

Playful Evaluation: Leveraging Games for Evaluating Ubiquitous Technologies

Mirko Fetter

Faculty of Media, Bauhaus-University Weimar, Germany
mirko.fetter(at)medien.uni-weimar.de

Abstract. In the following paper I want to motivate the approach of using Pervasive Games to evaluate different aspects of Ubiquitous Computing technology. The paper outlines the challenges of Ubicomp evaluation and shows how evaluation based on games can address some of these challenges.

1 Introduction

The nature and characteristics of Ubiquitous Computing applications, that are literally everywhere, that use multiple and diverse channels for input and output and are designed for a variety of different areas of application from the living room to the office bear a number of new challenges when these applications are to be evaluated in a normative or summative way.

Abowd [1] mentions the often frail and prototypical character of Ubicomp applications and further the challenge of evaluating these prototypes in realistic settings and environments often limited by constraints like time and costs. Furthermore, testing in classic usability laboratories seems as inappropriate and contradictory as applying the often task-centric HCI methods in order to evaluate applications that are per definition invisible, calm and interwoven in our daily activities. In this sense Ubicomp research is still lacking of canonical standards, guidelines, and Frameworks that help to achieve comparable evaluation results [2], as well as it still missing broad accepted standards and recognised paradigms and platforms for developing usable Ubicomp systems much as like the WIMP paradigm or widget toolkits help to design desktop applications. As a last issue, privacy concerns are always at hand when talking about Ubicomp. Though even if sensible data will be kept safe and secret when the final system gets deployed, user studies at early development phases will often have to work with this sensible data in order to improve the system.

In the following I want to discuss the approach of using Pervasive Games [3] as a evaluation platform for Ubicomp technologies to circumnavigate some of the mentioned challenges and shortcomings. I will give a short overview of some of the possible advantages of this method and give a more concrete example of how such an approach can look like.

2 Concept

By combining virtual and physical game elements Pervasive Games – and their multifarious occurrences as Crossmedia, Location-based, or Multimodal Games, etc. – form a new concept for providing a novel gaming experience to the user. Based on the many similarities to – what I want to call here – *serious* Ubicomp applications, Pervasive Games can help to evaluate aspects of these applications.

Leveraging games for the evaluation of Ubicomp applications gives the researcher the freedom to control multiple variables like location, the participating social entities, design of the artefacts etc. and the possibility to simulate different settings by altering the game's rules or tasks. In this way, different requirements to the scalability, accuracy, granularity etc. of what is sensed, inferred or displayed can be modelled and tested. Thereby the natural play instinct not only has the affect, that people enjoy evaluating the system, the players are often eager to win and therefore have to rely on the technology to fulfil their quests - and therefore will be very demanding testers. Some will even fathom the limits and constraints of the application by trying to cheat. In order to experience unique gaming moments, some participants might even be willing to reveal more private details than in a normal evaluation, by integrating the game in their daily life. On the other hand - if necessary - the amount of privacy invasion can be adjusted or completely reduced by adapting the level of fictionality of the game setting.

As one example I want to mention Mobile Chase [4], a location-based game developed in order to research different aspects of location-based applications and an attendant build modular Framework underneath that gave us the freedom to exchange single modules or even design completely new games. Such platforms help to sketch game scenarios that map to real world areas of applications in soft- and hardware and so help to evaluate design ideas in early phases. In the concrete example aims were to evaluate the usability of different types of interfaces (e.g. 2D vs. 3D maps) and a variety of sensing technologies and algorithms (e.g. GPS vs. Cell-ID positioning) against each other for pedestrian navigation.

Concluding I would like to say that games can help to evaluate how different technologies perform, how interfaces are really used, etc. in a preliminary stage and under conditions that come near to their later considered application.

References

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