
Reducing Perceived Waiting Time in Theme Park Queues via Multiplayer Augmented Reality

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Abstract

Guests attend theme parks for entertainment experiences that they cannot experience anywhere else. These experiences often elicit physical exhilaration (such as roller coasters), sometimes in combination with digital media (such as 4D cinemas), and are almost always in a social and joyful setting. Thus, we argue that theme parks are an ideal location for pervasive / ubiquitous / mixed reality play, not only for prototyping and experimentation purposes but also as a means of introducing large audiences to novel experiences that may hint at the future of play.

Research Summary

Our research group collectively has many years of game design research. We have members from the Centre of Game Design Research¹, the Exertion Games Lab², and the School of Science (formerly Computer Science and IT)³, all three of which are within RMIT University. We conduct research projects into exergames, artificial intelligence in games, player modeling, and mixed reality play.

One of these projects, which is linked closely to the objectives of the Pervasive Play Workshop, is to investigate the use of emerging digital technology to enhance customer experiences in theme parks. In our already published work [3] we considered this in the context of the attractions themselves. There, we discussed the potential for cyber-

¹Centre for Game Design Research:

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physical systems to improve theme parks by filling a gap in an agency-structure spectrum created by the types of attractions that are often currently found within the parks. These new cyber-physical experiences would be more playful, providing some structured guidelines to foster play in a public environment while also allowing for the agency in a player's actions and strategy that most physical and digital games provide.

We have also recently provided a taxonomy of existing pervasive play research that is targeted at a water environment [4]. In this paper, we looked at research that fell within one of six degrees of water contact, ranging from being in the vicinity of water to being completely submerged. With those six degrees of water contact in mind, we discussed design considerations that had either been raised within the existing literature or that we had encountered ourselves while designing a playful experience for a water-based theme park.

In our most recent work, which is being submitted to CHI 2016 for review, we have switched our focus to an aspect of theme park experience that is one of the least pleasurable, namely their queues. Queuing times at popular theme parks can be hours long in peak seasons and, despite queue balancing technologies, are an inevitable aspect of the park. Therefore, rather than reducing *actual* queuing time, we follow the recommendations of prior work [1] in targeting a reduction in *perceived* queuing time.

Our current aim is to evaluate the impact of playful experiences on reducing perceived queuing time at theme park attractions. To do this, our objective is to create a prototype of such an experience that fulfills our currently observed design constraints. Our future objectives are to conduct user experiments with this prototype, from which we will derive a design framework that considers the public theme park

setting, as well as the the unique movement and HCI constraints in a queue.

Superpowers

William L. Raffe is a post-doctoral researcher with the School of Science, RMIT University. He is a member of Centre for Game Design Research (CDGR) and the Evolutionary Computation and Machine Learning (ECML) Group, as well as an associate member of the Exertion Games Lab. His PhD made contributions to the field of personalized procedural content generation by framing the player modeling problem as a recommendation system and the content generation problem as a metaheuristic search and optimization one. He specializes in artificial intelligence in games, including player modeling, adaptive systems, and intelligent agents. He is currently working on the research mentioned the summary above and as such is ever seeking to improve his skills and knowledge regarding pervasive play, with an emphasis on mixed reality game design.

Fabio Zambetta, Marco Tamassia, Florian Mueller, and Xiaodong Li are co-authors of the research that is summarized above. However, they will not be participating in the Pervasive Play workshop this year.

Inspirational Articles

Mandryk and Inkpen [2] provide a clear and concise review of pervasive/ubiquitous play, up to the publication date (2001). This article provides a strong discussion of the benefits of ubiquitous play, especially in relation to fostering a child's freeplay and the personal development that comes from it. Of particular note is the discussion on the collaborative and co-located nature of this type of play and the need for technologies and design principles that allow for and foster a more physical multiplayer game.

Heger et al. [1] provide an example of a queue experience similar to the one that we are envisioning. We believe it to be a good example of introducing play into an everyday environment by providing a shared digital interface that hosts a game. Guests are not required to play the game, nor is it much of a distraction if they choose to ignore it. Rather, the game is there as a form of entertainment for whenever each guest feels compelled to interact with it, which we believe to be a defining feature of pervasive play.

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