PHYSICAL AND SPIRITUAL PROXIMITY: LINKING CAR2CAR COMMUNICATION WITH ONLINE SOCIAL NETWORKS

Monika Mitrevska

Supervisor: Christian Müller, Sandro Castronovo
Motivation

Sorry I'm late for the interview, Mr. Burnham. I'm stuck behind some loser who should never have gotten a license! Oh, great, now the schmuck's on his carphone!
Outline

- The Idea
- Research Questions
- Related work
- Implementation
- Expected Results
The idea
What do we know about the drivers around?
Road Rage
(Addressing anonymity)

- Anonymity and aggression
  - What if you could be totally anonymous (and invisible) for twenty-four hours: “rob a bank”
  - Anonymous but similar people

- Anonymity on roads
  - “The ’49 Ford is a living room on wheels.”; “home away from home”
  - Drivers self perception: unknown and socially isolated from others
  - personal-space buffer zones

- Field Study
  - Horn honking as a measure of aggression and the effect of anonymity
Car 2 Car communication

- Cars talking to each other
- Role of vehicles from more transportation means to “smart objects”

Use Cases
- Safety
- Traffic efficiency
- Infotainment and others
Social Networks

- Widely used and accepted
  - 1 in every 13 people on earth

- Available Information
  - 20 minutes on Facebook over 1 million links are shared, 2 million friend requests are accepted and almost 3 million messages are sent.

- Social Networks in Cars
Bringing All Three Together
Research Questions
What do we want to find out?

- Can we reduce the anonymity by introducing social networks in cars?
  - Can we reduce the road rage by reducing the anonymity on the roads?
- Which of the available social network information are useful in driving scenarios?
- Do different abstraction levels have different effects?
  - Does the type of information have different effect on different groups of people?
- Can we use the social networks for evaluation?
- Are there any scenarios where these information can have counter effects?
Related work
Road speak: Enabling Voice Chat on Roadways using vehicular social networks

- People spend hours every day driving the same roads
- Vehicular Social Networks
  - Spatial locality
  - Temporal locality
- Entertainment, utility and emergency purposes
- RoadSpeak – a VSN based system
- Drivers can communicate with each other by means of voice chat messages
Road speak: Enabling Voice Chat on Roadways using vehicular social networks

- **Account**
- **RoadSpeak client for smart phone**
- **Picks from the groups available along the route**
- **VSNs (Voice Chat Groups VCG)**
  - \{time, location, interests\}
- **Listen voice chat messages and reply**
Where People and Cars Meet: Social Interactions to Improve Information Sharing in Large Scale Vehicular Networks

- Social Network of vehicle residents improves information sharing
- The goal:
  - vehicles acquire context information from the other nodes based on their social roles
- Motivating Scenario
- Friend or a Friend-Of-A-Friend (FOAF) social networking technique
Where People and Cars Meet: Social Interactions to Improve Information Sharing in Large Scale Vehicular Networks

- Ubiquitous-Help-system (UHS) on top of a vehicular network
  - Profile, preferences, presence of other users, location, time

- Properties of other users
  - Locality
  - Common Ground
  - Reliability
Social Serendipity: Mobilizing Social software

- Mobile Phone-based system

- Uses:
  - Bluetooth hardware addresses
  - user database

- Cues:
  - informal
  - face-to-face interaction
  - between nearby users who don’t know each other, but probably should
## Through our prism

<table>
<thead>
<tr>
<th>Papers</th>
<th>The General Idea</th>
<th>Networks</th>
<th>Algorithm</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anonymity as a Road Rage Factor</td>
<td>Social status difference as a Road</td>
<td>Car - 2 - Car Network</td>
<td>Facebook as a users source</td>
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<tr>
<td></td>
<td></td>
<td>Proximity</td>
<td>Social Network in Car</td>
<td>User study</td>
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<tr>
<td></td>
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<td><strong>Road speak</strong></td>
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<td>No</td>
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<td><strong>Social Serendipity:</strong></td>
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<td>No</td>
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<td><strong>Mobilizing Social software</strong></td>
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<td><strong>Physical and Spiritual</strong></td>
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<tr>
<td><strong>Proximity:</strong></td>
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<td>yes</td>
<td>yes</td>
<td>Yes (not between Facebook users)</td>
<td>Yes</td>
</tr>
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</table>
The plan...

- Use social networks to present information about the drivers around

Why?
- We believe that reducing anonymity on roads can be beneficial

How?
- We get information from Facebook
- Present matching information

When?
- In a predefined scenarios
Our Work: Implementation

- User Study
- Car-to-car network
  - not available
- Simulation
- Facebook as a source of users
  - Facebook application
- Gather and compare the data from users
- Analyze results
Driver’s Model

- Why Facebook?
- Available information
  - Birthday, education, hometown, work, friends, activities, events …
- Comparison Level
  - Concrete similarities
  - Groups of interest
- Matching algorithm
  - Context; user similarities; importance of the information
Simulation

- Partially interactive animation
- The car drives along the road.
- The driver should reach a given destination in a given amount of time.
Scene 1: Traffic jam

- The car stops in a traffic jam.
- The counter is counting down the remaining seconds.
- The user can react by pressing one of the given buttons.
- After a driver’s reaction the cars start moving again.
- No additional information are displayed.
Scene 1: Traffic jam

- Same scenario as on the previous slide
- Additional Information
- Depending on the context and the drivers’ profiles
- After driver’s reaction the cars start moving again
Scene 2: Traffic Light

- The car stops at traffic light.
- The traffic light turns green, the car in front is not moving.
- The counter is counting down the remaining seconds.
- The user can react by pressing one of the given buttons.
- After driver’s reaction the car starts moving.
Scene 2: Traffic Light

- Same situation as on the previous slide
- Additional information are displayed
Scene 2: Slow car in front

- In this scenario, the driver is driving behind a slow car.
Scene 2: Slow car in front

- The driver is driving behind a slow car.
- Additional information
Evaluation Metrics

- Every user is assigned to one of the groups:
  - No information presented
  - Concrete, direct match information
  - General information
- The time when the situation occurs until the first reaction by the user
- Reaction type
  - Which button is pressed
- The intensity of reaction
  - The duration of holding the buttons down
  - The frequency of pressing the buttons
Expected results

- Significant difference between the users who were presented information and those who weren’t
- Difference between the users that got concrete and abstract information
- Difference between groups of users
- Indications that we can reduce the anonymity and the road rage by presenting additional information
Sorry I'm late for the interview, Mr. Burnham. I'm stuck behind some loser who should never have gotten a license! Oh, great now the schmucks on his carphone!

The driver in front is attending the same meeting at 2

Sorry I am late for the interview Mr. Burnham. The traffic is very bad and I am trying to be there as soon as possible.
References

- James W. Jenness. Supporting highway safety culture by addressing anonymity
- Ben Jann. Driver Aggression as a Function of Status Concurrence: An Analysis of Horn-Honking Responses
- Ansar-Ul-Haque Yasar, Nasim Mahmud, Davy Preuveneers, Kris Luyten, Karin Coninx, Yolande Berbers. Where People and Cars Meet: Social Interactions to Improve Information Sharing in Large Scale Vehicular Networks
- Stephen Smaldone, Lu Han, Pravin Shankar, and Liviu Iftode. RoadSpeak: Enabling Voice Chat on Roadways using Vehicular Social Networks
- N. Eagle and A. Pentland. Social Serendipity: Mobilizing Social Software
- [http://www.onlineschools.org/blog/facebook-obsession/](http://www.onlineschools.org/blog/facebook-obsession/)
Thank You!
<table>
<thead>
<tr>
<th>Facebook Properties</th>
<th>Direct Match</th>
<th>Message Sample</th>
<th>More General Match</th>
<th>Message Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books</td>
<td>Same book (books) they like</td>
<td>The driver in front likes to read (Book name)</td>
<td>Common books genre</td>
<td>The driver in front would like to read a good old comic book</td>
</tr>
<tr>
<td>Sport</td>
<td>Same sports they like</td>
<td>The driver in front likes (sport)</td>
<td>Type of sport</td>
<td></td>
</tr>
<tr>
<td>Favorite Teams</td>
<td>Common teams</td>
<td>The driver is a fan of (team)</td>
<td>Sport or type of sport</td>
<td>The driver in front likes (spot) / The driver in front likes (spot type) sports</td>
</tr>
<tr>
<td>Movies</td>
<td>Common movies</td>
<td>The driver in front enjoys watching (movie)</td>
<td>Genre</td>
<td>The driver in front likes to watch (genre) movies</td>
</tr>
<tr>
<td>Work</td>
<td>Worked or work in the same company</td>
<td>The driver in front worked/ works in (company name)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music</td>
<td>Common music</td>
<td>The driver in front likes (Group, Singer) music</td>
<td>Genre</td>
<td>The driver in front likes to listen (genre) music</td>
</tr>
</tbody>
</table>