Open position for MSc Project, 2015-2016

Change Detection by Comparing Aerial and Panoramic Images

Start / end dates: February 2016 – June Or July 2016

Supervision Team:
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Location:
IRISA, ENSIBS Building, Campus of Tohannic, 56000 Vannes, France

Keywords: Image Processing, Change Detection, Data Mining, Remote Sensing

Context and Research Environment:
IRISA (www.irisa.fr) is a joint research institute (UMR 6074) in computer science, signal and image processing, and robotics. It is supported by several universities, high schools, and national research organizations, and is structured in 7 departments, among which the "Signal and Image Processing, Robotics" is hosting the OBELIX team.

Within IRISA, the OBELIX team (Environment Observation through Complex Imagery, www.irisa.fr/obelix) deals with visual data (image) analysis and mining for environmental purposes. The data under consideration are massive, multidimensional (multi- or hyperspectral), noisy, heterogeneous (multi-sources), and with a spatio-temporal behavior (time series).

Project Description:
The objective of this project is to study change detection (e.g. destroyed or new buildings) occurring on some predefined geographic areas. To do so, it is necessary to analyze the aerial image related to a given area and some panoramic photos acquired more recently from the ground. These data will be registered beforehand with a crowdsourcing method design in the team [1]. Aerial and panoramic images show different perspective and thus require some specific comparison methods. Such methods will be designed in this project, thus bringing some improvements over the state-of-the-art. Besides, panoramic images contain some objects that may alter the quality of the comparison process (e.g. cars, road signs, pedestrians). Removing such objects from the panoramic images before performing the comparison will be considered to improve the method robustness.

The proposed solution will finally led to a software prototype using the OpenCV library. An experimental validation will be conducted to assess the method ability to address the problem considered. Finally, the intern will be involved in the writing of a scientific paper describing these works.

The main steps of the internship are as follows:
1. review existing works allowing for image comparison and change detection; (2 months)
2. design a new method and software to solve the aforementioned issue; (2 months)
3. conduct an experimental evaluation and assess the method performance; (1 to 2 months)

Required Technical Skills:
Image analysis and processing. Some knowledge in machine learning would be appreciated.
Programming in C/C++

Job opportunity:
Depending on the internship skills and motivations, an extension of the study through a PhD position can be considered.

Gratification:
Internship stipend will be offered.

References: