ENGINYERIA INFORMÀTICA

Ponster, tu app de realidad aumentada

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INTRO

Augmented reality has become a very popular topic in the last five years. With the introduction of mobile smartphones, developers started to have the chance to develop applications using the powerful CPUs and GPUs of those devices.

STATE OF THE ART

The techinique of mixing real world elements with virtual elements displayed on the screen of a device is what we call augmented reality. In the field of augmented reality, a lot of things have happened during the last years. The progress in the fields of computer vision and image processing have led to several new techniques of detection and tracking. This, combined with the increasing availability of powerful mobile devices, has enabled developers to build a plethora of high quality AR-based applications. Nowadays, modern mobile devices use integrated cameras, motion sensors and proximity sensors to make these AR-based experiences.

Augmented reality in mobile devices is slightly different from what can be seen in desktop environments. Although every year we have more powerful mobile smartphones (citation needed), processing and drawing into the device's screen is still an expensive operation in terms of computational cost. This is one of the reasons why cost-efficient computer vision algorithms and techniques have emerged in the past years.

Most of the augmented reality apps follow this behaviour:

- Get the input from the camera or a video.

- Search for an object of interest.

- Introduce our object into the scene, considering the camera or the input position.

In this chapter we are going to describe which are the different techniques that enables us to do them.

4.1 Object recognition

In order to provide an augmented reality experience, we have to know first which is the real world element that we are going to use as a reference to mix the real world input with our virtual elements. This reference can be from an image from the smartphone

camera to the user location. Ponster searches a particular image inside the camera input in order to draw the poster image. In computer vision, this is usually referred as object tracking.

In computer vision there are a lot of object recognition techniques. In the development of Ponster, two of these techniques have been tested: template matching and feature-based detection.

4.1.1 Template matching

Template matching consists of finding areas of an image that are similar to a provided template image.

4.1.2 Feature detection

Speeded-Up Robust Features - SURF

Features from Accelerated Segment Test - FAST

Oriented FAST and Rotated BRIEF - ORB

4.1.3 Descriptor extraction

4.1.4 Descriptor matching

Brute-Force Matcher

Fast Library for Approximate Nearest Neighbors - FLANN

4.2 Tracking

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TECHNOLOGIES

Describe here Vuforia, OpenCV, FastCV, UIKit, etc.

5.1 OpenCV

5.2 FastCV

5.3 Vuforia

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DEVELOPMENT

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TRACKING

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CONCLUSIONS