

Backseat Gaming: exploration of mobile properties for fun

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ABSTRACT

This paper presents a prototype developed as part of the Backseat gaming project. The aim of the project is to explore how to make use of mobile properties for developing compelling and fun game experiences. The prototype is developed for use in a highly mobile situation, that of a car passenger and is realized by the use of mobile devices and the users physical location during speed to merge the virtual content and surrounding road context into an augmented reality game.

Keywords

Mobility, augmented reality, wireless computer games, handheld computers

INTRODUCTION

Mobile games like the GameBoy have been around for many years. Basically they put the PC gaming experience into a handheld platform. Today, we also have mobile operators and mobile gaming companies, utilizing the wireless networks to bring the gaming experience to the mobile phone. Despite the changed circumstances when being mobile there are only a few examples of games that are exploiting the very novelty of mobile game technology [1]. The Backseat gaming project explores how to use mobile properties such as location, speed, direction, time, changing surrounding and occasional encounters to create a compelling and fun game experience. To do that we have chosen a highly mobile situation, that of a car passenger. The projects' target group is travelling children. Going with a family on vacation often involves hours of boredom for kids in the backseat of the car, this often result in a journey filled with distracting moments for the driver losing their concentration from the road and a lot of monotonous moments for everybody in the car. While travelling, children often play electronic games such as GameBoy. They also play traditional games that relates to the road context, like "eye-spy with my little eye", to pass away with the time. This particular game involves children spotting some object outside the car, and stating the term, "eye-spy with my little eye something beginning with the letter G". The letter "G" in this case could refer to grass, grocery store, ground or whatever. The other participants

have to guess until they give up or successfully come up with the answer.

In this paper we present a prototype developed as part of the project. The prototype uses mobile devices and the users physical location during speed to merge the virtual and the real into an augmented reality game where the surrounding road context is an important factor for the experience.

RELATED WORK

There exist many research projects that aim at bridging the virtual and the real, such as applications that augment the physical world and makes it possible for the user to retrieve digital information connected to people, places or things. One of these is Websigns from the CoolTown research program [2], which uses wireless devices equipped with digital compasses and GPS to link information on the web with physical places by aiming the device toward a specific goal. There are also some gaming projects that explores the possibilities of mixing the virtual game content with the physical space surrounding the player as for example ARQuake and Pirates! [3, 4]. ARQuake is an augmented reality game which maps the traditional game Quake onto a physical game arena. Pirates! is a mobile multi player game that except from using location for triggering events also explores the social aspects of gaming. In our research, in addition to location, we also introduce variables such as speed, direction, timing, changing surrounding, fast movement of manipulative objects and multiple entry and exits.

THE BACKSEAT GAMING PROTOTYPE

The initial prototype involves a game connected to a road outside Stockholm. During the travel the player is guided by a dwarf through a dark forest inhabited with evil ghosts. The ghosts desperately seek a map that contains information about loopholes in the universe which make it possible for the ghosts to be materialized in our reality and take over the world. This map is hidden in a chip mounted somewhere in a PDA, and is the reason why the ghosts attack the player. The game content that develops while traveling along the road has clear connections to the environment seen outside the window of the vehicle, the user will for example pass a swamp, an ancient sacrifice site, and a castle that are of great importance for the game content. Except for conveying the content the mobile device can also be used as an aiming tool and radar to catch the attacking ghosts. The user can also aim it at different

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objects along the road, such as signs and artifacts, to pick them up and thereby use them within the game.

Augmenting the Road

In this game the user is immersed in three parallel realities, the man-made environment within the car, the one outside it and the one encompassed by the virtual content. The real world passing by the vehicle acts as the world where the game takes place and is augmented with digital content, connecting the virtual and the real worlds together. These parallel realities are also connected in the opposite way where the game uses input from the real world such as artifacts and objects to enhance the game play.

Design challenges

Successful design of mobile applications such as Backseat gaming, depend on the handling of specific properties of the mobile setting [5]. In particular, we focus on context sensitivity and timing of game events. Specific parts of game manipulation will only be relevant during short time span, and when the player moves in the vicinity of a location. The narrative have to be adapted to allow different combinations of location based game events dependent on how the players enter and travels through the game. The progression of the game depends quite significantly on the speed, and hence timing is of great importance. The introduction to the game can be played out before the travel takes place, or is automatically triggered when the vehicle turns into the beginning of the road. Along the road the player will pass several places that the story of the game ties on to by triggering different location based events. These events have to be triggered in advance of the place in question and have to take into account the velocity and the direction of the car. There might for example exist various speed limits at different parts of the road or a traffic jam that slow down the speed. The speed also needs to be considered in relation to movement of manipulative objects such as the flying ghosts outside the vehicle. Other aspects that need to be examined are entry points into the game environment, that of entering the road from a point that is different then normal. The vehicle might for example enter the game from a side street, 1 kilometer into the game. Another aspect of the gameplay is, what happens if the vehicle moves back and forth, turns around and drives in the other direction or exits the game, through another side street and reenters the game, at another location, skipping some key event that normally would have been triggered.

Implementation

The Backseat gaming prototype augment the road environment with digital content to create a mixed reality combining the real surrounding with the virtual fantasy world into a compelling game. Distance has in this case been taken from a more immersed form of augmented reality using a traditional see-through head-mounted display to a more simpler form by making use of handheld mobile devices such as a context aware PDA [2]. The game is implemented on a Compaq IPAQ Pocket PC. To receive the positioning data about the users coordinates and thereby

be able to trigger different events in the game the Pocket PC is equipped with a CompactGPS card. Another important part of the game that ties the real and the virtual worlds together is for the user to be able to aim the mobile device towards a specific goal outside the vehicle. This is achieved by using a Honeywell digital compass module that provides heading, pitch and roll output mounted on the back of the Pocket PC and connected to the standard RS-232C serial port.

CONCLUSIONS AND FUTURE WORK

We have presented the Backseat gaming prototype, a game that takes into account different mobile properties to create a compelling and fun game experience. Mobile devices are used to mix the virtual and the real into an augmented reality game where the surrounding road context plays an important factor for the gaming experience. We issue timing of events in relation to speed, location, direction, changing surrounding, fast movement of manipulative objects and multiple entry and exits. Future work will involve evaluation of the architecture and the gaming experience that has been created. In the evaluation of the gaming experience we will look at how the use of mobile properties can enhance the gaming experience through connecting the virtual content closer to the surrounding reality. Our claim is that using mobile IT with location-based information can produced a more compelling gaming experience.

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