

Player feedback evaluation: indicating mass public potential for pervasive games

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Abstract. Player feedback data was collected for the pervasive game “Meet Your Heartbeat Twin”, an event-type LBS (Location-Based Service) game including affective computing through the player’s live heartbeats. Correlation analysis of the data demonstrates broad client profile for pervasive games, covering age, gender and hobbies. The data also shows that Urban Games are clearly a novel experience; they are not an extension neither from video games, nor from mobile phone casual games. Surprisingly, the online sharing of the player’s very personal data, player’s location and live heart rate was not perceived as a critical issue at all. As expected, game control is crucial: to have fun, players need some adaptation time for GPS orientation and this even for a very low level complexity of mobile phone usage.

Keywords: pervasive games, ubiquitous games, urban games

1 Introduction

Pervasive games are a new kind of games that are played in non-dedicated places and at times that can cover any moment in life. The game world combines both, virtual as well as real world objects, places and people: we define pervasive games as *games that rely on the ambiguity between real world and game universe* [1,2]. Various sensors and actuators constitute the interfaces between the real world and the game universe. These sensors and actuators are often linked through the mobile phone to internet, making the mobile phones the actual technological driver of pervasive games.

In the last decades the mobile phone has become a mass consumer product, even a necessity in human’s daily life. In addition to communication, its functions now embrace location-based services, context aware services as well as entertainment. By 2010, Nokia expects 50% of their telephones to be equipped with GPS (Global

Positioning System) sensors [3]. This popularization of GPS, together with flat rate data billing plans will dramatically boost the number of potential pervasive game players. The only remaining limit will be the creativity of the pervasive game studios.

Although the “killer app” in pervasive games has not emerged yet, several pervasive games have had a big success: “Geocaching” [4], which allows the search of real treasures by GPS, “Botfighters” [1], which offers locating and “destroying” other players on the streets, and “Mogi-Mogi” [1], which invites to collect virtual treasures spread around in the city.

For the moment the criteria for successful pervasive games are barely known. The fact that pervasive games overlap with everyday life of the gamers, approaches their gameplay rather to strategy games than to action games. Pervasive game scenarios have to deal with unpredictable individual and social behavior, with simultaneous involvement of the player in several tasks, some in the game, others related to his daily life [5,6].

So as we glimpse into the near future, the following question arises: who will be the players of the pervasive games? This paper reports an empirical study on the player profiles of the pervasive game “Meet Your Heartbeat Twin” [7]. The results open a promising perspective on a potential mass public market for pervasive games.

2 Description of the game “Meet Your Heartbeat Twin”

A typical “Meet Your Heartbeat Twin” (MYHT) session comprises around 10 players who are equipped with heart rate sensors and GPS. A game session lasts around 20 minutes. Every participant sees a geographical map of the game area on his or her mobile phone that indicates the positions of other participants with the same heart rate as the holder of the mobile phone. The positions of the participants with different heart rates are invisible to the player. The aim of the game is to physically meet a person with the same heart rate. The challenge is that by approaching a heart rate twin, one’s heartbeat might change either due to physical effort or to emotional arousal. New players will appear on the player’s map because his heartbeat now matches theirs.

Game spectators can follow the game session on a giant screen, on which the game map with the totality of the players’ data is shown. Thus, the spectators have full and live access to the emotional and geographical dynamics of the game. Once the game is over, a next group of around 10 persons takes turn.

Concerning the technology of MYHT: Bluetooth connects the sensors to the respective mobile phone. Client and server code are written in JAVA using the mobile phone game middleware GASP [8].

3 Data collection

Data collection for this study was done during two different events. The first event was the digital art festival “LeCube” that was held in Issy-les-Moulineau/France in

July 2008 [9]. In order to solicit common citizens to participate at the projects, the festival was free of charge, mainly held outdoors and spread out over the city center. 15 game sessions of MYHT were played.

The second event was a popular neighborhood gathering in Paris. A citizen association that organizes regularly such events in the 2nd arrondissement in Paris, invited us to present MYHT and install a game counter in July 2008. MYHT was announced in the local press [10], 3 game sessions where played.

We asked the players to fill out the questionnaire after they had participated at the game session and returned their equipment. About 80% of all players were willing to spend about 5 minutes to answer the 17 questions, i.e., 83 in the first event and 13 in the second event. The number of 96 responding participants ensures strong power of the statistical analysis.

The multiple-choice questionnaire consisted of two types of questions; the ones related to the player's profile and the others related to the player's opinion about the game. In the next section, we will present the frequency distributions of the players' parameters (profile and opinions) and statistically analyze the relations between them. All statistical data analysis was done by SPSS. The level of statistical significance was defined as $\alpha = 0.05$. This means that the error probability is smaller than 5 percent. In cases where we emphasize the result of no-difference or no-correlation, we required $\alpha = 0.10$.

4 Results

We handle the data from the two events in one single data pool. Where we report numbers, we present percentages, but all statistical analyses were done with actual frequencies.

4.1 Player profiles

The available data comprises age, gender, residence, interests, and GPS experience.

In terms of age, the players were between 12 and 62 (Figure 1) with a median of 25 years.

It may not surprise that the game attracted primarily younger participants. But it is especially noteworthy how many participants of the second half of the life-span were attracted by the game too.

The gender distribution of the players was near to even, with a slight preponderance of female participants: 55% women vs. 45% men.

In order to identify the place of residence, the player's postal code was asked for. For further statistical interpretation, however, only two categories were retained: urban with 52% and sub-urban with 48% of the players.

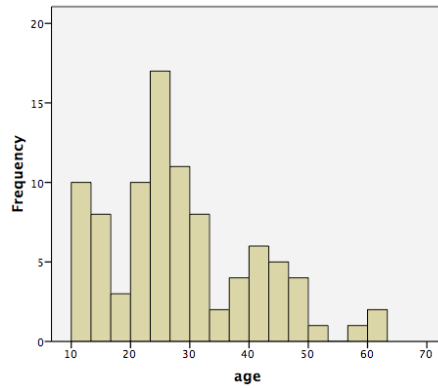


Fig. 1. Age distribution of participants.

Two questionnaire items covered the players’ interests, i.e., their preferred activities or hobbies and the type of games they usually play (Table 1). For both questions, several choices were proposed, each choice could be answered by “yes” or “no”.

Table 1. Interest: (a) Preferred activities, (b) Games usually played

Preferred activities		Games usually played	
movies	65%	social games	41%
theatre	43%	console games	43%
sports	30%	mobile phone casual games	14%
strolls	45%		

Table 1b shows that social games and console games are more frequent than the more modern mobile phone casual games. It is remarkable that our MYHT game attracted many participants who by far do not appear as game freaks. Pervasive games seem to offer something that also attracts new segments of game consumers. Geographical orientation skills and prior use of GPS help the gamers to understand the graphical interface and the control of the avatar position. This is why we added a player profile question in order to distinguish prior GPS users from novices. 14% of the players had previous regular GPS experience, 86% did not.

4.2 Player opinions

Most of the opinion questions offered Likert scales allowing a choice among 4 degrees of agreement with a given statement.

As Figure 2a shows that 91% of the participants liked the game very much (70%) or rather much (21%), and only 1 participant did not like it at all.

In order to find out whether the players of a certain group like the game more than some other group, we analyzed the correlation between the opinion answers and player profile.

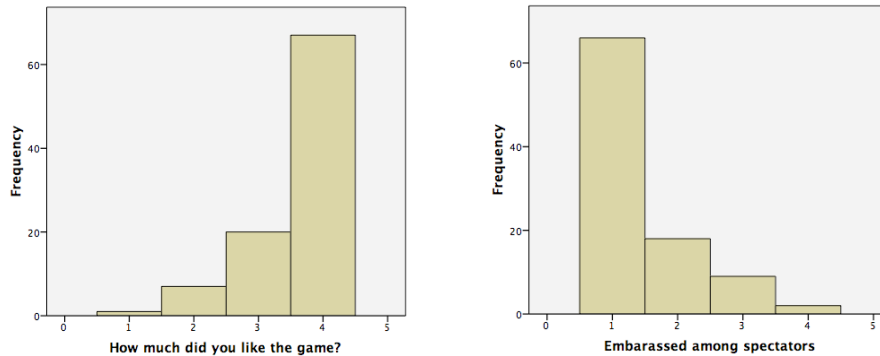


Fig. 2. a) Frequency distribution to the question “How much did you like this game?”. b) Frequency distribution to the question “Did you feel embarrassed to play among non-participant spectators?”

Age: In order to enhance the power of the analysis, we compared those of age 25 or younger with those of age 25 or older. The analysis yielded no statistical significance ($t = 1.15$; $df = 60$; $p = 0.25$). An additional analysis with all participants also yielded a non-significant correlation between liking and age ($r = -0.07$; $p = 0.52$). This is an important finding: Pervasive games are attractive to both, young and older users. A similar game, “GO!”, by XiLabs and Visual System was staged in a public park in Shanghai and we found equal success for young university students during the weekends as retired seniors during morning weekdays.

Gender: There was no significant difference between female and male players ($t = 0.62$; $df = 90$; $p = 0.53$). Apparently, men and women like pervasive games equally well. As with MMOGs [11] and social games [12], it seems that pervasive games find its prospective clients equally in men as in women.

The hobby preferences did not influence the liking of MYHT either (all p 's > 0.50). This finding indicates the independence of pervasive games as a new type of game: they are neither video games on mobile phones, nor sophisticated casual mobile phone games.

How difficult was this game to play? 75% of the players found the game “very easy” (18%) or “rather easy” (57%). Players with prior GPS experience surprisingly did not find the game easier than players without prior GPS experience. However, comparing mobile phone game users with those not used to mobile phone games yielded a sizeable difference in easiness, i.e., 3.23 vs. 2.85 ($t_{\text{one-sided}} = 1.82$; $df = 92$; $p = 0.04$). Although MYHT game interface was set up to avoid any difficult telephone manipulation: playing uses a single button, it still seems to need some training to be played by anyone.

As the game was played in public and under the eyes of non-playing spectators, we asked the players whether this made their participation uncomfortable. According to Figure 2b, 70% of the players felt “not at all” uncomfortable. This was equally valid for both genders, both age groups, and for mobile phone gamers vs. mobile phone non-gamers (no significant differences, $p > 0.10$ in each case).

There could be another reason for feeling uncomfortable, namely publicly sharing a personal attributes like the heart rate. Data analysis suggests that this is not the case,

the answers to a further question showed that 84% of the players felt “not at all” uncomfortable.

5 Conclusions

MYHT investigation shows that pervasive games are clearly a novel experience; they are neither an extension from video games, nor an extension from mobile phone casual games. With the pervasion of 3G/GPS into the general public, pervasive games are being transformed from elite media into mass media, with possible attractiveness to broad player profile, including age, gender and hobbies. The extension of the magic circle is a crucial feature of pervasive games [13]. It seems that it is also the very same characteristic that makes it attractive to players: players love to play in the middle of their city, in the midst of non-players.

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