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## Georeferencing of UAV images

### Proposal for a Master thesis topic (EN)

In order to use an aerial image to support an application in a particular location, it is necessary to apply the geometric corrections and geocoding. This demand comes from several areas, including traffic monitoring, security and agriculture applications, to name a few, where the use of unmanned aerial vehicle (UAV's) has been shown to be of extremely important. The determination of ground control points (GCP) is mostly a slow and costly process, which affects the georeferencing process of images.

In this particular case, images are acquired by an UAV hovering over an intersection as shown in figure 1. In addition, an orthophoto of the same area is available along with a DTM. The applied workflow uses the orthophoto as a base image and perform image matching to look for feature points in the base image and the raw image. Given that the orthophoto is geocoded, the (X,Y) world coordinates of the features extracted from the orthophoto are given along with the Z world coordinate from the DTM and can be used as GCP's in the spatial resection. Extracting features can be done using a feature detection algorithm like scale-invariant feature transform (SIFT) or other point detectors. Various point detectors can be used and compared.

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Figure 1: UAV image

The goal is to implement the workflow performing the automatic orientation of the UAV images for georeferencing. The results have to be discussed and compared with reference data.

The dataset, an orthophoto, a DTM, and reference data to be used are provided to the student.

This thesis will be supervised by Sara El Amrani M.Sc.

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