



Road network extraction from IKONOS satellite images based on c-means and FCM clustering in spectral and spatial domain

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Nowadays attaining geospatial information is a challenging issue for many scientists and experts in the field of spatial decision making. Feature extraction from aerial or satellite images is a supplemental technology to achieve these kinds of information and is able to facilitate image analysis and interpretation and updating existing databases which are one of the urgent requirements of each organization.

The most prominent linear topographic features to be extracted from satellite images are roads. Roads are important large networks that seem to be the most vital transportation arteries of each country which extraction of them has been one of popular research areas in computer vision, remote sensing, photogrammetry and GIS communities. Therefore many efforts have been performed to extract them from digital images.

This paper aims to deal with road network extraction from Ikonos satellite images based on clustering techniques for updating road network databases of RMTO (Road Maintenance and Transport Organization of Iran).

Clustering techniques attempt to separate a dataset into distinct regions of membership. While there are many different algorithms for clustering, this paper focuses on the two well-known clustering algorithms for classification of image in spatial and spectral domain; c-means and fuzzy c-means (FCM) clustering. By using these clustering algorithms in spectral domain and binarization of the classified image, road class features are obtained. Afterwards morphological functions are used for thickening roads and eliminating misclassified pixels in the road class image. Then c-means

clustering is performed in spatial domain on road class binary image and cluster centers which are road centerline pixels are achieved. By connecting of these pixels and vectorizing of obtained centerlines, road class features are obtained in vector format. Finally accuracy assessment is performed for estimating correctness of proposed method.