

Car Pooling System with SMS Alerts

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Abstract

Carpooling (also known as car-sharing, ride-sharing and lift sharing), is the sharing of car journeys so that more than one person travels in a car. Carpooling reduces each person's travels costs such as fuel costs, tolls, and the stress of driving. Carpooling is one method that can be easily instituted and can help resolve a variety of problems that continue to plague urban areas, ranging from energy demands and traffic congestion to environmental pollution. Authorities often encourage carpooling, especially during high pollution periods and high fuel prices. We intent on making an ANDROID based application that will enable to let people know if vehicles are available for carpool in their desired path they can sign in for it. This will enable people using this application to share expense, not worry about hiring a cab and making new connections. People having this application on their cell phone with advance facilities can easily carpool with unacquainted people without worrying about security. It will also helpful for blind or lack of knowledge of using gadgets such a people they can operate this application using speech recognition technique. It will show the accurate time requires to reach at particular location. It gives a better way for pooling a car with a very efficient environment that is easy to use. This is a Web-based collaboration, communications, and content delivery framework.

Keywords:

Pooling, GPS, Android Apps, SOS.

1. Introduction

Transportation is a major issue these days especially in India. One of the most used means of communication in roadways. One of the major forms of road transport consists of the private passenger car. These cars are generally used with only a single rider.

Because of these causes pollution, traffic congestion (Jam), increasing parking space, wastage of time, no new connections & many more. Now a days, there is no. of application are in used but they are working in some bounded area. So, we have to remove the boundary through our application. We are developing the application which is working as like social networking sites. It is touch of everyone those have smart phones. This app is working as social networking site so the security is big issue. We have trace this problem by providing various security advance facilities such as for SOS we develop a technique which used when the passenger or driver in trouble. Our apps will provide a facility for blind person through speech recognition. It will track the location of passenger & driver those who involve in carpool. After all the passengers rich at their desire location it will be disable automatically. All the users involve in this carpooling system are track through GPS in head office when they made a pool; according to the security point of view it is important. They can watch the SOS notification also & according to that action will takes place.

This can be done as the know each other and can communicate. But when going on an inter city trip you are not aware if some other person also intends to make the same journey. Thus the applications helps you in seeing people and journey schedules and make an informed decision about do you wish to travel alone or save money and travel with a safe company. Furthermore, carpooling has documented social and environmental benefits that include:

- It helps in reducing traffic congestion as number of vehicles on the road can be reduced significantly.
- Miles of travel of a particular vehicle and emission of gases by the vehicles can also be reduced.
- As the system aims at the empty seats it increase vehicle occupancy.
- More efficient land use as parking requirement is reduced. Thus also helps in saving cost of building and maintaining infrastructure.

Our application is an attempt to make a system which is user friendly and provides an opportunity to share cars. We intent on making an application which

would be help the users to upload, view and register for journeys both short distance (daily commute to work) and long intercity trips. The system will be designed taking into consideration the users need about safety.

2. Existing system

All the present available systems have a very attractive and innovative interface which helps the user to understand the system in a easy way. These systems work efficiently and engineered very well by the different sources available. But the problem with available systems is that they do not provide component that builds up trust among the fellow passengers. The reason is all the available sources only concentrate on physical structures of the system.

2.1 Drawbacks:

- No interaction component available.
- Don't know with whom you are travelling with.
- Not helpful for blind people.
- Not Secure.
- Not track the location.
- Not Flexible.

3. Problem statement

There is acute problem of traffic on roads these days and the increasing fuel prices add to the misery of daily users of personal vehicles. Also use of vehicles causes pollution which has its adverse affects. Car sharing is a solution but issues like security and trust come into picture. Can this problem be solved? Solution to this problem is mobile based Carpool system. The Carpool system would enable its user a safe and secure way to share cars. This could include both short daily journeys such as going to workplace within the city and also long inter-city trips.

4. Proposed system

Our proposed system overcomes the drawbacks of the existing system. It has advance facilities to make it more user-friendly. It provides details of the owner and his/her car to maintain transparency between users of the system. It will track the location of users those who involve in pool through GPS Navigation system. It has SMS Alerts facilities for notification purpose. The High security makes it faithful to use. The security aspects gets more enhance by SOS facilities if the user is in trouble. It is available on Smartphone's so it is more flexible & dynamic to use.

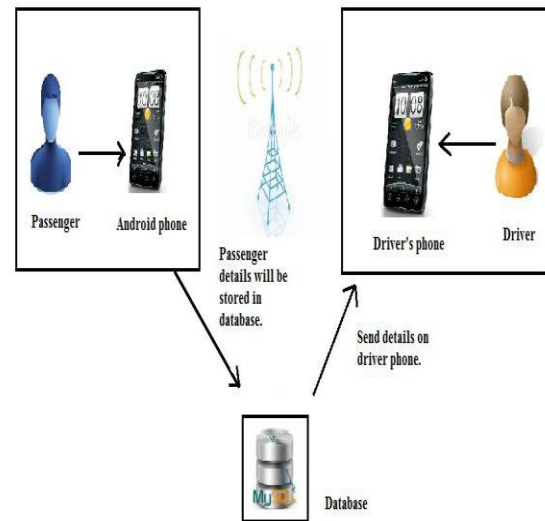


Figure 1. System Architecture with internet access

4.1 Our plan and its Advantages:

- Registration for users for security.
- Provides pool details to the user.
- Can create his/her own pool.
- Approval/Disapproval totally depends on driver.
- User-Friendly.
- Blind can also operate it.
- Track the location till the pool is made.
- Carpooling head-office track each & every pool, so
- it helpful to take action if someone is in trouble.

5. System Requirement

- A) Hardware Components
- B) Software Requirement

A) Hardware Components:

Table 1: Hardware Components

System	Pentium IV 2.4 GHz & onwards.
Hard Disk	40 GB
Monitor	15 VGA Color
Mouse	USB
RAM	256 MB
Smartphone	with Android 2.0 onwards

B) Software Requirement:

Table 2: Software Requirements

Operating System	Windows XPSP2 & onwards.
Language	Java (JDK 1.6 & onwards) & Android SDK Tools (Version 22.0.4).
Data Base	MYSQL 5.5.28
IDE	Net Beans IDE 6.9.1
Browser	Any.

5.1 JAVA

Java is an object-oriented programming language developed by Sun Microsystems a company best known for its high end UNIX workstations. Java language was designed to be small, simple, and portable across platforms, operating systems, both at the source and at the binary level, which means that Java programs (applet and application) can run on any machine that has the Java virtual machine (JVM) installed.

5.2 J2EE

Java Platform, Enterprise Edition or Java EE is a widely used platform for server programming in the Java programming language. The Java platform (Enterprise Edition) differs from the Java Standard Edition Platform (Java SE) in that it adds libraries which provide functionality to deploy fault-tolerant, distributed, multi-tier Java software, based largely on modular components running on an application server.

5.3 Tomcat Sever 5.5

A Number of servlet containers are available today. The most popular one & the one recognized as the official servlet/JSP container is Tomcat originally designed by Sun Micro Systems Tomcat by itself is a web server this means that you can use Tomcat to service HTTP request for servlets as well as static files(HTML, image files & so on). Tomcat 5.5 uses the Jasper 2 JSP Engine to implement the JavaServer Pages 2.0 specification.

- **JSP Custom Tag Pooling** - The java objects instantiated for JSP Custom Tags can now be pooled and reused. This significantly boosts the performance of JSP pages which use custom tags.
- **Background JSP compilation** - If you make a change to a JSP page which had already been compiled Jasper 2 can recompile that page in the background. The previously compiled JSP page will still be available to serve requests. Once the new

page has been compiled successfully it will replace the old page. This helps improve availability of your JSP pages on a production server.

5.4 Development Tools

Eclipse & Android SDK Tools are an integrated development environment (IDE) for visually designing, constructing, testing, and deploying Web services, portals, and Java (J2EE) applications.

5.4.1 Eclipse

In computer programming Eclipse does a multi-language Integrated development environment (IDE) comprise a base workspace and an extensible plug-in system for customizing the environment. It is written mostly in Java. It can be used to develop applications in Java and, by means of various plug-ins, other programming language including Ada, C, C++, COBOL, Fortran, Haskell, JavaScript, Lasso, Perl, PHP, Python, Ruby, Scala, Clojure, Groovy, Scheme, and Erlang. It can also be used to develop packages for the software Mathematica. Development environments include the Eclipse Java development tools (JDT) for Java and Scala, Eclipse CDT for C/C++ and Eclipse PDT for PHP, among others. The initial codebase originated from IBM VisualAge. The Eclipse software development kit (SDK), which includes the Java development tools, is meant for Java developers. Users can extend its abilities by installing plug-ins written for the Eclipse Platform, such as development toolkits for other programming languages, and can write and contribute their own plug-in modules. Released under the terms of the Eclipse Public License, Eclipse SDK is free and open source software(although it is incompatible with the GNU General Public License). It was one of the first IDEs to run under GNU Classpath and it runs without problems under IcedTea. [16]

5.4.2 Android SDK Tools

The Android software development kit (SDK) includes a comprehensive set of development tools. These include a debugger, libraries, a handset emulator based on QEMU, documentation, sample code, and tutorials. Currently supported development platforms include computers running Linux (any modern desktop Linux distribution), Mac OS X 10.5.8 or later, Windows XP or later; for the moment one can develop Android software on Android itself by using [AIDE - Android IDE - Java, C++] app and [Android java editor] app. The officially supported

integrated development environment (IDE) is Eclipse using the Android Development Tools (ADT) Plugin, though IntelliJ IDEA IDE (all editions) fully supports Android development out of the box, and NetBeans IDE also supports Android development via a plugin. Additionally, developers may use any text editor to edit Java and XML files, then use command line tools (Java Development Kit and Apache Ant are required) to create, build and debug Android applications as well as control attached Android devices (e.g., triggering a reboot, installing software package(s) remotely). Enhancements to Android's SDK go hand in hand with the overall Android platform development. The SDK also supports older versions of the Android platform in case developers wish to target their applications at older devices. Development tools are downloadable components, so after one has downloaded the latest version and platform, older platforms and tools can also be downloaded for compatibility testing.[17]

Android applications are packaged in .apk format and stored under /data/app folder on the Android OS (the folder is accessible only to the root user for security reasons). APK package contains .dex files (compiled byte code files called Dalvik executables), resource files, etc.

5.5 Database platform – MySQL

The world's most widely used open-source relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases MySQL is a popular choice of database for use in web applications, and is a central component of the widely used. The MySQL is the open source database.

5.6 Design tool – Star UML Software Modeller

StarUML supports most of the diagram types specified in UML 2.0. It is currently missing object, package, timing and interaction overview diagrams (though the first two can be adequately modeled through the class diagram editor). StarUML supports most of the diagram types specified in UML 2.0. It is currently missing object, package, timing and interaction overview diagrams (though the first two can be adequately modeled through the class diagram editor).

6. Non-Functional Requirements

- There are requirements that are not functional in nature. Specifically, these are the constraints the system must work within.
- The apps must be compatible with both the Android 2.0 and onwards based Smartphone's.

6.1 Performance Requirements

- 24*7 availability of services that we usually don't get in traditional system.
- Immediate accessing of services.

6.2 Safety Requirements

- The database should be carefully maintained by the administrator any loss may lead to chaos.
- Prevention of the abusive use of the language in the forums.
- Prevention of fake ids.

6.3 Security Requirements

- The Administrator password must be highly confidential.
- The users id must also be confidential.
- The users should not reveal their id to others as it may lead to wrong usage of account.

7. Basic Concept

Car-pooling is the sharing of rides in a private vehicle among two or more individuals. It involves the use of one person's private or company vehicle to carry one or more fellow passengers. Carpooling is the easiest and most common ridesharing arrangement. It usually consists two to four persons commuting in a vehicle. Sometimes carpoolers share driving, and other responsibilities. In other cases, one person does all the driving and is reimbursed for mileage by his or her riders. The carpool driver may pick up passengers from their home or the passenger may find a way to get to the driver's home at a specified time or they may meet at a particular location. Car-pooling defined as an effort by drivers of motor cars who agree to take turn to share rides from places of residence to places of employment. As the definition implies, car-pooling therefore refers only to the exercises carried out by the owners and drivers of private motor cars. For

example, if two persons A and B would like to car pool, they must first be owners and drivers of cars. They will then organize among themselves as to who is to drive on which day or which route to follow, and so forth. Preferably, A and B would alternate driving on a daily or weekly basis, or on any other basis they prefer.

There will not be any charges or fees involved. Excluded from the definition are those who ride share but do not own a motor car; and those who own motor cars ride share regularly but did not share driving. In these two cases, payments of fees are usually involved. If a car owner drives alone to work every day and spends approx. Rs. 5392 including fuel, maintenance and parking etc. It is assumed that on an average, he travels 40 kilometer per day. If he shares the car with three carpoolers who have their own car and drive to the same workplace. Then each of them can save Rs. 4044 per month of the total spent on commuting to the work place. All the four carpoolers have to bring their own car for a week in a month and drive themselves with other three carpoolers.

8. System Architecture

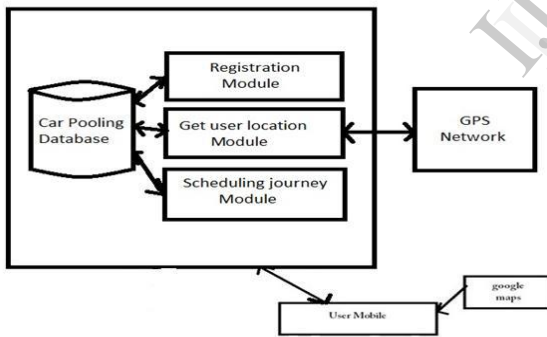


Figure 2. System Architecture

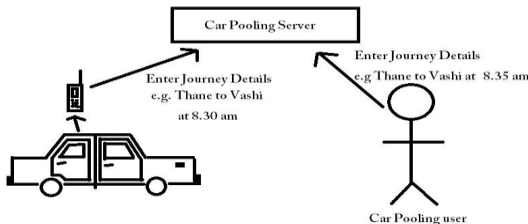


Figure 3. Start of Journey Situation

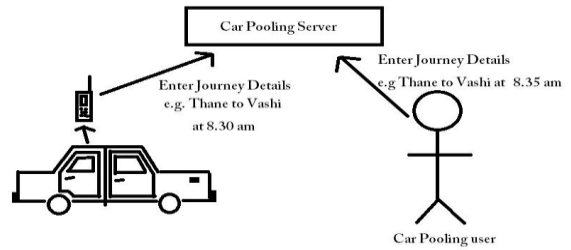


Figure 4. Start of Journey Situation

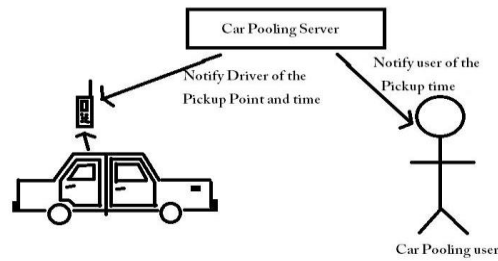


Figure 5. Once the request is accepted

9. Literature Survey

Carpooling system is used in many countries like China 77% had heard of carpooling and 16% was used. After this survey they did attitudinal questions towards carpooling, then survey was interested in carpooling were 62% and 38% were not interested. They used many means to come in contact with people like Newspapers, Internet, Friends, Colleagues, and Radios. These all means were used for people to get carpooling information. After using carpooling system the statistic suggests the saving and expenses would be as follow;

Table 3. After using carpooling system the statistics suggests the saving expenses

Carpooling Disadvantage	Time Coordination Difficulty	Cost Sharing Difficulty	Less Privacy
Driver	53%	29%	37%
Non-Driver	75%	72%	27%
Carpooling Disadvantage	Potential Dispute	Inconvenience	In security
Driver	68%	76%	37%
Non-Driver	70%	20%	36%

Did you know that here in Maharashtra State, petroleum used for transportation is the number one source of air toxins and greenhouse gas emissions, a major contributor to global warming? Each of us can reduce our impact on the environment. Think about it – every time two people share a ride, they're helping to reduce emissions from cars by half! Reducing vehicle emissions helps combat global warming, improves air quality and has positive effects on public health. And who hasn't been stuck in traffic recently? The World watch Institute found that the average Maharashtra adult now spends 72 minutes per day behind the wheel, often alone. Carpooling cuts down on congestion, which cuts travel time. Through your school's carpooling campaign, you can make a measurable difference in fossil fuel use and in the greenhouse gas and toxin emissions released into Washington's atmosphere. And you'll be cutting down on traffic congestion. The Green Team Carpool Project is easy to implement, with step-by-step instructions for helping participants better understand how their actions affect the environment. These project guidelines will support your environmental club or class through the entire process, from determining the scope of the project through implementation and results presentation.

10. Objectives

The objectives of the Car Pooling System can be stated as follows:

1. Enable users to create events that would specify the following information-
 - The total vacancy in the car.
 - The time at which the event is going to take place.
 - The Final destination.
2. Development of the logic that would enable-
 - Poll in the location information of all the intended recipients.
 - Take decision based on the context on the location.
 - Send SMS to all the selected recipients and handle the accepted or rejected messages received from the recipients.
3. Generate a Google Map that shows the initiator the map between his location, all the recipients that agreed to his car pooling event and the final destination.

11. Motivation

The application under consideration, the Car Pooling application, is a novel idea which has never been implemented before. This became our source of motivation for going ahead with this project. All the current car pooling methods are

- Time consuming.
- Require a lot of before-hand planning.
- Require several rounds of communications in the form of series of e-mails or a series of telephonic conversations.

A different source of motivation behind the development of this application is that of the IOK College, pune. Teachers & Student of this college suffering one problem that they have to do struggle for lift so we offered a Car Pool for some relief. We thought; why not develop a mobile-based instant Car Pooling application as our gift to the students & teachers of the IOK-COE? This really gave us the passion to go after the completion of this project. The initiator of the event could select intended recipients from the contact list. The application then checks for the relative context of the location of all the selected recipients and forwards the event to only those recipients that satisfy the context.

12. Carpooling Strategies

Carpooling is car-sharing; it helps save money and also is a way to minimize pollution. Carpooling is well established and used on daily basis in China and the US. We need to set up some strategies to encourage carpooling in India. These may include:

- Legislate for carpooling to ensure the legal status of carpooling and protect the legal rights and interests of carpoolers.
- Establish special carpooling agency by government to lead the carpooling propaganda, organization and service works. Encourage public carpooling institutions to promote the carpooling development.
- Implement carpooling incentive programs to improve the carpooling share in daily commuting modes.
- Carry out carpooling pilot projects to examine the effect and efficiency of carpooling programs.
- Carry accurate pick up time by considering all the aspects for particular route.

13. System Implementation

Carpooling system is a dynamic system which relies on two underlying sources of information: which includes route announcement by the uploader and route selection and registration by passengers. The user (uploader) who is going to travel by his/her vehicle will mention source, destination along with the route selected. He will also mention the capacity of vehicle. The user (passenger) who finds the path convenient can register for the trip. Carpooling system has a detailed phased registration system. For security and ensuring trust the system will check for any valid identity proof such as UID, pan card number provided by government, police character certificate. Our system will take feedback about users experience in trip. For displaying routes and users position we use digital maps. Even the uploader is blind/lack of knowledge of have to use gadget that can use this system easily.

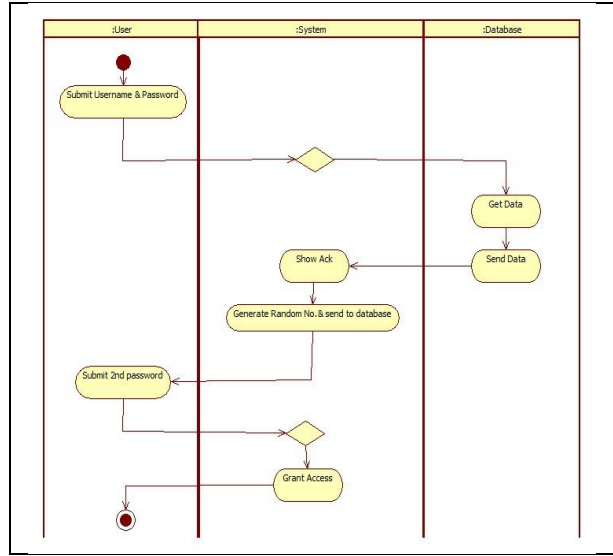


Figure 6. Activity Diagram for Login

14. Workflow of System

14.1 Activity Diagram

Initially user is made to fill all mandatory fields filled in registration form. Once the user clicks submit, the username is verified. If the username is already present, then the user is again taken back, so that he can change the username. If the username is not present then it checks for password and remaining mandatory fields. If any of the mandatory field is left empty or filled incorrect, then the user is informed to enter the correct values. Once all these verifications are succeeded, then the registration is done. User Login to the system by entering username & password, the submit it, verify it & then grant access.

After the corporate employee successfully logs into the system, he can see the available car pools. If there are any existing car pools he can join the car pool. If they aren't any existing car pools he can also create new car pool.

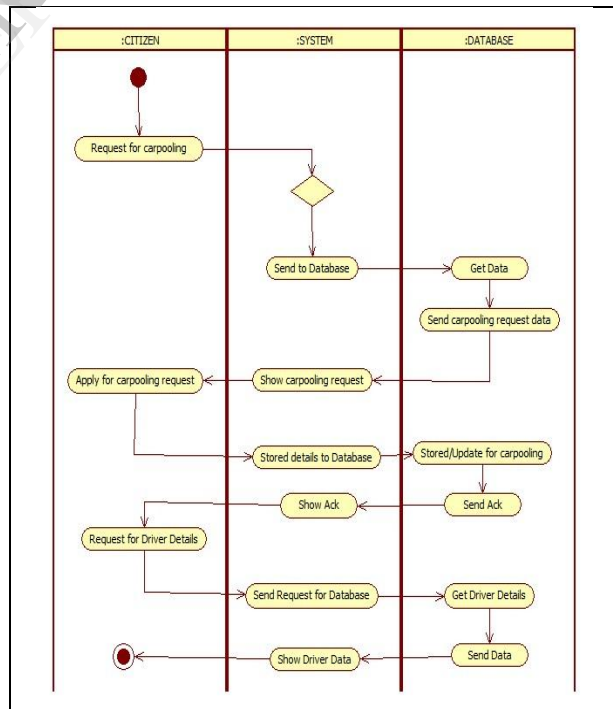


Figure 7. Activity Diagram

15. Conclusion

- 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 that only identified people get into the vehicle so that trust can be established. The people registered are 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.
- It will also provide a security to citizens.
- It will give the accurate pick-up time.

16. Future Scope

- It will be user-friendly for blind & lack of knowledge people.
- Bike can also be used in future for pooling.
- Pooling system can be for transportation goods in sharing manner (Truck Pooling).

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