Smart Beetles: towards a Geogame for Smart Citizens

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Abstract

Smart cities make use of information technologies to improve performance and quality of urban services, to decrease costs and to optimize resources. However, many citizens do not know all the services and advantages that a smart city offers to them. In this work, we created a geogame to involve them in different cities and, by playing with real services, increase their knowledge about smart cities.
Keywords: geogame, 3D, basemap, smart city, citizen, videogame.

1. Introduction

Nowadays, we can encounter many location-based games designed to take into account user's location by using GPS as localization technology [1][2][3]. Most of them might be classified as geogames [4]. However, this type of games usually lacks of the 3D rendering component, that is, they are not using such a powerful feature, which could bring players to a better user experience. Moreover, from the perspective of game design research, these games do not present a clear and specific spatial level structure, which would enable us to have a better understanding of the geographic environment of each geogame.

In this context, the contribution of this paper consists in defining and implementing a geogame that features: 3D rendering of cities, specific spatial level distribution and structure, integration of different gamification techniques such as leaderboards and a successful integration of libraries and tools (such as Unity3D, OpenStreetMaps and ESRI City Engine) with a common objective.

Figure 1: Smart Beetles Spatial Level Distribution. Conceptually, the level selector.

2. Game Overview

In this game, users (or players) visit a set of cities. They are immersed into real scenarios, that is, with real cities and real services, testing their knowledge by learning more about a specific city and/or service at the same time that they are playing.

Aiming at sustaining interest in the experience over time, for each level, leaderboards with best players will be available.

Apart from the usual elements existing in many games such as leaderboards, settings and other functionalities and assets, this game offers some unique features that we proceed to explain.

As previously commented, one of the objectives of this game is to provide a manner to better know cities. Therefore, the different levels are connected to real data and services of the selected city, which gives a more immersive experience to the users as they observe realtime information while playing.

As an example, we might have a level where traffic conditions are connected to the game. In this level, the player should visit some checkpoints, in the shortest time possible. However, the traffic service for this city, at that time, informs us that some streets have slow traffic conditions. Therefore, if you cross the streets with slow traffic, you will be slowed down, as it occurs in real life.

3. Potential Players

Our target players are people interested in knowing better a city, tourists or even casual players only interested in competing to other users, within this virtual environment. In general, users play in different cities in the world, and services such as traffic conditions or information about bus stops, to name a few, will be connected to the corresponding level.

About skills, players should know what is a bike lane, bus stop, metro station and, in general, all the concepts related to transportation, traffic and general services offered by a smart city.

4. Geo-narrative

In this game, levels are mapped to cities. Thus, players should first select a city. After that, we defined different levels for the selected city. Figures 1 and 2 show the visual representation for the mentioned selectors.

As an example, the level "Valencia", could offer three sublevels:

- Sublevel 1: players must cross some checkpoints in the shortest time possible.
- Sublevel 2: players must arrive to a given place, but traffic conditions are present, they might modify the player's speed if a "slow" street is crossed.
- Sublevel 3: players must pick some items up and metro stations could be used to save time.

As commented before, this game is directly connected to geographic environments such as cities. It is important to underline that players can enable different modes of locomotion, which has implications in scores and leaderboards. It is possible to play at some levels by selecting a mode of locomotion. Available locomotion modes are: pedestrian, bike, car and bus, but in order to simplify the narrative we can suppose the pedestrian mode is enabled and never changes.

Figure 2: Sublevel selector from a given city.

5. Geocontent

This game has been designed to exploit specific features of the cities included. Therefore, it is not relocatable to other cities or regions. Moreover, geocontent is previously created and totally bound to a particular city.

Therefore for a given city (level), we define an extent to limit players' movements, Thus, in that context, the geocontent will consists of: 3D models of buildings, a 2D basemap and, depending on the sublevel, specific information from the city, which is used to build the sublevel and set the mission and the objectives.

6. Game Mechanics

Essentially, the game here described, is a competitive and pacman style game [7]. Players start the game and a set, or group, of cities appears. Sublevels, from a given city, offer different missions, which are strictly related to city services. Once all the sublevels have been passed, another city can be activated and so forth.

6.1. Mission

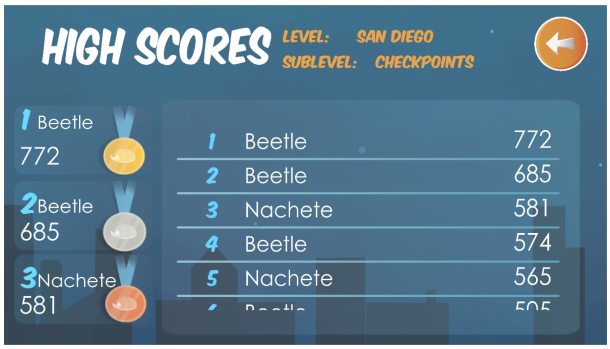
In brief, the objective is common in every sublevel, which consists in collecting some existing items, located in particular places of the city, in the shortest time. However, it is possible to find some dynamic elements trying to make your mission difficult. Currently, this game is offering only one sublevel where items are located in well-know places of the corresponding city.

6.2. Rules

- Levels and Sublevels have a specific order.
- A player is represented as a beetle (just for fun), and movements are bound to the accelerometer sensor, optionally we consider to bound them to the GPS sensor.
- Sublevels always show 3D Buildings and a basemap, see Figure 3.
- Levels are defined by the city, the objective: to cross checkpoints as fast as possible, best route avoiding traffic jams, use as many bike lanes as possible, best route by using bus lines and so on.
- Scores are calculated in seconds. Fastest players are ranked in higher positions. See Figure 4.

Figure 3: Smart Beetles level in San Diego.

Figure 4: Leaderboard in San Diego.



7. Conclusions

In this work, we presented an initial version of Smart Beetles, the first level of this game is freely available in App Store[5] and Google Play[6]. Currently, we are working in the integration of realtime services in the game.
This geogame was implemented using Unity3D, OpenStreetMaps and ESRI City Engine. Moreover, the company pixelder.com is collaborating in the dissemination of this work.

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