Image Content Analysis Using Modular RBF Neural Network

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Abstract. Image content analysis has become an important issue in multimedia processing. Region-based image retrieval systems attempt to reduce the gap between high-level semantics and low-level features by representing images at the object level. Recently, the radial basis function (RBF) neural network has been proposed to solve the classification problem; however, it is time-consuming and sensitive to center initialization. Therefore, modular RBF neural network (MRBFNN) incorporated with a self-organizing map (SOM) and a learning vector quantization (LVQ) neural network is proposed for semantic-based image content classification. Using SOM and LVQ, we can obtain more appropriate centers for the RBF neural network. Moreover, principal component analysis (PCA) is applied to reduce the dimension of features. Experimental results show that the proposed method is capable of analyzing components of photographs into semantic categories with high accuracy, resulting in photographic analysis that is similar to human perception.

Keywords: Image content analysis, region-based image retrieval, PCA, SOM, RBF

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