

Automatic Road Extraction form High Resolution Satellite Images

R.M.P.N.S. Bandara¹, P.C.P. De Silva², J.M.S.J. Bandara³

The presence of high resolution satellite images and their potentials to be used in many fields such as urban planning, transportation engineering etc ,especially in the meaning of preparing and updating maps, have made the automatic extraction of objects, a new challenge in remote sensing. Automatic road extraction, one of major uses of preparing and updating maps, provides means for creating, maintaining, and updating transportation network, which subsequently offers databases for all means of traffic management. Moreover, automatic road extraction is a critical feature for an efficient use of remote sensing imagery in most contexts, which has been an active research area in computer vision and digital photogrammetric for over past decades.

Further, the pixel-oriented analysis of satellite data has a main limit: the acknowledgement of semantic low level information, as the amount of energy emitted from the pixel, where the context does not assume any role. Conversely, the application of object-oriented image analysis on very high resolution data allows obtaining, by an automatic or semi-automatic analysis – with a minimal manual participation – a good classification also in presence of high and very high resolution data of small cities, where higher is an error possibility. Object-oriented image classification involves identification of image objects, or segments, that are spatially contiguous pixels of similar texture, color, and tone.

A simplified methodology using the object oriented image analysis for automatic road extraction for the Colombo City Area is presented in this paper. The proposed object-oriented image classification method comprises few fundamental and important steps towards content analysis and image understanding for instant image segmentation and classification. Few algorithms and techniques for the segmentation and classification in order to identify road features from satellite images were also supported to the proposed method.

Key words: Object-Oriented Methods, Image Segmentation, Road Network, Algorithms

Authors Details:

1. UG Student, Department of Town & Country Planning, University of Moratuwa, Sri Lanka, nsanj88@gmail.com
2. PhD Student, Department of Civil Engineering, University of Moratuwa, Sri Lanka, chameeradesilva@yahoo.com
3. Professor, Department of Civil Engineering, University of Moratuwa, Sri Lanka, bandara@civil.mrt.ac.lk