

Comparative Analysis of Dynamic Carpooling Issues

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Abstract

This article is extracted from the Bachelor of Science dissertation in Computer Science of Daniel Graziotin[14] and contains the comparative analysis of the issues against the adoption of Dynamic Carpooling. For more information, please visit the project website, <http://dycapo.org>

| Paper | Interface Design | Algorithms | Coordination |
|-------|---|--|--|
| [11] | Give start, ending points and clear indications. Filter what information to reveal | | |
| [8] | Provide lots of flexible settings to satisfy users. | | Provide a static/dynamic approach, let users insert entries days before the start |
| [10] | Provide different levels of services: - simple: just destination and pickup - groups preferences (only women etc.) - scheduling of rides | | |
| [1] | | | |
| [7] | | | Implement one-time registration process, simple. Provide RFID devices for drivers and passengers |
| [6] | | | |
| [5] | Focus on simplicity. Provide voice, speech recognition. Allow users to communicate each other. | | Driving passenger away from the destination but near transportation locations (e.g. a bus station) increases quality of service and enhances coordination. |
| [4] | | Given, built around social connections. Social network needed. | Built around social connection between users |
| [12] | Implement a simple registration system from mobile phone. In a second phase link social networks profiles, or manual fill. Develop a very simple UI | | |
| [9] | | Both data structures and Algorithms for matching are given | |
| [13] | Build it similar, simple and intuitive like Twitter. Use parameters like “where are you going?”. Car position is essential: drivers should get a message and just confirm or refuse a ride | | Use legal pick up points |

Table 1: Paper Analysis: Interface Design, Algorithms, Coordination

| Paper | Trustiness | Safety | Social Aspects |
|-------|--|---|--|
| [11] | | Authenticate before the match: password / PIN monitor arrival at destination Provide a feedback system a la EBay | Announce matching items in profiles before the ride Do research in social capital aspects |
| [8] | | Create a PIN at registration phase to be used by the client | Add social networking support to help finding neighbours |
| [10] | Brand the idea: apply stickers on every car that participates. Give limitations to drivers: age limits, extra driving tests, check on criminal records etc. | Provide Auto Event Recorders on cars. Implement an emergency button on mobile phone, record GPS data. Provide a feedback system a la EBay | |
| [1] | | | |
| [7] | Record carpooling activity when cars pass through RFID readers | Build it around RFID, record lots of data and positions | |
| [6] | Involve community and governments in planning and implementation phases | Let the service be available only to registered users; Provide a Feedback system | Give the possibility to create social connections |
| [5] | | Use RFID, GPS. Implement a complete rating system. Display vehicle and driver information before entering a vehicle. Display participants pictures. Assign random numbers for passenger pickups to confirm the ride. Provide voice and video features. | Match passengers socially. Link the application to social networks. |
| [4] | Use social networks to enhance it. | | |

Table 2: Paper Analysis: Trustiness, Safety, Social Aspects Pt. 1

| Paper | Trustiness | Safety | Social Aspects |
|-------|--|---|----------------|
| [12] | People are ready to spend 17% more time to pickup a friend of the social network rather than a stranger. Implement it. | Implement a rating system. Use and record GPS data. Do extra research in this field. | |
| [9] | Use social networks to enhance it. | Implement a GPS Help button. Record time, place, and sound. Develop a Feedback system | |
| [13] | Market against negative prejudgments of people: ride-sharing is associated with unreliability, problems with passengers and crime. Use the survey provided. | Solve problems related to reliability, politeness and customs. Make people change mind about the dangers of carpooling. Implement a rating with rate of confirmed trip-requests, rate of canceled trips and time accuracy. Use RFID, GPS, Blue-tooth, event recorders and everything else you could add. Measure and record the speed of vehicles. | |

Table 3: Paper Analysis: Trustiness, Safety, Social Aspects Pt. 2

| Paper | Critical Mass | Incentives | Suggestions |
|-------|--|---|---|
| [11] | | | Provide a location-aware system Make use of mobile phones |
| [8] | Provide mass marketing before, during and after deployment. Search for start-up incentives | Search an institutional sponsor. Make the government provide parking spaces to participants | Implement both Web and mobile clients. Implement a static and a dynamic approach. Start with a many-to-one system: all at a single destination |
| [10] | | Use a cooperative, public development of the system | Implement a Web interface and mobile clients (using phone calls) |
| [1] | | | |
| [7] | | Make employers incentive employees. Involve Regional Transportation Boards | |
| [6] | Create an incremental service, starting from a thread of backwards compatible services (bus, taxi). Don't introduce new devices for the service, use mobile phones | Find a way to make the service a business case. Search for public incentives | Implement the system mobile only. Record GPS data. Provide a non-obtrusive system for authentication Research on quality of service measures |
| [5] | A multi-hop system will solve the problem, as more rides will be available, waiting times will decrease and quality will rise. | Convince governments to change laws to enforce carpooling | Use a dynamic, multi-hop, real-time mobile system to minimize waiting times, one hop at a time |
| [4] | | | Use mobile phones and sms. Use GPS. Use a provided high-level description of the system |

Table 4: Paper Analysis: Critical Mass, Incentives, Suggestions Pt. 1

| Paper | Critical Mass | Incentives | Suggestions |
|-------|--|--|--|
| [12] | Involve users in some parts of development process. Research further on this topic. | | Implement a mobile and a web system that interacts with social networks profiles. Use Opensocial and other social networks. Use our high level description of the whole system |
| [9] | Market-formation problem: discover a new, winning formula. Start with an existing service, like taxis. Find large employers. Serve events (i.e., concerts) | Find money. Search for incentives from governments | Implement our Use Cases Provide our functional requirements. Provide our non-functional requirements |
| [13] | Convince the user to use the system for the first time. Pay the user directly for the first N times of use. Integrate public transportation system. Implement the system first for an existing taxi network, and then private cars could participate. | Provide a free taxi of public transport ride in case of no return possibility. Include existing carsharing projects in the system startup. Create an own currency system to be converted in real money. Convince governments to adapt the laws for dynamic carpooling | Implement a mobile, GPS, Multi-hop system |

Table 5: Paper Analysis: Critical Mass, Incentives, Suggestions Pt.2

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