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Graph – Based High Resolution Satellite Image Segmentation for Object Recognition

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Abstract. Object based image processing and analysis is challenging research in very high resolution satellite utilisation.

Commonly either pixel based classification or visual interpretation is used to recognize and delineate land cover categories. The pixel based classification techniques use rich spectral content of satellite images and fail to utilise spatial relations. To overcome this drawback, traditional time consuming visual interpretation methods are being used operationally for preparation of thematic maps. This paper addresses computational vision principles to object level image segmentation. In this study, computer vision algorithms are developed to define the boundary between two object regions and segmentation by representing image as graph. Image is represented as a graph $G(V, E)$, where nodes belong to pixels and edges (E) connect nodes belonging to neighbouring pixels. The transformed Mahalanobis distance has been used to define a weight function for partition of graph into components such that each component represents the region of land category. This implies that edges between two vertices in the same component have relatively low weights and edges between vertices in different components should have higher weights. The derived segments are categorised to different land cover using supervised classification.

The paper presents the experimental results on real world multi-spectral remote sensing images of different landscapes such as Urban, agriculture and mixed land cover. Graph construction done in C program and list the run time for both graph construction and segmentation calculation on dual core Intel i7 system with 16 GB RAM, running 64bit window 7.

[Conference Paper](#) (PDF, 2042 KB)

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