AUTOMATIC 3D CHANGE DETECTION BASED ON OPTICAL SATELLITE STEREO IMAGERY

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ABSTRACT:

Change detection is one of the most heavily investigated topics in satellite image evaluation. Numerous detection methods and many kinds of images are used according to different applications and user requirements. One major problem related to 2D change detection based on satellite images lies in the lack of height information. Thereby only the changes influencing reflectance values or local textures changes can be detected, while the changes in vertical direction, for example, the changes of the height of a building are ignored. In this paper, a novel method is proposed for automatic 3D change detection from 2D optical stereo satellite imagery. In this method the vertical information are adopted a main parameter in the comparison procedure of the imagery of two dates. The emergence of DSM generation system makes it possible to acquire 3D geo-spatial information with high precision. Changes are identified by analysing the difference of the generated DSMs. Two level of 3D change detection methods are proposed in this paper. One is using the binary change detection methodology, where the differences are detected by computing the values of the pixels associated with the surface information. The other is within the 'from-to change detection', in which the post-classification comparison is adopted. In this approach, mean shift segmentation is adopted to obtain a reasonable segmentation results, after which the 3D classification will be processed mainly based on the means of one parcel and the height differences to the neighbours. Finally, the detail detection result can be achieved based on the comparison of the classification results. In order to evaluate the performance of our approaches, we carried out experiments on satellite data over the city of Kairo from the years 2005 (Cartosat imagery) and 2009(GeoEye imagery). First experimental results on these data sets confirm that the 3D change detection methodology can provides good results

TOPIC: Change detection and process modelling
ALTERNATIVE TOPIC: Image processing and pattern recognition