

MULTITEMPORAL FUZZY MARKOV CHAIN-BASED CLASSIFICATION OF VERY HIGH RESOLUTION IMAGES OF AN URBAN SITE

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ABSTRACT:

This work discusses the application of the cascade, multitemporal classification method based on fuzzy Markov chains, originally introduced in (Feitosa et al. 2009), over a set of IKONOS2 images of urban areas within the city of Rio de Janeiro, Brazil. The method combines the fuzzy, monotemporal, classification of a geographical region in two points in time to provide a single unified result. The method does not require knowledge of the true class at the earlier date, but uses instead the attributes of the image object being classified at both the later and the earlier date. A transformation law based on class transition possibilities projects the earlier classification to the later date before combining both results. While in (Feitosa et al. 2009) the fuzzy Markov chain-based method was evaluated over a series of medium resolution, LANDSAT images, in this work very high resolution images were processed. Additionally, while the target area of the previous work was characterized predominantly by agricultural use, in this work an urban area was the subject of classification. The results showed that the performance of the multitemporal method was consistently superior to that of the monotemporal classification of the study area, and confirmed the robustness of the fuzzy Markov chain-based method with respect to sensor characteristics and target sites. Reference: Feitosa, R. Q., Costa, G. A. O. P., Mota, G. L. A., Pakzad, K., Costa, M. C. O., 2009. Cascade multitemporal classification based on fuzzy Markov chains. *ISPRS International Journal on Photogrammetry and Remote Sensing* 64 (2), 159-170.

TOPIC: Data fusion and data assimilation

ALTERNATIVE TOPIC: Change detection and process modelling