Image fusion techniques for land use mapping using Landsat ETM+ Satellite imagery, for Kisumu Municipality, Kenya

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Abstract: Urban land use and land cover is important for any planning and management activities within any city. The use of panchromatic, medium-scale aerial photographs to map land use in urban areas has been an accepted practice since the 1940s. However use of aerial photographs has proved to be expensive. The utility of Landsat imagery has been demonstrated in many fields including agriculture, environmental monitoring, forestry, land resource analysis, land use planning etc. This paper evaluates the use of Landsat 7 Enhanced Thematic Mapper Plus (ETM+) satellite imagery for urban mapping through band combination using data fusion techniques. Landsat 7 system is designed to collect 15m resolution "panchromatic" data in the near infrared (IR) and six bands of data in the visible, near-IR and mid-IR spectral regions at a resolution of 30m. The ETM+ multispectral, panchromatic, and thermal images are used. Data fusion techniques for combining a higher spatial resolution image with lower spatial resolution multispectral image using Idrisi Remote Sensing system are examined. Results indicate that incorporation of a higher spatial resolution panchromatic image improves the classification accuracy.

Keywords: Data Fusion, Image Classification, Landsat EMT+, Pan-sharpening.