A Serious Mobile Game for Landmark production – A Work in Progress Report

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Abstract: Serious games are defined as games with a purpose. These games serve a purpose beyond play in difference to games, whose purpose is nothing than the play activity itself. Human Computation Games, a particular form of a serious game, engage humans to solve problems, the computer cannot solve, at least today. Humans solve the problems voluntarily and with fun, because the tasks and their solution are part of a game. The Human Computation Paradigm proposed by Luis von Ahn has been implemented until today in a variety of Online Games. A well-known example is the ESP Game. Within this paper we present a Serious Mobile Game, based on the Human Computation Paradigm. Our game is a vampire role-playing game designed to support the production of landmarks for mobile navigation of pedestrians. The shift from online to mobile games, based on the players' physical movement in a mixed game world, has consequences for the design of a Human Computation Game.

1 Introduction

Designers of a Serious Mobile Game face a twofold challenge in designing the game: the serious purpose and the uncontrollability of the real world. Serious games are defined as games with a purpose. These games serve a purpose beyond play in difference to games, whose purpose is nothing than the play activity itself. A particular form of a serious game is a game, which uses principles of human computation. A well-known example is the ESP Game [Vo06]. Human computation tries to solve problems the computer cannot solve, at least today. Humans become engaged into solution finding. They solve the problems voluntarily and with fun, because the tasks and their solution are part of a game. If the feeling to be exploited for other purposes dominates the play experience, players stop playing.

Mobile Games based on the physical movement of players within a mixed game world provide their own challenges for game design. Neither the designers nor players are able to completely foresee and control the every day world, within which the game is situated. If the uncontrollability of the real world dominates the game, play becomes destroyed. The question then is, how to design a Mobile Human Computation Game?

In this paper we present Clan*destine*, a vampire role-playing game, which uses the Human Computation paradigm in the field of mobile gaming. The serious purpose of this game is the production of landmarks for mobile navigation, useful not only for this or other mobile games, but for mobile navigation of pedestrians in general. Players of this game create and execute quests, which are connected to certain places, buildings, memorials, or benchmarks of the real world. This paper is a Work in Progress Report of the study project "Drive-By Shooting"[1] of the Bachelor Study Program Digital Media at the Hochschule Bremen. We designed the game and currently develop an elementary prototype. Aiming for a deeper understanding of Mobile Human Computation Games and the conditions of generalizing our approach, we compare the core mechanics and the framing conditions of both types of Human Computation Games, online and mobile. The core mechanics of a game is the sequence of elementary steps, which a player has to fulfill at least if he strives to follow the game logic. By designing the core mechanics a game designer defines formally the play experience or in more general terms the aesthetics of a game. The framing conditions are those needed to play the game, players, environment, and devices. We compare the core mechanics and the framing conditions of an Online Human Computation Game, the ESP Game, with core mechanics and framing conditions of Mobile Human Computation Games. We start with a presentation of (2) related work and describe (3) the differences between Human Computation Online and Human Computation Mobile Games in general. In chapter (4) we present our approach in particular and discuss our experiences. We finally (5) summarize our approach.

2 Related work

Current Human Computation Games are Online Games. Luis von Ahn, who developed and published several Online Games, proposed the paradigm [Vo06, VD08]. Three formats of Human Computation Games exist today according to Luis von Ahn: Output-agreement, Input-agreement and Inversion-problem Games [VD08]. All formats follow a similar principle: a player receives information, draws conclusions, expresses them and scores in the case of a correct answer. The most well known Human Computation Game is the ESP-Game also called the Google Image Labeler. For the comparison purposes outlined above we focus on the ESP Game. Two independent players receive a picture, which they have to describe by short tags. The agreement between the independent players validates the image description of the single player. This data quality control function is not part of the single human tag act. The ESP-Game solves the problem to describe images semantically correct and improves the quality of image search results. According to Luis von Ahn "the game is fast-paced, enjoyable and competitive; as of July 2008, 200.000 players had contributed more than 50 Million Labels" [VD08].

[1] The members: Vitalij Dadaschjanz, Tolan Druckmiller, Mathis Frerich, Dennis Gieseler, Tobias Hartge, Lars Harzem, Carolin Hubatsch, Christina Hülsemann, Maximilian Jung, Kevin Kerney, Jan Küster, Sakir Özyuert, Mario Tietjen, Ellen Weber and Mario Ziegenbalg. They all contributed to the current paper. The project has been initiated by the authors of the project proposal, Barbara Grüter and Jörn Loviscach, the supervisors at the start of the project, together with Markus Krause, PhD student at the University Bremen, and Stephan Wolff, member of the research group Gangs of Bremen at the Hochschule Bremen [Gr08]. Barbara Grüter and Jörn Loviscach supervised the project during the first term Wintersemester 2008-2009. Jörn Loviscach then left our university and moved to the Fachhochschule Bielefeld.

As mobile games are based on the players' physical movement in a mixed game world, the shift from Human Computation Online to Human Computation Games must have consequences for the game design. At the project start we knew only one research group at the University of Bamberg, working on Geogames, which applied the Human Computation Paradigm to a Mobile Game, called CityExplorer [Ma07], [Ma08]. However, there are two further games, which are not Human Computation Games in the strict sense of the word, but also serve a serious purpose. In the game Treasure players have to collect virtual gold coins scattered in the game area and to upload them to the server. The players know the location of the coins but they do not know, where they will have sufficient WiFi access. They have to look for and consequently learn about the WiFi coverage of the area [BB05]. A similar game is Feeding Yoshi, where players explore the characteristics of network coverage. Feeding Yoshi is a Multiplayer Game. Players play the game intermittently while going through their daily routines of work and leisure. They are organized in teams of roundabout four players. But they do not need to stay close to each other. The game enables individual play. The game goal is "to collect as many points as possible, by feeding Yoshis the fruits they desire" [Be06]. The Yoshis and the fruit plantations having to be detected by the players are actually wireless access points. Both games have been designed to explore the different ways in which mobile games are embedded into the daily life of players. The serious problems humans solve in these cases are not problems, which computers cannot solve. – The game CityExplorer, which has been developed by the research group Geogames from the University Bamberg, is particularly designed to generate geospatial information, which computers cannot deliver at least today. The players have (A) to choose a category from a list of landmark categories: churches, restaurants etc. Their task is then (B) to traverse a predefined area, for example the inner city of Bamberg and (C) set markers attributed to those local instances, which fit into the chosen category. The marker setting process, according to Matyas et al [Ma08], consists of the following steps: "(1) take a photo of the location you want to set your marker at, (2) type in the name of the location, (3) approach the location as close as possible and (4) select the correct location category. At steps (1) and (4) the current GPS coordinate is recorded. With these two GPS coordinates the angle, from which the photo for the marker was taken, can be reconstructed." Having collected a number of markers the players upload their photos and metadata to the CityExplorer website. Then (D) a community-driven validation process starts. Each player has to evaluate the data of the other players. The player, who collected most markers, wins. There are further variations of the game, see [Ma08]. The play tests revealed: the validation process, not integrated into the game, was no fun. The authors summarized (1) Designers should leave the game area as open as possible; (2) an in-game data quality control is needed; "Here an integration into the game flow is most critical"; (3) Mobile Human Computation Games are feasible [Ma08].

At the beginning of our study project we played CityExplorer ourselves and discussed concepts and experiences with Sebastian Matyas, a member of the research group Geogames at the University of Bamberg. When we played CityExplorer, we got the impression that players knew very well that they primarily feed a database. While playing, the teams are not necessarily aware that they are contending for the win, because the feedback about the other team's state is not given during game play. This and the missing integration of the validation motivated our own approach to game design.

3 Comparison Human Computation Games, Online and Mobile

	Online	Mobile
Play activity	Imagination, vision & hand movement	Imagination, vision & body movement
Core mechanics & Data production	Identical	Integrated
Raw data	Distinct	ambiguous
Data production	Tagging & validating	Data collecting, tagging & validating
Meaningful Play	Fast, repetitive	Explorative , Fast pace or Slow Pace & UCC

Table 1: Differences between Online and Mobile Human Computation Games

Comparing Online and Mobile Human Computation Game the different framing conditions become immediately visible. The online player sits at the desk in front of the computer. The mobile player traverses a game area, on which neither the player nor the researcher is able to get an overview. The online player has a static and reduced environment. He is enabled to fully concentrate on the play action. The mobile player focus on the play action while at the same time taking into account the changing context, the traffic, and bystanders. In short, the framing conditions of the online game assure the abstraction of the player and the solely focus on the play actions. The framing conditions of the mobile game change in an unpredictable manner. The player constantly has to generate the abstraction himself (see also, [Mo05], [Ko07]). Comparing the core mechanics of both game types further differences emerge. The play activity of the online player is characterized by the players' imagination, his vision and hand movement. The play activity of the mobile player is characterized by his imagination, his vision and body movement. The raw data the online player has to deal with are reproducible images. The raw data of the mobile player the landmarks are ambiguous phenomena. Consequently the data production of the online player consists of tagging and validating, while the mobile player additionally has first to collect the raw data, and then to tag and validate them. – The repetitive game mechanics of the Human Computation Online Games is not applicable to Mobile Games. Applicable are the cognitive functions deployed by the mechanics. Cognitive functions like identification or recognition, comparison, labeling, and validation are general. But the way they work is fundamentally different. Cognitive data production and the core mechanics of Online Human Computation Games are identical actions. This is different for Mobile Human Computation Games, as we will see.

4 Our approach: integrating mobile play and serious purpose

4.1 The game Clan*destine*

The player takes the role of a vampire. She accepts and accomplishes quests and thereby earns good, skills and reputation. As common in role-playing games, the quests tell stories, have to be developed by the players themselves and can be combined into larger-sized campaigns. The player belongs to a clan that has certain features, which provide its members with abilities but also drawbacks. So by picking the membership to a clan, the player defines a part of the character he plays, including a set of the vampire abilities. A clan supports its members and provides them with a minimal amount of blood that guarantees the survival. At the same time, the use of vampire abilities consumes blood. If the player wants more blood, she has to fulfill quests that bring blood as a reward.

The clans, among themselves, have complicated relationships and background stories, but all in common that they try to hide their actions from humans. So the vampires have to stay undiscovered while undermining the human society. Since the clans struggle for influence in the underground, the player's actions have an effect on the balance of power. For example it is possible to gain dominance over a district and thereby exploit the local establishment, like banks or hospitals.

4.2 The core mechanics integrating play and serious purpose

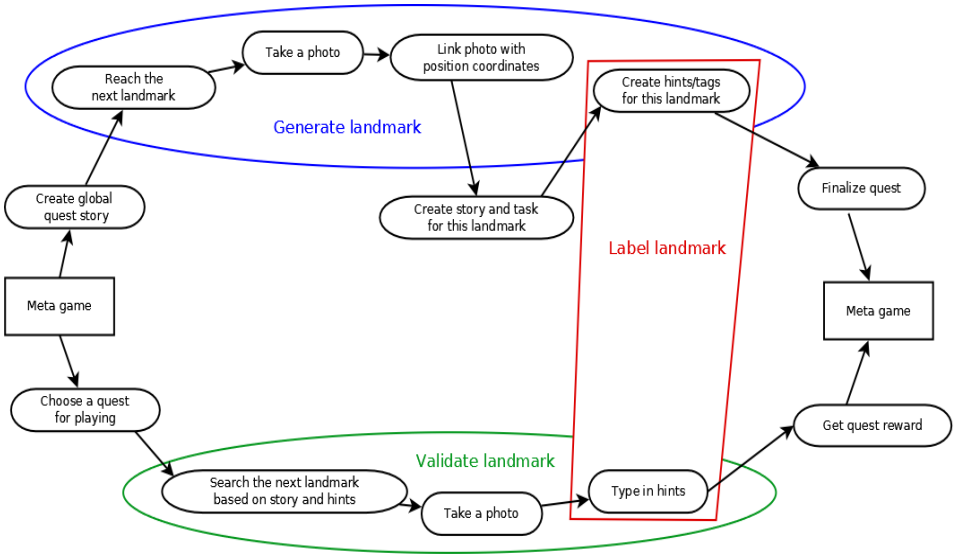

Figure 1: The Core Mechanics of the Role-Playing Game Clan*destine*

The core mechanics of the game Clan*destine:* The player develops a quest. He traverses the area and chooses a place, a building, a memorial or benchmark of the real world. He takes a photo and the coordinates and describes it with tags. The quest is developed in the form of a riddle, the other players have to solve (see Figure 1).

The character starts at any place he wants looks for nearby quests provided in a form of a list with short descriptions. He chooses a quest and starts to solve the entailed riddles. At first he must find the location. Assuming, that he is at the right coordinates, he takes a photo and tags and gets the appropriate feedback. If he succeeds in solving the riddle for the location, he has to fulfill a task that is located there, for example a fight with a creature. After that, he gets one further snippet of the quest (see Figure 1).

To ensure that the geospatial information generated by the players fits into the everyday world, we designed a Janus-faced game world, consisting of the world, as we know, and the vampire underground. If we would have created e.g. a fantasy world without any overlapping with the real one, there would have been a certain risk: Players could change the meaning of landmarks according to the altered meaning in the game world. As a result, the collected information would be of no use to an outstanding person.

Designing mobile human computation games, we have to take into account the changing framing conditions. We developed a slow pace, explorative and detail-focused game. These characteristics are typically covered by a role-playing game. Cognitive data production and the core mechanics of this game are different. All cognitive actions of data production are play actions. But not all play actions are functions of data production.

5 Conclusion

Designers of a serious Mobile Human Computation Game risk the playability of their game if they let the serious purpose dominate and at the same time ignore the context of mobile game play. From the perspective we have developed in our project the concept of repetitive core mechanics is not applicable to Mobile Human Computation Games. The changing context requires play activities that are more open, more flexible, more adaptable to unexpected circumstances and as such not reducible to repetitive mechanics. In contrast to the Human Computation Games that Luis von Ahn proposed and that exists currently, our game is not fast, and not repetitive. Like the most role-playing games, it will require some time to get acquainted with and consume time while playing. This is a certain drawback. It may reduce the target audience, but the remaining one will, with some certainty, be one that is enthusiastic and take the game seriously.

A role-playing is of course not mandatory. A fast casual game should be possible too. But solely repetitive mechanics will not work for a Mobile Human Computation Games at least as far as we have learned.

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