

The Road Rager – Making use of traffic encounters to enhance a mobile gaming experience

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Abstract

Road Rager is a prototype built in order to explore our assumption that physical presence during temporary encounters would enhance a mobile gaming experience. In this case, it is a mobile multiplayer game designed to enable passengers in different cars to play against each other during a meeting in traffic. Using such meetings as part of the gaming experience opens new interesting possibilities for novel and engaging mobile experiences. In this paper we present the game concept and the possibilities to interact - designed to successfully benefit from the dynamic and vivid mobile context created during a traffic encounter. We also present initial user feedback on the gaming experience.

1 Introduction

Future mobile technology will provide more services that exploit the benefits of mobile life [Chincholle 2002]. Current mobile games are often portable versions of classic computer games [Kuivakari 2001]. There is also the possibility of incorporating different aspects of mobility to create immersive experiences. We suggest that a mobile game could become compelling in a new way, if it is aware of the vivid and dynamic mobile context. Travelling along a road means a continuous flow of impressions and new situations where changing scenes, sense of motion and contingent encounters provide for a very special experience. It can be seen as a sequential experience, resembling a dramatic play of space and motion, also called the highway experience. Contingent traffic encounters such as rapid meetings, protracted overtaking or gatherings i.e. traffic jams or red light accumulations constitute an essential part of the experience of travelling along a road [Appleyard et al. 1964]. We explore how these meetings, the motion of the accompanying traffic, can be combined with a multiplayer game and how it can add to the gaming experience.

A game prototype, i.e. *Road Rager*, was created. *Road Rager* uses wireless ad hoc networking technology to enable game-play between car passengers as they convene within a limited range. A hypothesis is that a possibility to identify other players would spur social interaction and enhance the gaming experience. Due to high relative speed an encounter can be extremely momentary, sometimes not longer than a couple of seconds. Consequently, a central design challenge concerns the possibility to enable and balance the player's engagement between virtual and real when the time for identification and interaction with the opponent player is very brief. However, drawing on a screen based interface risks having the player focusing on the screen rather than looking out through the window of the car. This inspired us to explore the interaction in terms of a tangible interface. The fictitious connection between the game world and occurring encounters was achieved by means of direction and distance to the opposing car. Additionally, it was important to recognize that traffic encounters occur in a variety of ways, this imply that different kinds of encounters call for different possibilities to interact. When designing the game we chose to focus on three different

encounters, i.e. meeting in opposite lanes, overtaking and traffic-light accumulations. Furthermore, the game is designed in such way that it often is rewarding for the player to identify the kind of encounter taking place, in this way we further stimulate the player to engage with the surrounding physical world.

2 Combining Mobile Gaming with Traffic Encounters

Any road user's journey often coincides with several other journeys. Traffic encounters arise when two or more people on the roads are co-located and are within visible sight of each other e.g. in intersections, passing in opposite lanes or when overtaking [Juhlin 2001]. Encounters with other road-user can occur in many different ways. Due to high relative speed an encounter can be extremely momentary, others more persistent. When designing the game we have focused on three different types of encounters, i.e. meeting of two vehicles travelling in opposite lanes, overtaking and traffic-light accumulations (fig. 1). These encounters were chosen because we believe that they constitute short gaming events but bring about different challenges when designing the game.

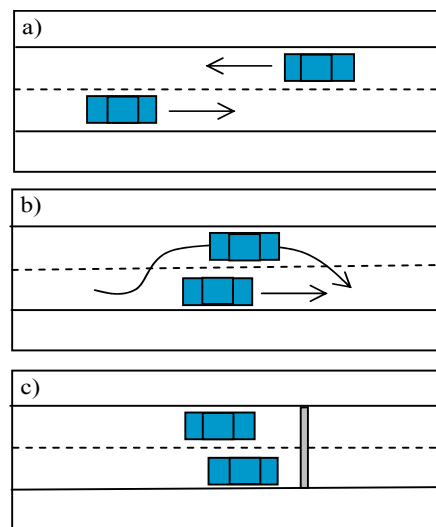


Figure 1: a) Meeting in opposite lanes, b) overtaking, c) traffic-light accumulations

3 Road Rager

A hypothesis is that the possibility to identify other players will enhance the gaming experience and spur social interaction. This motivated several design criteria:

- The game should be designed to support the fictitious connection between the game world and the physical world.

- It should support identification, awareness and social interaction between players.
- It should take different situations into account, i.e. it should recognize that different kinds of encounters call for different possibilities to interact.
- It should cultivate the player's fantasy and imagination.

With these design criteria in mind we will in this section present the *game concept* and the ability to *interact within the game*.

3.1 Game Concept

The game *Road Rager* consists of a framing story, a set of game level stories and of manipulative events automatically taking place when players are in the proximity of each other. The framing story is told when the game starts to provide the player with the story as well as an understanding of the rules and goals of the game. Game level stories are told in between manipulative events with the purpose of cultivating the fantasy of the game-play. When the game begins the player takes on the role as a character with magic powers. The goal of the game is to collect as many stars as possible. The implementation of the game currently supports that only two persons play against each other during a manipulative event. When two players are within wireless reach the game initiates a duel with the purpose to enchant the opponent. If the player manages to enchant the opponent he can trade his belongings for stars. The manipulative event ends if one player gets enchanted or if they get out of each others range.

3.2 The interaction within the game

In order to preserve the connection with the physical world during brief meetings it is essential that the player during these events can focus outside the window of the car rather than on a screen. We have partly used a tangible interface to directly link the digital and the physical world and provide a seamless method of allowing natural physical and social interaction between people [Ishii and Ullmer 1997]. In swift meetings, when the period of time for interaction with other players is limited, the player can concentrate on spotting the other player and act instantly without looking at the screen.



Figure 2: PD#1.0, PDA and Bluetooth GPS

The tangible interface is realized as a magic tool, i.e. the PD#1.0, equipped with fourteen LED's and two buttons. The LED's communicate certain information relevant for the game-play. Four of these, so-called locator LED's, inform the player about the direction to the opponent player. Ten smaller LED's, so-called power bars, are placed in two rows and are sequentially turned on and off to indicate the amount of magic power the players possess. One of the rows indicates the player's own power and the other the opponent's. The buttons are for changing tool and for firing it.

To further encourage the player to interact directly with the physical world we use sounds as feedback on the interaction. We also use it as a two-sided feedback, meaning that both players will hear audio feedback as a result of an action. The purpose is to increase the awareness and feeling of presence of the other player and to encourage social interaction.

At the same time as the real world can provide for a rich space where the game can take place it is also important to cultivate the fantasy and imagination of the game and to provide the player with proper feedback and interpretation of the game-play. Therefore we have chosen to use the screen of a PDA as interface in between different manipulative events. We use the screen to show animated stories related to the game play and to reveal the identity of the opponent character. Graphical feedback is also used for showing the result of the game-play.

3.3 Virtual Tools

The interaction during manipulative events relates to the traffic encounters in terms of direction and distance to opposing car. These design parameters are varied to enable the PD#1.0 to be turned into any of three different virtual tools, i.e. an *Electro squeezer*, a *Sludge thrower* and a *Magic wand*, and are designed to be more or less suitable for the traffic encounters previously discussed (fig. 1).

The tool that demands least understanding of the opponent's physical location is the Electro squeezer, based on neither aiming direction nor distance. This tool can be used in a battle without knowing anything about the location or direction to the opponent player, as long as being within wireless reach. It is fired by squeezing the PD#1.0. The Sludge thrower is based on aiming direction which makes it more dependent on an understanding of the opponent's physical location than the Electro squeezer. When using the Sludge thrower the locator LED's are active and indicates, if lightened, the direction to the opponent. This tool is used in the same fashion as if throwing something, i.e. the player has to move the PD#1.0 forward/ downwards at the same time as aiming it towards the opponent. The player will then hear a sound indication that something is flying in the air for two seconds and then a sound indication hit or miss. The Magic wand is the tool that demands most understanding of the opponent's physical location, being based on both aiming direction and distance. Similar to the Sludge thrower it also shows the direction to the opponent player with the help of the locator LED's, but with a twinkling light in order to easily be able to tell them apart. Additionally, it makes use of distance to the opponent player. The closer the player is to the opponent, the more powerful is the tool. The wand can be used to cast magic spells on other players. To cast a spell, the Magic wand should be swung to follow a particular pattern. This tool can only be used once during an encounter.

- *The Electro squeezer*: No demand of aiming or identification
- *The Sludge thrower*: Aiming but not identification needed
- *The Magic wand*: Aiming and identification needed

4 Mapping game manipulation to traffic encounters

The tools and the scoring are mapped to the type of traffic encounter accordingly. The Electro squeezer is quicker and easier to use than the other two tools and require no understanding of direction or identification of opponent. Consequently, the Electro squeezer is suitable for encounters that last for a very short period of time when the interaction time is very limited, such as in a sudden meeting. Additionally, it can be handy to use when it is hard to aim, such as during parts of an overtaking when the opponent is located behind the back. The Sludge thrower is a tool suitable to use at encounters that persist for a while longer such as during an overtaking or at traffic lights. This is due to the procedure of using the tool, which is a bit more time consuming than the Electro squeezer. We also imagine that the Sludge thrower could spur the players to interact socially by gestures during close up meetings such as when standing still at the traffic light. Similar to the Electro squeezer the Magic wand can be favourable to use in a swift meeting. At a good hit in closer proximity of the opponent player it is very powerful. Still, using the Magic wand is also related to a bigger risk of failing. It can for example be difficult to identify the location of the opponent player in time because of intense traffic or dense road networks, such as in a city-centre.

	Meeting	Overtaking	Traffic light
Electro squeezer	Quick and easy to use	Quick and easy to use	Quick and easy to use
Sludge thrower	Slow-bad to use	Easy to use in longer encounters	Easy to use
Magic wand	Difficult to use	Difficult to use	Very difficult to use

Table 1: Suitability of tools during different traffic encounters

The reward system is so designed so that the player would need to choose tool depending on the encounter in order to be successful in the game. The more connection to the opponent player the tool convey the more powerful it is to use. But choosing the most powerful tool is not always the best solution as it also can be very difficult to master during certain encounters. Firing the Electro squeezer is very quick and easy but has a low effect on the opponent character. The Sludge thrower is trickier and more time consuming to use than the Electro squeezer but is in the long run more powerful. The Magic wand, that requires an identification of the opponent players' location in order to be used successfully, can be more powerful than any of the other tools if fired at the right distance.

5 Implementation

The game is developed on a Pocket PC equipped with WLAN capability to enable network connection between the players. It is aware of the players aiming direction by means of a digital compass and its geographical position by means of a GPS-receiver. A Basic stamp II microcontroller controls the LED's and

the external buttons. A serial cable connects the PD#1.0 with the Pocket PC. Gaming activity between players during multiplayer events is accomplished through peer-to-peer wireless ad hoc networking, allowing connection between the players without any further infrastructure. Road Rager uses the MongerLib library in order to handle this connection [8]. Mongerlib uses a rapid mutual peer discovery protocol to quickly detect and connect the players when they meet. It takes care of transmitting and receiving information between the connected devices as well as make sure the devices disconnect properly when coming out of reach from each other.

6 Initial user feedback

An initial user test was conducted in order to discover design flaws and to observe the feasibility of using encounters as resource for the game-play. Furthermore, to get an indication if a possibility to identify other players during temporary encounters would spur social interaction and enhance the gaming experience. The test was set up to involve a total of fourteen children, seven children in the age of eight and seven children in the age of ten. The two age groups played the game separately for approximately thirty minutes. It took place in a simulated situation where three cars simultaneously drove along a preset route with two to three children in each car. This ensured encounters with other players as well as made it possible to observe the game-play. Initially all participants got an explanation of the game. The activities were video recorded and an interview was carried out after the game-play. Unfortunately the test cases turn out to be fewer and the game-play sometimes uneven because of technical problems, but there was nevertheless still valuable result that informs us about indications and flaws for a future evaluation.



Figure 3: Kids playing Road Rager

It was clear both from the interviews and from observations of the players' behaviors and expressions during the game-play that these temporary encounters created a very thrilling gaming situation. This was not just the case for the player in charge of the PD#1.0, but also for the rest of the children in the car. As these gaming events occurred suddenly and often during short periods of time it was usual that all children in the car were involved

trying to spot the opponent and to suggest what tool to use. It was also usual that the children divided tasks in between each other so that one was in charge of the PDA and one of the PD#1.0 or that one took care of the game manipulation and one of the searching of the opponent. Situation also occurred when several children held the PD#1.0 at the same time trying to help each other. Many children mentioned in the interviews that it was the searching for the opponent that was the most fun and thrilling part of the game. Equally, they also mentioned that one of the worst things with the game-play was if they didn't manage to visually spot the opponent. Another thing that they mentioned as fun was the way they could move and manipulate the PD#1.0 in order to play the game.

The tools that were most used during the game-play was the Electro squeezer and the Sludge thrower. Even though several children from the beginning had decided that the Magic wand was the most useful one they soon changed their minds. None of them got the concept of waiting until they were close up before using it, which resulted in disapproval. The tool that was generally considered as the most fun to use was the Sludge thrower, but it was often exchanged by the Electro squeezer because of the difficulty to aim during certain meetings.

7 Conclusion

We have in this paper presented a game built in order to explore our assumption that physical presence during temporary encounters would enhance a mobile gaming experience. A hypothesis when designing the game was that a possibility to identify other players would spur social interaction and enhance the gaming experience. The game concept and the possibilities to interact - designed to successfully benefit from the dynamic and vivid mobile context created during a traffic encounter, has been described. We also presented initial user feedback on the gaming experience. The initial user feedback gives a strong indication that meetings and the motion of the accompanying traffic, occurring during car traveling, can be used to create a compelling and fun mobile game experience. The user feedback also indicates that possibilities to identify other players can spur social interaction and enhance the gaming experience.

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