6 month internship
M2 students – Engineer School

IGN - Laboratoire MATIS

Change Detection in Urban Areas using multi and hyperspectral imagery

Context

The MATIS lab of the French National Institute of Geographic and Forestry Information (IGN) has been carried out for many years research in land-cover classification and change detection from various sources of remote sensing data (airborne and satellite optical images, 3D lidar point clouds...), both in urban and natural environments.
Urban environments are characterized by a strong heterogeneity in shape, size, materials and uses as well as a high biodiversity… Very high spatial resolution remote sensing data becomes a useful tool to monitor them. Indeed, it is essential for its fast and accurate understanding and its ability to cope with the large size and highly variable temporal evolution of urban areas. Among the existing techniques, hyperspectral imagery, which acquires information in more than 100 spectral bands with a high spectral resolution (typically 10 nm) is a promising data source for land-cover characterization and evolution analysis.
The **HYEP project** (funded by the French National Research Agency - ANR) aims at developing on-purpose methods for processing multi- and hyperspectral images at various spatial resolutions for urban area monitoring (both land-cover semantization and change detection). Four application cases are targeted, namely impervious surface estimation, urban vegetation mapping, building roof characterization, and urban wetlands.

Subject

The goal of the position is to develop a land-cover classification scheme that is able to simultaneously handle multi-sensor and multi-temporal data. A first fusion scheme has already been proposed. It has now to be improved to be able to deal with inconsistent data (e.g. diachronic images). It could also be extended to jointly merge knowledge from both sources to improve classification and to detect changes.

For that purpose, airborne data acquired by IGN and ONERA from 2012 to 2015 over the city of Toulouse (France) will be used, as well as images simulated by ONERA from this data and corresponding to existing and forthcoming spaceborne sensors.

Skills

The candidate should have strong knowledge in remote sensing, image processing or computer vision.

- Good spoken and written English. Knowledge of French would be useful.
- Good knowledge of programming language (C++/Python) is mandatory.

Organization

- **Deadline for applications : 1 February 2016.**
- **Duration:** 6 months starting Feb/March 2016.
- **Location and salary** : MATIS lab. of IGN in Saint-Mandé (94), Paris, France. The wages will be ~1400€ per month before taxes (SMIC).
- Applications must include:
  - a detailed CV with a description of realized projects + publications ;
  - a motivation letter ;
  - and must be sent to the contacts in a **single PDF-format**.

Contact

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