Real-Time Carpooling System

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EXTENDED ABSTRACT

1. INTRODUCTION

Transportation is a major issue in our world today. Traditional problems of transit, once thought of as a strictly civil engineering difficulty, are increasingly being revisited and recognized as a critical environmental crisis. Transportation accounts for about 29% of all greenhouse gas emissions [1]. There is also a growing awareness of the environmental impact associated with the fabrication of cars, especially from the nickel-metal hydride batteries in more fuel-efficient hybrids. The dominant form of personal transit today is the private passenger car. Very often, these cars are used with only a single rider. An over abundance of cars creates many well-documented problems for urban areas, such as increased traffic, increased pollution, parking congestion, and the need for expensive infrastructure maintenance. The expenses, both environmental and fiscal, of single occupancy vehicles can be reduced dramatically by utilizing the empty seats in these vehicles. Carpooling targets these empty seats: it takes cars off the road reducing traffic and pollution, and may provide an opportunity for social interaction.

2. SYSTEM IMPLEMENTATION

Real-Time Carpooling is a dynamic system which relies on two underlying sources of information: quick and easy route announcement by the members (member end) and flexible and intelligent route matching by the system (server end). Multiple methods of the route announcement, including automatic search and route changing systems, local chat, helpful functional user profile, would be similarly handled by the server. Carpooling system has a detailed phased registration system. It will interact with police. Our system has its own credit system for feedback. For displaying routes and users' location we use digital map. Additional thing that we are using is possibility to see the closest bus stops and train stations with schedules.

3. RELATED WORKS

Existing solutions could be broadly classified into three types based on their approach. First is the system of displaying users' plans in which the drivers and riders offer their carpooling plans. The second type uses interaction between users, route maintenance and fault-tolerance of the system. And the third is problem of user's trust to the system and other users. Nowadays it is possible to use digital maps and cell phones. For example, Share Your Ride [2] uses digital map for displaying the road trip. It is very important to use automated route-matching solution to match up a rider and a driver. ICarpool [3] uses high precision trip matching to find the best carpool match. At the moment there is no system which contains user-friendly interface and reliable automatic system core thus combining all these three types within one system. Whereas, we expect that using cell phones would be better carpooling solution for the interaction between users and the system.

4. PROTOTYPE

We developed a prototype to check the feasibility of this system. In prototype a passenger submits a request for a ride or a driver offers a ride. If a member has the flexibility to be either a passenger or a driver, then they will also be given the option to select both. Our prototype is simpler in using. The wireframes are optimized with all the features for each user's request. To use the system the user must be authorized. The registration consists of two levels which differ from each other by level of access. To use all the system they should pass the second level

which consists of filling the rest of the information about their selves. The unregistered users at the first can see statistics of using the system which has different charts. If the user has some questions, they can send a mail to the support service. After the first step of authorization the user can see the other users on the map, statistics of using the system and closest public places. The multilevel authorization system is better for attracting new users because they can see the first results of using. In the user's profile, there is information about their place of residence, history of travels and credits, chat and mini games that use feedback credits. That means that the user can see all the statistics of using carpooling system and send message to the driver or passengers. In profile the user can change their information about responses, upload new avatar or the photo of the car. The prototype involved two important automatic systems such as changeover system for unforeseen situations and the automatic route search system.

5. ESTABLISHING TRUST

One of the greatest barriers to carpooling is trust, which is obviously multidimensional [4] and fits with the theory that behavior has multiple influences [5]. Ability, integrity, and benevolence are three dimensions of trust identified by Bhattacherjee [6]. We have identified a number of features to instill trust to attract new members. The members should be mutually available without compromising their privacy. Our system has a personal profile page. Members can easily link to personal pages, which would provide the necessary information for trust building. It is also conceivable to extend the information on a profile to include driving license. Also, to promote the trust, members will have the option to create "favorites" and "blocked" lists of the members. Manually created lists will prioritize carpools with acquaintances and avoid particularly awkward matches. Automatically created and updated smart lists let the members to set the parameters for their matches, which allow a user-customized matching routine. For instance, a member could block smokers and prefer dog lovers. But more useful feature of our system is a credit system. In this credit system the user can give assess to another user. It allows collecting their own points which informs another member about social view of this person. Also the members can leave a note where they can write their own opinion about the trip.

6. RESULTS AND DISCUSSION

The result of our project is designed and optimized system. Real-Time Carpooling system have easy and friendly interface. We created system with simple but organized route request. Combination with digital map gives full immersion in trip. There are no doubts about the reliability of redundant system due to automatic route search system and changeover system for unforeseen situations. If our system cannot find the solutions with carpooling then it will find the nearest public transport routes in the specified time. These opportunities give a profound trust in our system. The user's profile contains all the information needed for traveling. Interactive credit systems which help to know public attitude for each member and cooperation with police gives a trust for members' safety. Unlike other projects, our system affects all aspects of carpooling. In our system all the shortcomings of previous work were taken into account. Real-Time Carpooling system works with latest technologies that give us big advantages over previous works. The use of mobile phones makes the system easy to use everywhere and every time.

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KEYWORDS: carpooling, mobile phone, trust, automatic system, credit system, driver safety.

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