CityExplorer – Geographic Data Acquisition by Extending the "Magic Circle"

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1. Abstract

Games are often perceived as deliberately unproductive activities set apart from other activities of our daily life by spatial and temporal confinement and by specific rules of social interaction. With the introduction of pervasive and especially location-based mobile gaming, however, the spatio-temporal and the social borders of games – the "Magic Circle" of Huizinga (1971) – have been transgressed repeatedly. Game play and everyday activities start to merge. We propose to challenge another traditional feature of games, namely their unproductiveness. We argue that game play can produce goods and services that are valuable outside of the actual game without affecting the attractiveness of the game. As an example we describe the Geogame CityExplorer. Three case studies are presented in which we show how semantically enhanced geospatial data can be generated during the course of the game. Such data is of value, for instance, in location-based services or navigation systems. We conclude with an evaluation of quantitative and qualitative aspects of the data acquired while playing.

2. Introduction

"We authors, over the years, have felt many pangs of conscience as too much time is spent on games, wasting good effort on something largely unproductive." In writing this sentence, Peltola and Karsten (2006) express a widely shared feeling about game playing. They go on, however, by making clear that "playing in general is necessary part of the experience of meaningful life". This statement is their conclusion from the opening chapter of the seminal "Homo Ludens" by Huizinga (1971, originally from 1938). Huizinga identified several formal characteristics of games including spatial confinement which games share with magic rituals that are bound to a "magic circle". The picture of the "magic circle" became prominent in the gaming community through the work of Salen and Zimmerman (2004). Huizinga states that games and play are explicitly defined by the space within which they take place, the time a game or play lasts and the rules that are active during the game/play. Participants of a game must freely agree to these changes in their ordinary life to be part of the game or play. Further he says that no material interest is connected to it and no profit can be gained.

Similarly, Caillois (2001, originally from 1958) states in his definition of games or play – which distinguishes more clearly between games (*ludus*) and (free) play (*paidia*) – that these are unproductive human activities. They create nothing of value outside of the game. Both, the definition of Huizinga and that of Caillois, were formulated to define games (and play in general) before the digital age. So it is not surprising that Aarseth (2001) argued for the creation of a new field of game research. His main argument is that modern video games are not comparable with traditional games, mainly due to their simulation aspect. Nevertheless, almost all of Huizinga's formal restrictions still apply to video games. For example, a video game is spatially bounded with the player sitting before a screen. The video game lasts from a few minutes to a few hours and is always played according to the rules implemented into the game. Unproductiveness seems at least as much a feature of digital games as of classical board games.

With respect to pervasive games we adopt the definition proposed by Montola (2005) being aware of the criticism that Brown (2007) and Nieuwdorp (2007) have expressed. Montola holds that pervasive games are those games that violate at least one restriction of the definition of Huizinga. In other words, either the spatial and temporal confinement is broken up or the social consensus is missing to the effect that players no longer need to explicitly agree to take part in the game (see also e.g. Poremba 2007 or Harvey 2008). Note that technology plays no role in this definition. As a consequence, outdoor games like "Hide and Seek" or Live Action Role-playing Games (LARP, see e.g. Copier 2005 or Stenros et al. 2007a/2007b) can be seen as pervasive games. With this definition in mind we investigate a special kind of pervasive games: location-based mobile games. These games may transgress the "Magic Circle" with respect to any dimension Montola mentiones. Generally, the requirement of spatial confinement is relaxed as the movement of the players is a necessary part of these games (Kiefer et al., 2006).

In this paper we explore an additional possibility to extend the "Magic Circle", namely by producing a valuable good during the game play which is useful long after the game has ended. In our case, the good is constituted by semantic enhancements to geospatial data, which is used by location-based service. Data acquisition has been identified as a potential field of application for location-based mobile games, but the idea has never been put into practice (Capra et al., 2005 and Peltola and Karsten, 2006). Following a suggestion made by Matyas (2007a) we describe the Geogame "CityExplorer" in which players localize geographic points of interest and categorize them semantically. From non-mobile games it is known that semantic categorization tasks can be successfully addressed by communities of players. A prominent example is the ESP game, a kind of competition about the correct tagging of images in the web (von Ahn & Debbish, 2004).

With three use case studies, two in the city of Bamberg (Germany) and one in the city Yokohoma (Japan) we intend to bring an answer to the following questions – besides looking at the fun factor of such games:

- What quantities and qualities of geographic and semantic data can be reliably acquired by using CityExplorer?
- Are players of location-based mobile games willing to share their collected data? Are there privacy concerns?

The rest of the paper is structured as follows. We will show in section 3 how location-based mobile games extend the "Magic Cricle". Section 4 introduces the Geogames framework and gives a short explanation of the balancing problem found in Geogames like CityExplorer and how it is used to integrate data acquisition tasks into the game play of CityExplorer. The CityExplorer game is presented in detail in section 5 as an example of a location-based mobile game that extends the "Magic Circle" to generate a valuable good. A short overview of the architecture of the game system is given and two use case studies are described together with a first evaluation. Finally, in section 6 we discuss our results and give a brief outlook on further research directions.

3. Location-based Mobile Games extending the "Magic Circle"

Some sort of mobile device and some type of localization technology form the basis of any location-based mobile game. In principle, this makes it possible to gather primitive geospatial data like raw GPS tracks with any such game. Matyas (2007a) showed that a huge amount of qualitative data can be collected while playing a game. His evaluation showed that data of the amount of the road network of the city of Bamberg could be acquired in around 74 hours of game play. His study is based on the Geogames CityPoker and GeoTicTacToe (see for both e.g. Kiefer et al., 2007). Both games are event-based games that last only a relative short period of time (one to two hours) and take place on a citywide game board at maximum.

Such traditional location-based mobile games – other examples are Can You See Me Now (Benford et al. 2006) or Human Pacman (Choek et al. 2004) – have the disadvantage that they have to be carefully organized. Especially the game board has to be set up in advance which means that someone for example has to hide game objects there or record GPS coordinates for all game relevant locations. This reduces the data acquisition ability of these games in two ways. Firstly, the amount of data collected during the course of the game is limited by the short time span of the game. Secondly, the kind of data is limited to GPS tracks or positions of localization units (like WiFi hotspots) because all the other game relevant locations are already localized by the game organizer before the start of the game.

Seamful games (see e.g. Chalmers et al. 2004, Barkhuus and Chalmers 2005 or Broll and Benford 2005) try to avoid the organizational effort by the fact that they define the game board as little as possible. Players explore the game area without knowing in advance how it looks like. For example in Treasure (Barkhuus and Chalmers 2005) players have to pick up coins that are randomly scattered in the game are and upload them to a server. Although players know the location of the coins, they do not know where they will have WiFi access – and how good it will be – to upload their coins. Consequently they learn the WiFi coverage in the game area wail playing the game.

Few location-based mobile games proposed in the literature (see e.g. Bell et al. 2006, Peitz et al. 2007, Flintham et al. 2007 and Drozd et al 2006) have been highlighting the fact that such games can provide slow-paced game play that lasts over a long period of time – from days to months. Such games offer players the possibility to play only for a few minutes per hour or even only a day and still be successful in game play terms. These games do not only extend the "Magic Circle" spatially but rather temporally, so that a seamless interweaving into daily activities becomes possible (Bell et al. 2006). But the problem of the limited types of collectable geospatial data remains.

Another approach to tackle this problem can be found in Casey et al. 2007. In the Gopher Game players can build small mini games or missions (like in Chen and Benford, 2007) that other players carry out. If successful both players get points for it, the one who came up with the mission and the player who accomplished it. The game builds upon the Hitcher framework of Drozd et al. (2006) and so the intention is that the players would generate location-based missions in the first place. But as the whole set up falls more in category of *paidia* (Caillois, 2001) it is not surprising that the evaluation of the missions showed that only a small fraction were actual location-based. Most missions produced were of the kind "take a photo of your stinky feet", that is, missions which could be played comfortably from home while e.g. lying in the bed or sitting on the coach.

To avoid such problems, we propose a location-based mobile game that falls in the *ludus* category of Caillois (2001) definition of games. In the Geogame CityExplorer the location-based part of the game is integrated in the rules and not optional like in the Gopher game. It also uses elements of the seamful design approach for location-based mobile games and is especially designed to be played for a relatively long period in time. But before we take a closer look at CityExplorer we shortly introduce the Geogames framework that forms the theoretical background for it.

4. The Geogames Framework

Locomotion plays an increasing role in the game space (Benford et al. 2005). However, it is still not completely understood how the physical challenges (locomotion) of a location-based mobile game interact with the strategic elements (reasoning) and how each contributes to the game playing experience. The Geogames framework presented in Schlieder et al. (2006) has been designed to systematically explore that issue. This framework enables a game designer to turn almost any classical board game or card game – together with its specific form of strategic reasoning – into a location-based mobile game.

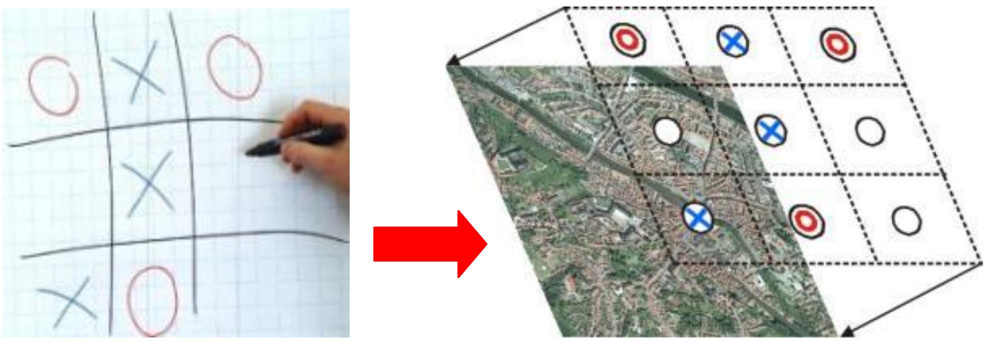

Fig. 1: Transformation of TicTacToe into the Geogame GeoTicTacToe

The simplest example of a Geogame is GeoTicTacToe (Schlieder et al., 2006). It is a location-based version of the board game Tic Tac Toe. In the classic board game two players set their markers - normally X and O signs are used – on a 3x3-square game board (see left side of Figure 1). Whoever manages to set three of his markers in a column, row or diagonal line wins the game.

GeoTicTacToe adopts these rules but transfers the game play into the real world. The spatial version of the game board consists of nine locations (GPS coordinates) found in the real world game area defined by the organizers of the game (see right side of Figure 2). Additionally two starting locations for the two players have to be defined. In contrast to the original game players of GeoTicTacToe do not set their markers in a consecutive order. The game is played in real-time, so that a player can set two or more markers before his contrary manages to set one of his own.

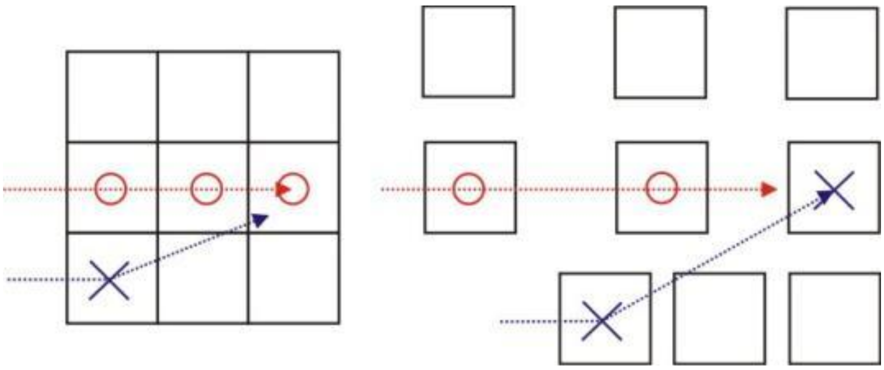

Fig. 2: Problem of balancing speed differences and a geographic solution

It is obvious that such a game gives an advantage to the faster player. Even if the speed difference between the two players is only marginal, the faster one is always able to set three markers in a line before the other player has a chance to prevent him (see Figure 2, left side). It is no wonder that such a game play will be seen as unfair by a majority of players. But how can we alter the game play of GeoTicTacToe without introducing the turn-based game play of the original?

One solution is quite easy to find: a geographic one. Here the faster player is handicapped by having to cover a longer road distance between two game board locations than the other. But the organizational effort is too high. First of all some kind of pregame event has to be taken out to find out who the faster player is and consequently will be handicapped in the actual game play. Second appropriate real world locations must be selected that have the right distance to each other according to the speed difference of the players. But not every real world game area will feature an environment where such a geographic constellation of game locations is possible.

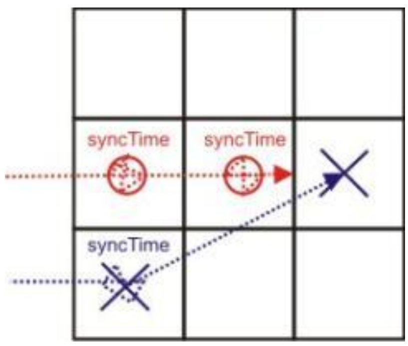

Fig. 3: Temporal solution with the syncTime interval

Schlieder et al. (2006) proposed quite another solution for the problem of balancing real-time location-based game play, a temporal one. To compensate a minor physical advantage of the faster player, players have to spend some predefined time period – called syncTime – at a game location in order to perform an game action there. In GeoTicTacToe for example the players have to wait until the syncTime interval is over before their marker is set and they can move on. Now this syncTime interval makes it possible for the slower player X in

Figure 3 to safely prevent player O to set his third marker in the second row. Note that the synchronization time does not prevent – and is not intended to do so – that a player can manage multiple markers consecutively. But it prevents that the game converts to a pure race game where the strategic decisions of the players are not irrelevant.

To compute the syncTime interval for any kind of Geogame Schlieder et al. (2006) use a variant of the classic MinMax-algorithm. It can be set up for different speed differences and for different game board constellations – see Kiefer and Matyas (2005) for more details on this subject. This special synchronization mechanism also permits the seamless integration of edutainment content (Kiefer et al. 2007).

It is not necessary that the syncTime is realized as plain waiting time. In CityPoker (Kiefer et al. 2007) for example players are forced to answer a quiz and then search for physical poker cards in the game area in order to change the found poker cards with cards from their starting hands. We will see in the following the integration of another type of activity into the synchronization slots of the Geogame CityExplorer, namely a playful data acquisition task. The game was first sketched in Matyas (2007a) as a theoretic design example to illustrate game design patterns to incorporate data acquisition tasks into location-based mobile games. We will see in the next section how this idea is put into an actual game. Out of space limitations we will not go into detail how to compute the syncTime for CityExplorer and focus more on the game design aspects. The more interested reader can think of CityExplorer as just a finite number of GeoTicTacToe games played after one another (see Figure 4).

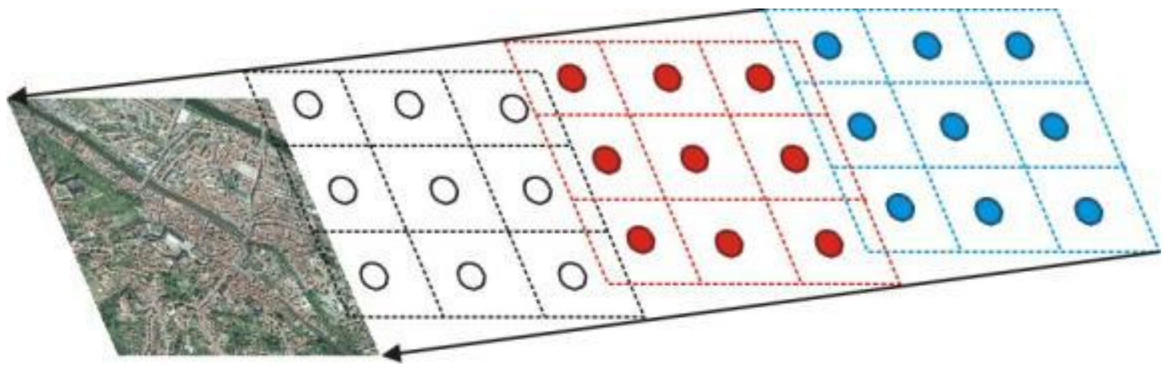

Fig. 4: CityExplorer seen as a consecutively played series of GeoTicTacToe

5. CityExplorer – towards a more slowly paced game play

The idea for the Geogame CityExplorer was inspired by the popular board game Carcassonne, originally designed by Klaus-Jürgen Wrede[1]. A game of Carcassonne always starts with a single tile of the fragmented and hidden game board. Players take turns to draw a new tile and lay it down to extend the land of Carcassonne. Then, they have the choice to place one of their game tokens (followers) on the tile just dropped. Followers can only be placed on specific location categories for example on streets, cities or on the cathedrals to control them. A player gets points for the location types their followers hold in control. Once all tiles are laid down, the final scoring takes place. The player with the highest score wins.

CityExplorer adopts the main game idea of Carcassone and relocates the game play in the real world via mobile devices and GPS technology. It can be played anywhere in the world by a theoretically infinite number of players. The game consists of an online component and a real-world offline component (Figure 5).

[1] http://www.carcassonne.de/, German only

Fig. 5: CityExplorer game board at the start of the game and sometime during the game, after players have uploaded recorded markers (scenes taken from the 1st test game in Bamberg)

The goal of the game is to seize the most of real-world locations in the explored real-world game area by placing virtual “followers” to them. Placing these markers is only valid on predefined types of real-world locations, as in the original. For example, players could be allowed to place their followers only to churches or beer gardens found in the game area. As hinted by the name “CityExplorer”, the game is designed to be played in a city as there are typically more interesting location types to be found.

The online component of the game[2] handles the game and player management. After registration, players can start new games or join existing ones in any region of the world. Before a round of CityExplorer, the players choose the set of real-world locations game markers are allowed to be placed to. This online pre-game phase is necessary to guarantee fairness. Some players may know the position of beer gardens better than others, who in return may have visited a few more churches recently. To balance such different knowledge levels, players are asked to choose an equal amount of preferred real world locations categories.

After all players have chosen their preferred location types and agreed with the play time, they download the mobile client on their GPS-capable mobile camera phone and start exploring. To set a virtual marker on the real-world game board, they must take a representative photo of the location they placed their marker to. Since the positions of the game-relevant locations are not known before the game, the verification of marked locations cannot be automated by the game software.

All set markers are to be uploaded to the online management platform. The players judge the correctness of the token placement of each other manually by reviewing the corresponding photos and marker positions on a Google maps component (see Figure 6). If a marker is judged to be wrong by one player, the owner of the marker has the possibility to adjust it – the coordinates, the location type (category) as well as the photo – and get it count in the final scoring, as long as the game is still running.

To add strategic depth to the game play and simulate the tile-based game board of the original, the real-world game board is divided in non-overlapping regions – also called game board segments. Players explore these segments and place their markers on valid locations within them. The player who holds the majority of markers in such a region claims the domination of it and gets points for it at the end of the game. Additionally, players get points for placing the most markers to one valid type of locations on the entire game board. Consequently, in order to win the game player must not only keep the marker count in the different game board segments in mind but also which player currently is leading a location category. As game time is limited the players have to wisely choose which type of marker to set where on the game board. When the game time is over, which can vary from

[2] www.kinf.wiai.uni-bamberg.de/cityexplorer/

one day to several months – just as the players who started the game round chose – the player who has gathered the most point’s wins.

Fig. 6: A Wizard was used to help judge the players the validity of uploaded markers

CityExplorer is a game primarily designed to be played over a longer period of time – for the use cases we chose for example a game time of a full week. Therefore it is not likely that the player would understand that they have to wait a predefined period of time every time they set a marker. In order to indirectly integrate the syncTime interval in the game flow players start a CityExplorer game with a completely empty game board – the game board is just structured in non-overlapping squares as explained above. The players have consequently to invest time to search the game area for appropriate locations – at least for those categories of the other players. Then taking a photo takes additional time. These two game mechanisms are sufficient enough to solve the speed balancing problem and prohibit a player to run through the game area and set much more markers than any other player.

5.1 CityExplorer system overview

The core application of CityExplorer is based on a mobile phone application that makes it possible to take georeferenced photos with the help of a GPS receiver and semantically annotate the photo. Supported are build-in GPS receivers or external ones that can be connected to the phone by Bluetooth. The game uses an offline and an online component so that some form of communication between the two is required. Due to high data traffic costs in mobile phone networks - at least in specific countries (like Germany) - we support two scenarios to upload data from the mobile phone to the server.

The first scenario we came up with was the realization of an indirect upload mode to make an asynchronous game play possible. In this mode all game play data is stored on a memory card in the mobile phone. To upload your set markers you have to take the following steps: (1) Connect the mobile phone to a personal computer, (2) copy the taken photos and the corresponding metadata file to the hard disk and (3) use a web interface to finally upload the photos and the metadata file to the server (see Figure 7, top). Although this might seem a little cumbersome, the fact that CityExplorer is a slow-paced game reduces the reservations on the player side. The current state of the game can be downloaded and copied to the mobile phone to have a better overview of the course of the game while on the streets.

The second scenario that was realized for the Japanese test game – thanks to a wide spread availability of data flat rates there – was a direct upload of all game play data from the mobile phone to the server. This has the advantage that the players don´t have to manually move the files from the mobile phones to their computer and then to the server (see Figure 7, bottom). It makes also a more synchronous game play possible, because players can then look up the current state of the game any time they are outdoors.

In both scenarios the photos and metadata information will end up in a database on the server. We used a PostGres database with the PostGIS extension due to their ability to provide spatial data structures, like the point positions we use for the marker and the position of the photographer. It gave us also the ability to easily set up spatial queries like looking up every feature within a specific region or bounding box.

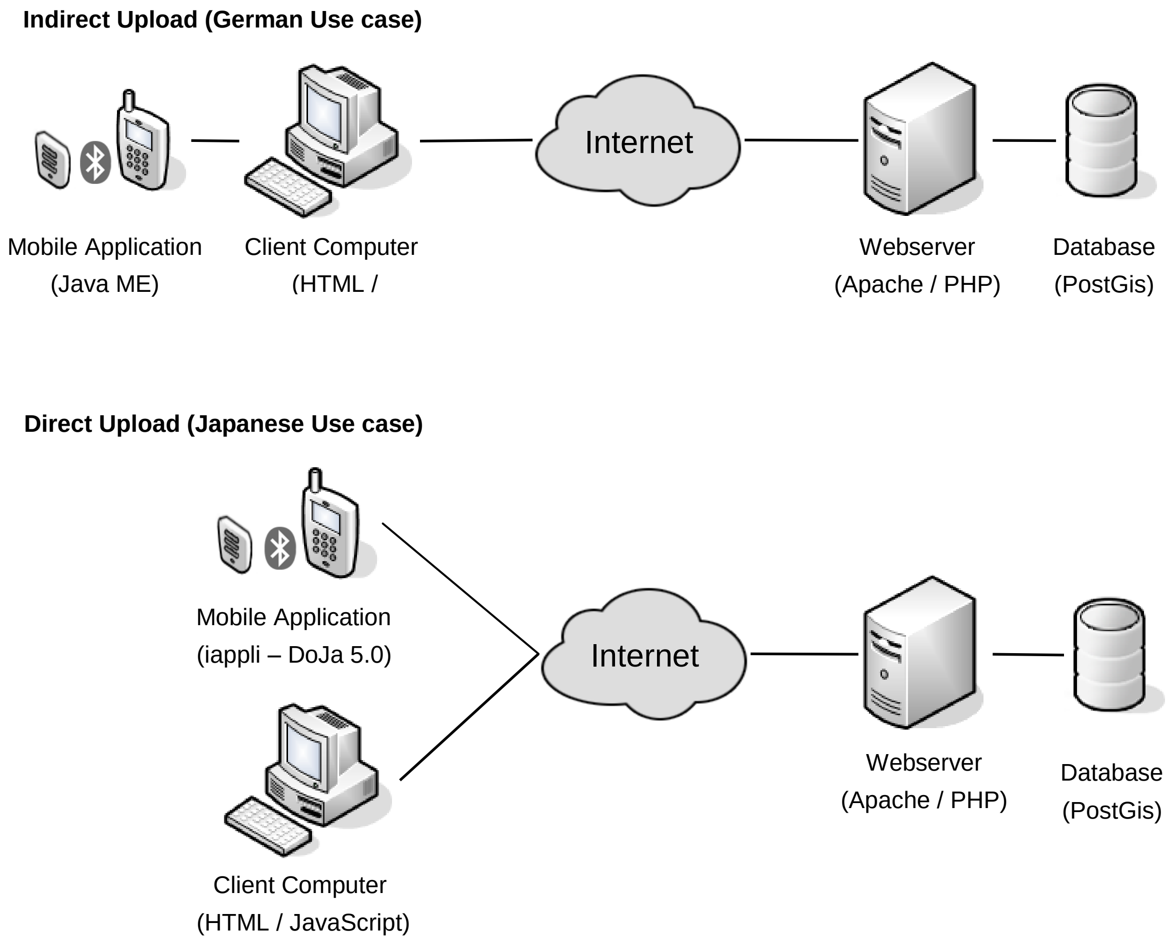

Fig. 7: Asynchronous and synchronous game play mode of CityExplorer

Besides these more technical differences was the game play identical in both versions. But as communications costs for multiplayer location-based mobile games are always seen critical (Bjerver, 2006), we think that a move into the asynchronous game play direction is worth considering.

5.2 Use case studies

To evaluate the possibility of CityExplorer to extend the “Magic Circle” to produce valuable semantically enhanced geospatial data two use case studies were carried out in the city of Bamberg (Germany). To evaluate additionally the easy adaption of the game to any region of the earth one test game was set up and taken out in Yokohama (Japan). In all of the games a price for the winner was given to stimulate the competition between the players. Figure 8 gives a few visual impressions from these CityExplorer games.

For the two games in Bamberg the Laboratory for Semantic Information Processing provided four mobile phones (Nokia 6630) and four Bluetooth GPS receivers. The first game was played by laboratory staff and one computer science student. The age of the players ranged here from 23 to 29. This game lasted for seven days in the second week in March.

The second game was played by two female players – building a team – with no computer science background and four computer science students – two of them also forming a team. The age of the participants lied here between 24 and 32. Because of the eastern holidays this game lasted nine days in total.

The test game in Japan was supported by Keiji Yamada-sensai from the C&C Innovation Research Laboratories of NEC R&D. NEC provided mobile phones with integrated GPS receivers for the initially five participants. Because of the term holidays and other schedule problems on the side of the local players only two took actually part in the game. But nevertheless this test game showed that CityExplorer is practically applicable on every corner of the world. To set up the Yokohama game we only had to get the GPS coordinates of the top left and bottom right corner of the game area. Entered into a web interface on the CityExplorer website and all the other needed files can be downloaded by the players and copied to their mobile phones.

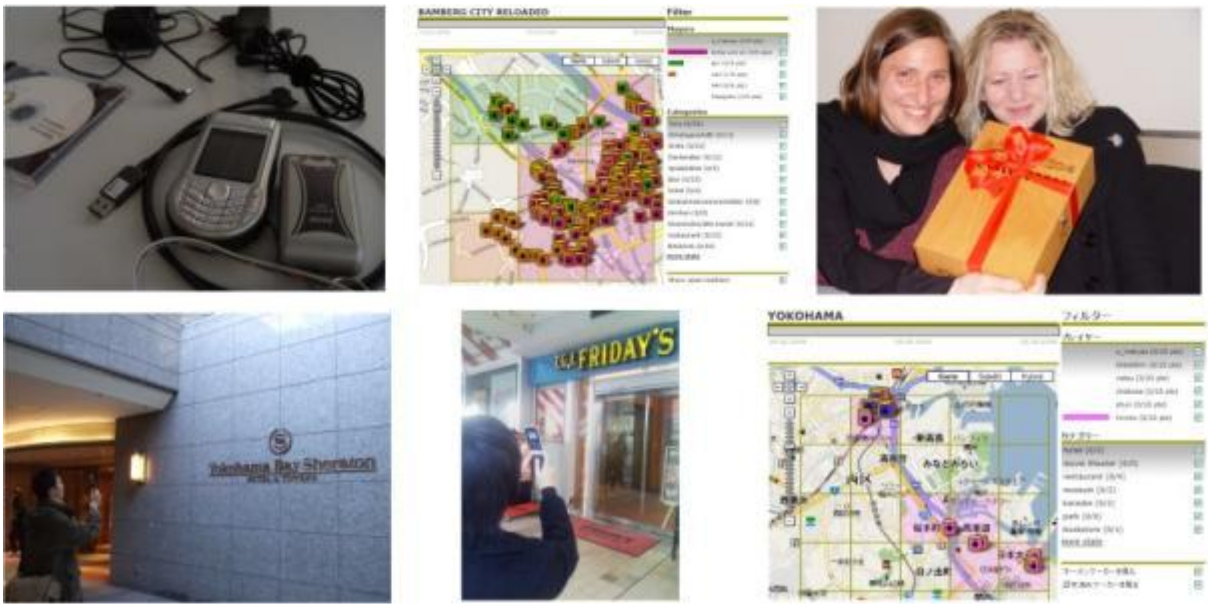

Fig. 8: Impressions from the use case studies in Bamberg (top, 2nd test game) and Japan (bottom)

5.3 Preliminary results

We are currently in the process of evaluating the collected geospatial data from the test games that ended on March 25, 2008. For this reason we can report only preliminary results at this point in time. Due to the rather small number of players in the Yokohama use case we only evaluated the geospatial data generated by the two games in Bamberg. Talks are under way to conduct a full test game in Japan in the coming weeks.

The ten players in Bamberg collected a total of 584 markers – 276 in the first and 308 in the second game – over a period of 16 days. This includes GPS coordinates in conjunction with the semantic classification and photos with an appropriate semantic tag for it. In addition, every time the participants were out in the streets playing the game their movement history was recorded too, just like in the game of CityPoker or GeoTicTacToe (Matyas 2007a). For example around 11 shoe stores, more than 20 restaurants and around 30 doctor's practices were georeferenced. Although this numbers might seem small in comparison to 15.026 hits one gets when he uses the search term “restaurant, Bamberg” in Google maps[3], most of the results there include not only restaurants where someone can eat but also commercial shops where I can buy stuff for my restaurant. Even worse are the search results for very general terms like “memorial, Bamberg”. The problem here is that memorials mostly have neither websites nor a no address. There simply is no data available to a search engine for finding appropriate matches apart from a club for memorials near Bamberg (see Figure 9). Players of CityExplorer had no difficulty in identifying and georeferencing 12 memorials in the city centre of Bamberg.

From a qualitative perspective the results look promising too. It was to be expected that non-professional geospatial data collectors would not provide high quality results. But the actually acquired data is at least of

[3] www.maps.google.de

sufficient quality to use it for thematic maps like the one shown by Google maps. This is also the case where the GPS error gets clear when the map view is switched to satellite images. Figure 9 for example shows in the top row the recorded location of a small Asia restaurant in a narrow street – where GPS signal is always not that good. On the thematic map the position is sufficient exact but not on the satellite image view. Here the real position of the restaurant is indicated by a red circle and the marker position is clearly some 15 meters away of it. On other occasions, as can be seen on the bottom row of Figure 9, both positions are perfectly ok.

Fig. 9: Visual inspection of the marker quality (*red circle later added*)

A more detailed evaluation of the marker collection from our test games will be done in the following weeks. It should reveal the exact percentages of the markers that can only be used for thematic maps and markers that are precise enough to be used for example in car navigation system or systems with similar demand for accuracy. So far nearly all of the markers qualify for the usage on thematic maps and around 10-30% for more demanding services. We will discuss in the following section how we can increase this percentage a good deal.

The participants did also complete a questionnaire and participate in a short interview right after the game. Two interesting results emerged out of this – beside that fact that all players had fun playing the game.

All players told us in the interviews that while playing the CityExplorer their perception of the city space increased. For example in our first test game players chose the category “hair stylist”. Two players independently from another told that before the game they knew only of one or two hair stylists in the city centre of Bamberg but while playing they found suddenly saw a hair stylist on every next street corner. The same topic comes up in the interview with the female team of game two. The category in questions here was “gates”. But also location types not picked as categories in the game were perceived more intensive. This team also told us that while they were on tour setting markers they would see many location types that would have made perfect categories of the game, of which they thought before the game that too few instances of it would exist in the game area.

Furthermore revealed the questionnaire the fact that the game encouraged the players to be more in the open-air than they usually would and that they visited places they rarely do. This strengthens results reported by Anderson et al. (2007) that mobile technology can stimulate people to be more physically active. They achieved such an increase in physical activity only by giving users reports of their activity statistic throughout the day, using patterns of fluctuation in GSM signal strength. We think that a game like CityExplorer or similar location-based mobile games can provide a funnier and longer lasting motivation for people than plain statistics could.

6. Discussion and Outlook

In this paper we have shown that location-based mobile games cannot only extend the "Magic Circle" in the spatial, temporal and social dimension but also can be used to produce valuable goods. We described the game Geogame CityExplorer that was used in three use case studies to produce semantically enhanced geospatial data. This data is especially valuable for location-based services like Google maps. Our preliminary results indicate that the quantity and quality are more than sufficient for the production of thematic maps straight out of the game data. For more demanding services in terms of accuracy further steps have to be taken to refine the collected data. One approach for such a refinement was proposed by Matyas et al. (2007b). The main idea here is to aggregate redundant geospatial data to get a qualitatively increased result.

One aspect that received much attention from the research community are privacy issues related with GPS tracking of people (see e.g. Iqbal and Lim, 2007). Although tracking is correctly perceived a problem when our everyday activities are concerned, we think it is not really critical in game play. While playing a game like CityExplorer rarely locations of personal interest are visited as is the case when people are tracked on a 24/7 basis to detect places that are meaningful for them. Our players also explicitly stated that they would not chose locations of personal importance as categories in the game. It remains to be seen if this holds true for players of younger age, but we think that people are getting more and more sensible for this issue.

Another open research direction we see is the design of more casual location-based mobile games. Slow ly paced games like CityExplorer or Feeding Yoshi! (Bell et al., 2006) are especially tailored to be played during everyday activities. But the evaluation of these two games has showed that players do not switch between the game and serious activities that easily. Most of the players of CityExplorer have reserved explicit time slots – mainly after or before work/school – in advance to play the game. A direction that maybe that seems more promising for casual location-based mobile games is indicated by game examples of Kiefer et al. (2007) and Brunnberg and Hulterström (2003). These are games designed for times were people are moving from point A to B in a more linear fashion, like on a car trip (Backseat gaming, Brunnberg and Hulterström) or on a bycicle tour (FluPa-Guide game, Kiefer et al.). On such trips, which may last from a few minutes of several hours, passengers and/or drivers have leisure time to spend although they might be on the way to some serious tasks. But the linear nature of the game board and the inability of the players to much influence their movements are difficulties which needs further research to understand in more detail.

Acknowledgement

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