

of car pooling event or as invitees for a car pooling event. When the user launches this application, the user is given three options to choose from. The user can create a new car pool event, view the events that he has created earlier or view invitations for car pool event from other users. When the user chooses to create a new event, he is given a form which has fields such as subject of the car pool, time of the car pool, vacancies in the car, destination address of the car pool. Now when the initiator views the event generated, he can see all those who all have responded to the event. Once the vacancies are full, the other invitees who try to accept the invite later are displayed a message which says that the car is full.

The System architecture shown in fig.1 show how the system actually works interacts. The main modules are the passenger and driver. The application will be installed on both the devices and they will interact with each other.
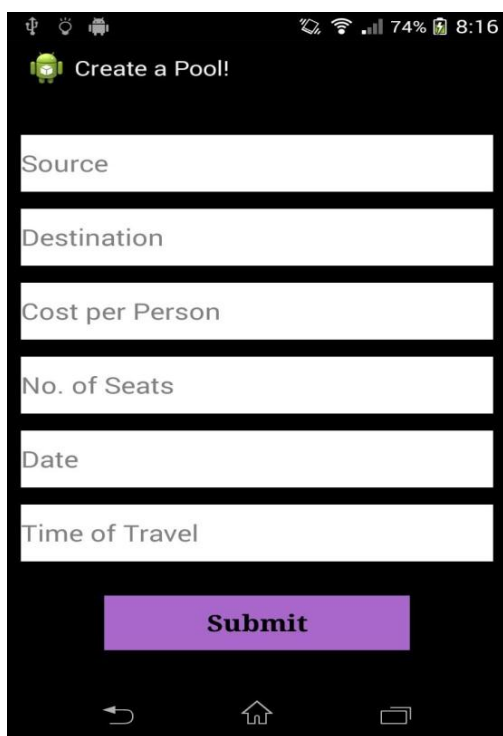

Figure 3: Creating a Carpool

Users can register themselves through website.
Once registered a user can login through their mobile and perform various functions like:

- Schedule Drive i.e. user will book his drive.
- Check car schedule i.e. user can check schedule of the booked car.
- User can post his/her offer/s so desired car poolers can have look on it.
- User can check the profiles of person who are carpooling with him/her for security purpose.
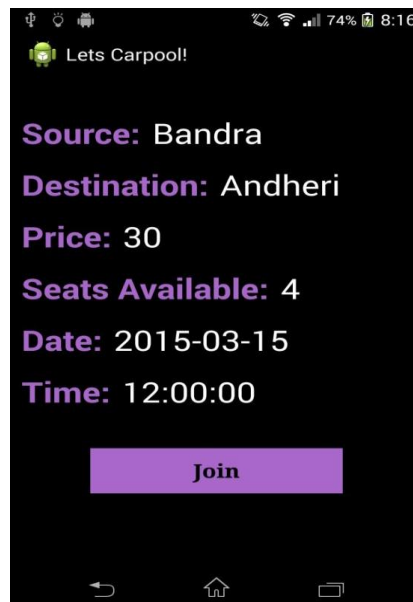- After the ride users will rate the passenger/ drivers for future reference and for security

Figure 4: Join Carpool

6. Future Scope

Carpooling system is very effective means to reduce pollution and the congestion of vehicles in cities. It also provides an eco-friendly way to travel. It also provides an opportunity to meet new people. As today most people prefer private vehicle to travel due to delay caused in public transport system and luxuries provided by private vehicles. Pre-registration ensures security, as only identified people get into the vehicle so that trust can be established. The people registered can be allotted specific days on which they should take their private vehicle, so that no inconvenience is caused to its registered passengers for daily commute. Thus the proposed carpooling system will be effective in reducing environment pollution.

This paper provides a proof of concept of the Car Pooling application. It is a stripped down version of our dream Car Pool application. There are a lot of improvements that can be incorporated into this paper that makes it more complete and feature rich. The future work with regards to this paper can be summarized as follows:

- At the moment, the routes are decided by the driver according how he thinks best. But the path obtained from this may not always be the shortest path. Thus we could have algorithms like the Dijkstra's algorithm or Algorithmic concepts like Dynamic Programming to calculate the shortest path between source, destination and all the recipients. Thus, optimization on this front can be obtained.
- The web service can be programmed to handle the context of the location. The context of the location can be determined by its proximity to the location of the event creator. Thus, the web service can determine a radius and determine the recipients which fall within the radius as the ones who would

receive the car pooling event message; while those which lie outside the radius would be ignored. Thus, broadcasting of the event can be avoided.

Other features can include displaying only the events that are pending when the user clicks on the View Created Events button. All the past and completed events could be stored in a separate history log.

Acknowledgement

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