

# Janak Joshi

**Title: Improving the quality of digital surface model generated from very high resolution satellite image by using OOA technique**

**Level: MSc**

## **Description of work:**

Very high resolution satellite (VHRS) images are widely used in many applications such as DSM generation. Stereo viewing capability enables to extract DSMs, with the high spatial resolution supporting the extraction of urban features such as individual buildings. However, with their frequently dense spacing, such as in the test area, Cairo (Egypt), occlusion and shadow often prevent DSMs accurately representing those individual structural elements. Similarly, mapping individual buildings, even in the highest resolution commercial data available, is very difficult. Object-oriented methods have been used successfully in the image processing of some build-up area type, but success is highly dependent on settlement density, contrast and image characteristics.



To extract buildings accurately from VHRS images, a DSM can play an important role, whereas the building outlines extracted from the image by OOA can in turn help to refine the quality of DSM. This mutual relationship between DSM and OOA can benefit each other and integration of these both techniques can help to optimally use the VHRS.

This research is aimed at exploring the possibility of using photogrammetric DSM generation and OOA together in such a way that one can benefit the other, i.e. DSM extracted from VHRS stereo image can be used as auxiliary input data for OOA to extract accurate building outlines which, later, can be used later for improving the quality of the DSM.

In this research, a VHRS image (GeoEye-1) of Cairo is used. Cairo is a typical dense urban area with very heterogeneous built-up environment, dense features, and narrow streets having irregular shapes, size and height of buildings. Excessive shadow, occlusion and spectral heterogeneity are other problems in the image analysis. GeoEye-1 is a new VHRS sensor, whose imagery has not yet been well studied and documented. Thus part of this research also concerns assessing the applicability of previously developed OOA methods for urban area analysis.

**Biography:** Janak Raj Joshi worked for the Survey Department of the Government of Nepal from 1999 to 2008. He obtained a B.Sc. and Survey Diploma from Nepal, and a Professional Masters Degree in Geoinformatics (with distinction) from ITC (2004 – 2005). He has been working at the Land Management Training Centre (Government of Nepal) since 2008.



He is currently finishing his Geoinformatics MSc degree at ITC, based in the Earth Observation Science (EOS) department.