SIFT point matching

Delaunay triangulation

Depth Inferring (darker means deeper, black means no data)

3D Depth Model representation

Augmented Objects Insertion Using Stereopsis and Delaunay Triangulation

Object attached to virtual surface using detected model.

Contributions

The main novelty of this work is that by analysing the images in search for low-level features (interesting points, image displacement, line segments) several high-level features (homographies, depth, surface normals, vanishing points, scene orientation) are extracted.

Interactive Insertion of Virtual Objects in Photos and Videos

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Abstract

The introduction of virtual objects in photos or videos has been the focus of many Augmented Reality applications. This paper proposes a framework using image analysis methods to automatically detect scene features to introduce virtual 3D geometry objects. The current high-level features include surfaces, depth and scene orientation automatic detection. The main use of this technology is in AR tools, games or applications which require the user to introduce an object that blends with a photographed or filmed scene. The main advantage of the proposed approach is that it can work only with one or two photos without prior knowledge, being ideal for mobile applications with camera or to be used with photo albums. Additional sensors can be added to increase reliability such as depth sensors or accelerometers but they are not essential. The main algorithms are intended to create a scene model in a few seconds and allow an interactive behaviour of the augmented objects.

As proof-of-concept three test-case scenarios are presented to demonstrate the current technology. The first is an augmented reality objected positioning system using a scene element as anchor. The other prototypes are based on the idea of virtual reshaping of a room adding virtual objects that automatically lay on the floor with the main orientation of the room.
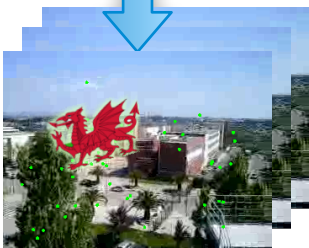
Augmented Reality for Videos using SURF

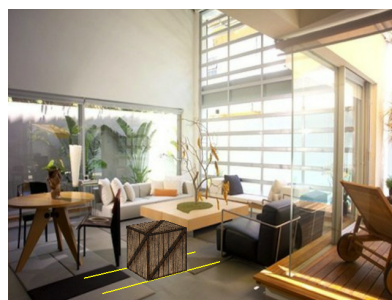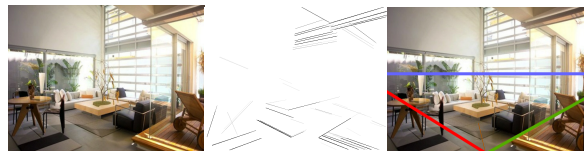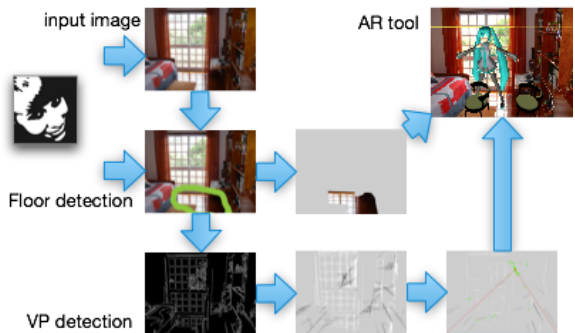The user selects an area in one frame.

The dragon is superimposed on that area.

The object is replicated to the other frames of the video in the same position and rotation as it was when placed.

Interactive AR room redecorating tool

input image

AR tool

Floor detection

VP detection

Vanishing points and horizon detection.

Insertion of object with orientation of the scene.

Floor and scene orientation detection for AR applications.

Interactive Augmented Reality Applications

For objects to blend seamlessly in interactive applications their geometry must blend with the lines, textures and properties of the photographed world. The problem addressed in this paper is how to introduce virtual objects in a interactive scene, that react to detected features of an image.

http://img.di.fct.unl.pt