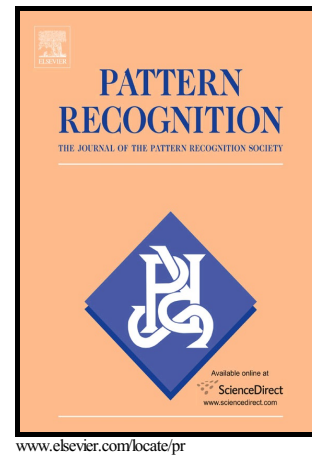


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Learning Structure of Stereoscopic Image for No-Reference Quality Assessment with Convolutional Neural Network

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Abstract

In this paper, we propose to learn the structures of stereoscopic image based on convolutional neural network (CNN) for no-reference quality assessment. Taking image patches from the stereoscopic images as inputs, the proposed CNN can learn the local structures which are sensitive to human perception and representative for perceptual quality evaluation. By stacking multiple convolution and max-pooling layers together, the learned structures in lower convolution layers can be composed and convolved to higher levels to form a fixed-length representation. Multilayer perceptron (MLP) is further employed to summarize the learned representation to a final value to indicate the perceptual quality of the stereo image patch pair. With different inputs, two different CNNs are designed, namely one-column CNN with only the image patch from the difference image as input, and three-column CNN with the image patches from left-view image, right-view image, and difference image as the input. The CNN parameters for stereoscopic images are learned and transferred based on the large number of 2D natural images. With the evaluation on public LIVE phase-I, LIVE phase-II, and IVC stereoscopic image databases, the proposed no-reference metric achieves the state-of-the-art performance for quality assessment of stereoscopic

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