Abstract

Title: Augmented Annotation of Real-Time Video on a Mobile Phone
Degree: M.A.I. (St.)

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Annotating an image from the camera on a mobile device with useful information about the buildings present, would provide a rich and intuitive way for a user to explore an urban environment. The application extracts the buildings in the image and compares them with a database of images. This project considers such an application, where all image processing takes place on the mobile device and a public database of images is used, Google Street View.

To identify buildings in an image a description of the building facades is constructed and is used to compare buildings across different images. Buildings are described based on the size, shape and positioning of the windows in the façade. The windows are defined as rectangular regions with four appropriate corners, all joined by edge pixels which denote the outline of the window. These windows are grouped into columns.

A specific corner detector was successfully implemented to extract and classify the four different corner shapes required by the application. A window extraction method has been developed which is capable of detecting windows using the previously identified corners and the edge pixels outlining the windows. The matching stage uses the pattern of columns to find matching facades, with a detailed score calculated based on the layout of the windows in the columns.

The system can successfully identify corners and windows which conform to the described definition of a window. The matching algorithm provided has shown good potential, but needs refinement to better handle missing windows. The biggest issue discovered is the distortion to images from Google Street View as a result of image stitching. These distortions can be severe enough to make window extraction impossible.