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.
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.

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-known 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.

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.
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.

References