Targetting of Parking Spots by Augmented Reality

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Abstract
The main goal reached by this research project was the development of an application for Android system capable of targeting parking spots with the help of augmented reality technology. This application is part of a parking system in the context of IoT (Internet of Things) and smart cities.

Key words:
Android application, augmented reality, assisted parking.

Introduction

This project consists of the development of an smartphone application capable of guiding drivers while they are using an smart parking service which guides them towards free parking spots. Since the software is used by people while they are driving, the idea is to allow them to get from application the necessary information without distracting the driver from the traffic. In addition, we also aim to provide a good user experience. Our approach consisted of mixing video captured from the street with visual information on the smartphone screen, characterizing an augmented reality application.

Results and Discussion

In our approach, the projection of visual information on the screen is not based on a physical object or a predefined image (also known as markers), but it is based on the geolocation of the device.

A first prototype was developed using the Unity3D platform. This platform offers a bunch of ready features when you want to create models with animated objects. However, It was decided to develop the final prototype with IDE Android Studio, since integration with other parts of the application was simpler.

Since the software is used by people while they are driving, our design aimed to not distract drivers from the traffic. For this purpose, two graphical elements were used: a "ruler" that determines the distance to the parking spot and an arrow that indicates on which side of the street the parking spot is located.

A major recurring difficulty in this type of application is the inaccuracy of real-time GPS data. This problem has several different sources. Strategies exist to mitigate this problem, however, they escape the discussion proposed in this work. In order to achieve the best possible results we configure the smartphone with high accuracy mode.

In addition, we also built a video database of real parking situations in order to investigate digital image processing algorithms and machine learning approaches to combine geolocation and computer vision in the identification of free parking spots.

Conclusions

After preliminary tests it was detected that the augmented reality in parking applications is justified, not only because it provides an interesting experience to the driver, but also because in situations where he/she is not able to find the desired parking spot, the use of this application greatly facilitates the search. The subsequent discussion is how to improve the application resulting in a better user's experience.

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