

An easy to use ArcMap based texture analysis program for extraction of flooded areas from TerraSAR-X satellite image

ABSTRACT

Extraction of the flooded areas from synthetic aperture radar (SAR) and especially TerraSAR-X data is one of the most challenging tasks in the flood management and planning. SAR data due to its high spatial resolution and its capability of all weather conditions makes a proper choice for tropical countries. Texture is considered as an effective factor in distinguishing the classes especially in SAR imagery which records the backscatters that carry information of kind, direction, heterogeneity and relationship of the features. This paper put forward a computer program for texture analysis for high resolution radar data. Texture analysis program is introduced and discussed using the gray-level co-occurrence matrix (GLCM). To demonstrate the ability and correctness of this program, a test subset of TerraSAR-X imagery from Terengganu area, Malaysia was analyzed and pixel-based and object-based classification were attempted. The thematic maps derived by pixel-based method could not achieve acceptable visual interpretation and for that reason no accuracy assessment was performed on them. The overall accuracy achieved by object-based method was 83.63% with kappa coefficient of 0.8. Results on image texture classification showed that the proposed program is capable for texture analysis in TerraSAR-X image and the obtained textural analysis resulted in high classification accuracy. The proposed texture analysis program can be used in many applications such as land use/cover (LULC) mapping, hazard studies and many other applications.

Keyword: Texture analysis; Feature extraction; Remote sensing; TerraSAR-X; Pixel based; Malaysia