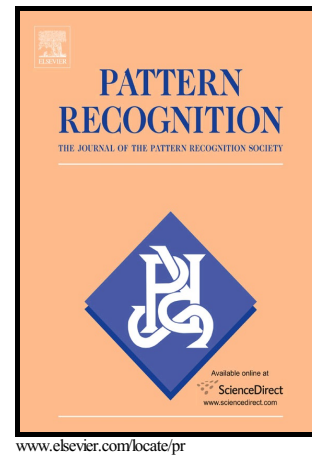


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# Deep Learning and Mapping Based Ternary Change Detection for Information Unbalanced Images

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## Abstract

This paper mainly introduces a novel deep learning and mapping (DLM) framework oriented to the ternary change detection task for information unbalanced images. Different from the traditional intensity-based methods available, the DLM framework is based on the operation of the features extracted from the two images. Due to the excellent performance of deep learning in information representation and feature learning, two networks are used here. First, the stacked denoising autoencoder is used on two images, serving as a feature extractor. Then after a sample selection process, the stacked mapping network is employed to obtain the mapping functions, establishing the relationship between the features for each class. Finally, a comparison between the features is made and the final ternary map is generated through the clustering of the comparison result. This work is highlighted by two aspects. Firstly, previous works focus on two images with similar properties, whereas the DLM framework is based on two images with quite different properties, which is a usually encountered case. Secondly, the DLM framework is based on the analysis of feature instead of superficial intensity, which avoids the corruptions of unbalanced information to a large extent. Parameter tests on three datasets provide us with the appropriate parameter settings and the corresponding experimental results demonstrate its robustness and effectiveness in terms of accuracy and time complexity.

*Keywords:*

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