

Infrastructure Change Monitoring Using Multitemporal Multispectral Satellite Images

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Abstract : The main objective of this study is to find a suitable approach to monitor the land infrastructure growth over a period of time using multispectral satellite images. Bi-temporal change detection method is unable to indicate the continuous change occurring over a long period of time. To achieve this objective, the approach used here estimates a statistical model from series of multispectral image data over a long period of time, assuming there is no considerable change during that time period and then compare it with the multispectral image data obtained at a later time. The change is estimated pixel-wise. Statistical composite hypothesis technique is used for estimating pixel based change detection in a defined region. The generalized likelihood ratio test (GLRT) is used to detect the changed pixel from probabilistic estimated model of the corresponding pixel. The changed pixel is detected assuming that the images have been co-registered prior to estimation. To minimize error due to co-registration, 8-neighborhood pixels around the pixel under test are also considered. The multispectral images from Sentinel-2 and Landsat-8 from 2015 to 2018 are used for this purpose. There are different challenges in this method. First and foremost challenge is to get quite a large number of datasets for multivariate distribution modelling. A large number of images are always discarded due to cloud coverage. Due to imperfect modelling there will be high probability of false alarm. Overall conclusion that can be drawn from this work is that the probabilistic method described in this paper has given some promising results, which need to be pursued further.

Keywords : co-registration, GLRT, infrastructure growth, multispectral, multitemporal, pixel-based change detection

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