Preliminary Results of Roads Detection in Informal Settlements using Object-Oriented Classification and IKONOS Data

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Abstract:

Nowadays problems related to informal settlements growth in urban area may be considerate more complex than ever. These tribulations are more accentuated in developing countries, especially in large urban areas. However, the uncontrolled, growth on these informal settlements, recall to the needs of geoinformation data in the management and development of urban areas. Geo-information data can be collected from aerial techniques and for remote sensed technique. These techniques, allow us to obtain spatial information from areas where unavailable access as well as a constant area development is not perceived in old techniques.

Development in Remote Sensory technology has increased the resolutions of spatial imagery. Unfortunately the traditional methodology employed to extract spatial information data has demonstrated unsatisfactory results when high-resolution images are collected from urban areas. In contrast the detailed information provided in these images has positive contributed to the use of these technology. However, the high internal variance still becomes a major problem for per-pixel classifiers.

Considering the information collected in a remote sensing image it can be fractal in nature, the more characterized are the image's fragments, the more realistic the classification can be. The extraction of primitives' objects is based on images segmentation, which has supported the best results on high-resolution images. Object attributes provide a wide range of information, which discriminate the different on land cover/use in comparison to pixel attributes.

The increased success of object-based classification has stimulated researches on different areas for land cover/use classification. However, the unknown spectral separability on urban structures as well as the irregular pattern of buildings, vegetation and roads require that the right combination between pixels and object information is essential for the successful use of land cover/use classification. Moreover, road information through satellite images is more easily to identify than urban structures such as buildings, parking lot, and houses. On these ways urbanization process can be efficiently estimated by transportation networking.

Due to a intensive urbanization process occurred in Brazil since 70's, and unplanned land use in urban areas, the objective of this study will be to elaborate appropriate rules to detected roads in an informal settlements according the object-based classification Technology. The study was conducted in a near urbanized area in Sao Paulo, Brazil by using an eleven-bit Ikonos image recorded in 2002. The area used is characterized by an unplanned occupation, where a dense urbanization is found intermixed with preserved natural resource areas. So far, our preliminary results to detect the basic transportation network, is conflicting with missing areas or inappropriate classification. In the future our goal will be to enhance the object-basic classification, by creating strategies, which will minimize commission and omission errors in road extraction.