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Local Directional Encoded Derivative Binary Pattern Based Coral Image Classification Using Weighted Distance Gray Wolf Optimization Algorithm

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Abstract : This paper presents a local directional encoded derivative binary pattern (LDEDBP) feature extraction method that can be applied for the classification of submarine coral reef images. The classification of coral reef images using texture features is difficult due to the dissimilarities in class samples. In coral reef image classification, texture features are extracted using the proposed method called local directional encoded derivative binary pattern (LDEDBP). The proposed approach extracts the complete structural arrangement of the local region using local binary batten (LBP) and also extracts the edge information using local directional pattern (LDP) from the edge response available in a particular region, thereby achieving extra discriminative feature value. Typically the LDP extracts the edge details in all eight directions. The process of integrating edge responses along with the local binary pattern achieves a more robust texture descriptor than the other descriptors used in texture feature extraction methods. Finally, the proposed technique is applied to an extreme learning machine (ELM) method with a meta-heuristic algorithm known as weighted distance grey wolf optimizer (GWO) to optimize the input weight and biases of single-hidden-layer feed-forward neural networks (SLFN). In the empirical results, ELM-WDGWO demonstrated their better performance in terms of accuracy on all coral datasets, namely RSMAS, EILAT, EILAT2, and MLC, compared with other state-of-the-art algorithms. The proposed method achieves the highest overall classification accuracy of 94% compared to the other state of art methods.

Keywords : feature extraction, local directional pattern, ELM classifier, GWO optimization
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