
Future User Research for Exertion Games

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Abstract

Exertion is gaining currency in digital game design. Exertion games promise increased athletic performance and hence health benefits. They also offer enhanced engagement due to the coupling of physical engagement with digital gameplay. Addressing these converging perspectives is one of the challenges currently faced by researchers. To illustrate the implications for game user research and provoke reflection about future challenges, we describe our current research on Joggobot, a flying robot companion for joggers. We present a set of questions from our work that we believe represent some of the key challenges researchers will face when considering robots in exertion games. Through these questions, we aim to support research into the future of exertion games and develop guidance for designers to create better game experiences that leverage the many benefits of exertion for players.

Keywords

Exertion games, exertion interfaces, whole-body interaction, exergames, sport, game design, jogging, running, quadrocopter, human-robot interaction

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

Exertion Games are digital games where the outcome of the game is significantly informed by physical effort [5]. The most buoyant exertion games today are enabled by console game systems such as Microsoft's Xbox Kinect, Nintendo's Wii and Sony's PlayStation Move. Exertion applications running on mobile phones that people use as part of their exercise routines are also on the rise: for example the Nike+ [1] is used by thousands of joggers who track their performance and share it with others online to engage in competitive races, such as "who ran the most kilometers this week?" Exertion games are an important area of research, as they have been applauded for their potential to offer health benefits, in particular combating weight issues, contributing towards addressing the obesity epidemic [3].

Exertion games pose unique challenges, but also opportunities for researchers interested in understanding the user experience when engaging in these play activities. Previously, we detailed evaluation methods available to researchers of exertion games, arguing that borrowing techniques and tools from both qualitative and quantitative colored disciplines such as sports, psychology and interaction design could be fruitful [6]. Combining methods may beneficially provide insights into the convergence that characterizes many exertion games in terms of their design objectives. Firstly, exertion games are meant to be engaging, as it is believed that more engaging experiences will result in increased participation.

Secondly, exertion games are meant to facilitate increased athletic performance, ultimately resulting in improved health outcomes. Although these two objectives often complement each other, experience from traditional sports suggests that physical activity is not always engaging for everyone [4]. The same could apply to exertion games, and researchers are faced with the challenge on how to address this convergence in their investigations.

Game user research for exertion games

To extend this work, we present our current position on game user research informed by explorative research undertaken in the Exertion Games lab¹. We believe that advances in technology combined with increased acceptance of robots in the population suggests that robots, autonomous embodied systems, will play a more prominent role in exertion games in the future. Robots will enable novel experiences for exertion game users, but also pose new challenges for researchers conducting research around these exertion experiences. We use an example project, Joggobot, to illustrate our thinking in this space. By pointing out the challenges and opportunities robots offer to exertion games, our aim is to a) inspire game researchers to consider robots in their game designs and b) inform game user researchers about the opportunities as well as the challenges they might face in the not so distant future.

Joggobot

Our recent research project Joggobot is an autonomous flying quadrocopter that functions as a companion for casual joggers (Fig. 1). Joggobot accompanies joggers during their runs. The aim is to transform the often

¹ <http://exertiongameslab.org>

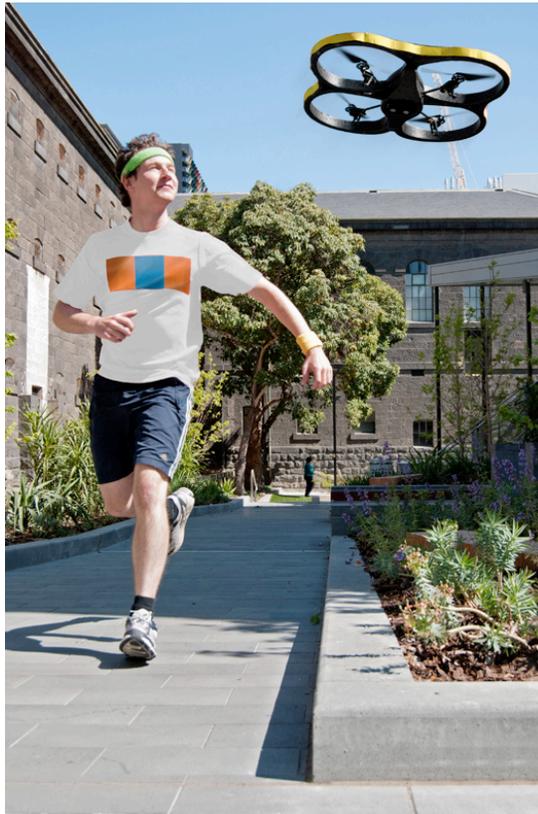


Figure 1. Joggobot – a flying robot companion for joggers

solitary exercise activity of running into a more engaging experience. Through a visual marker on the jogger's T-Shirt, Joggobot knows where the jogger is and can respond accordingly: Joggobot can speed up to motivate the jogger to run faster, it can fly next to the jogger to accompany him or her, similar to jogging with a dog, and it can perform flying "gestures" to entertain

the jogger, distracting them from the discomfort of exercise, or communicating to speed up or slow down. We are also experimenting with input from a heart rate sensor to enable the Joggobot to perform actions such as warning the participant when she/he reaches unhealthy exhaustion levels.

Our goal with Joggobot is to explore how a jogger and their flying robot could interact in order to offer an engaging jogging experience. This forms part of a larger research agenda on how robots can contribute towards more compelling exertion activities.

Although not a screen-based computer game, we see the interactions with Joggobot as a form of digital gaming. We view jogging itself as a game in which participants voluntarily strive towards a goal through less efficient means [7]. Initial observations with Joggobot suggest that participants easily engage with it in a playful manner. Future research aims to apply further insights from computer gaming research to the Joggobot experience.

Joggobot illustrating challenges for future game user research

Joggobot serves as a provocative research example to illustrate the challenges for game user researchers when considering robot interactions in future game experiences. We now highlight the challenges we encountered in our investigations to date, by framing them as stimulating questions:

- How should the robot's behavior be designed and what should the robot's role be? A coach or a companion? Could the design address both of these

approaches, and if so, how might a desired balance be achieved?

- Robots are embodied systems. What should the role of the embodiment be and how should this embodied nature be considered when conducting user research in games? Can embodiment be utilized so that it inspires, triggers, motivates and facilitates physical skills?
- People often attribute social behaviors to robots [2]. How should this be considered in our approach to user research in games, and, furthermore, exploited in the way we design these robots? Could the robot be a source of psychological support (for example by monitoring the jogger to promote confidence and security), in particular to people with motor difficulties (such as to support rehabilitation programs and special target groups like an elderly population).
- If both sports and computer gaming are considered games and play, what can they learn from each other and how could knowledge from both be exploited in our approaches to user research in games?
- Robot research is in its early days, as such, technical issues can be numerous. How we do consider this when doing user research on the resulting game experiences?

Conclusion

We have argued that exertion games are an important part of the digital game research design space, and detailed how these games pose unique challenges, and

also opportunities for user research in games. Building on this, we have used the Jogobot project, a flying robot companion for joggers, to provoke thinking on what might lie ahead for game user research in the - possibly not so distant - future of exertion games. Our intention is to open up this provocative issue for discussion.

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