A Carpooling Open Application
with Social Oriented Reward Mechanism

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Abstract. Carpooling is currently getting more and more attractive thanks both to an increasing emphasis placed on environmental issues and to the huge use of web based social networks. They indeed (1) allow to spread all information for an effective service (2) compensate the lack of confidence among carpooling users (3) promote carpooling companies via viral marketing (4) act as a basis for trust based users recommendation system. CORSA is an open source solution for a real time ride sharing (RTRS) carpooling service, with high accessibility, high usability, and effectiveness and efficiency in finding a riding solution for users. This proposal also endorses the role of social networks using a virtual credits reward mechanism.

Keywords: carpooling, RTRS, ride sharing, social networks virtual credits.

1 Introduction

The transport system based on sharing private cars, simply known as carpooling is an innovative yet quite old idea whose first proposals date back to more than thirty years ago [10] [22]. The renewal of the interest for carpooling is due to the increasing emphasis placed on the reduction in the number of vehicles, the expenses for gas and in energy consumption and pollution.

An additional factor that is encouraging the intensive adoption of carpooling comes from the massive use of web based social networks [12] [20]. They indeed represent a well-established tool:

– to share all information for an effective carpooling service (users personal profiles, ongoing position, preferred routes etc.)
– to leverage social relationships to remedy the lack of confidence among users that currently limits the use of carpooling,
– to encompass the traditional forms of marketing and advertising for instance endorsing carpooling companies by viral marketing [9]
– to provide feedback mechanisms as users/service rating and recommendation useful to build an overlay trust network [4] that can consolidate the relationship of carpooling users [8] and allow to safely add new users, e.g. persons could choose only trusted people for sharing their routes [5].

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– to exploit hidden relationships, for instance if a community of people that lives and/or work at close places is discovered [3], the system can put them into contact for sharing common routes.

The work presented in this paper, named CORSA (Carpooling Open source Ride Sharing Application) [17], is a solution for a carpooling service accessible anytime from anywhere with high usability, effectiveness and efficiency in automatically providing users with helpful solutions. In addition to these features, in our proposal we also endorse the role of social networks. Indeed, we reward users with virtual credits to promote carpooling and to spend such credits, an ecosystem of business or public institutions affiliated with the platform is needed; for this mechanism to be successful, we push users to publicize it to their friends belonging to the same social network acting as in a competition where the greater score you earn, the more credits you can spend on the platform, according to the viral marketing paradigm [16].

To exploit social networks from the very beginning, the initial set of users involved in the testing phase consists of students attending the same university, so a (possibly strong connected) virtual social network is already present. Finally, the work was developed using only open sources libraries, to spread its adoption.

The paper is organized as follows. In section 2, we briefly compare our approach with others, whereas in section 3, the application model and its architecture are discussed. In section 4, we introduce some use cases to show how the application works, providing concluding remarks and future works in section 5.

## 2 Related Work

In literature, two carpooling services exist, the Daily Car Pooling Problem [1], where each day a number of users declare their availability for picking up colleagues, and the Long-term Car Pooling Problem, where the goal is to define pools where each user will (in turn) pick up the remaining pool members on different days [19]. Our proposal falls into the former, in particular belongs to the so-called real time ride sharing (or RTRS) family problems [15] [13] [11], where trips are planned just before they occur.

Considering other (even commercial) solutions, there are several characteristics that differentiate RTRS platforms: user registration and management, with special attention to drivers; payment methods; Gamification mechanisms to encourage the usage of the service; feedback and ranking system to manage trust and reputation of users; route management, in particular pick up and dropoff points of passengers.

Six companies are taken into consideration: Lyft [18], Uber [24], SideCar [21], Wingz [25], BlaBlaCar [2] and Carma [6]. The first four offer services comparable to the ones of a taxi in which passengers contact drivers asking to dropped off in a certain destination. Registered users can become drivers if they successfully pass the company’s approval process and meet security requirements such as: no criminal record, minimum age 23 years old, at least three years of driving, a car that meets specific safety standards, no DUI. In addition, all drivers must have insurance coverage. The remaining companies, BlaBlaCar and Carma, are traditional carpooling, where drivers actually share their car for journeys they are doing. In all six cases, passenger pay a monetary compensation for the service. In the case of BlaBlaCar the payment is made in cash, in