BRINT: Binary Rotation Invariant and Noise Tolerant Texture Classification

Abstract:

In this paper, we propose a simple, efficient, yet robust multiresolution approach to texture classification-binary rotation invariant and noise tolerant (BRINT). The proposed approach is very fast to build, very compact while remaining robust to illumination variations, rotation changes, and noise. We develop a novel and simple strategy to compute a local binary descriptor based on the conventional local binary pattern (LBP) approach, preserving the advantageous characteristics of uniform LBP. Points are sampled in a circular neighborhood, but keeping the number of bins in a single-scale LBP histogram constant and small, such that arbitrarily large circular neighborhoods can be sampled and compactly encoded over a number of scales. There is no necessity to learn a texton dictionary, as in methods based on clustering, and no tuning of parameters is required to deal with different data sets. Extensive experimental results on representative texture databases show that the proposed BRINT not only demonstrates superior performance to a number of recent state-of-the-art LBP variants under normal conditions, but also performs significantly and consistently better in presence of noise due to its high distinctiveness and robustness. This noise robustness characteristic of the proposed BRINT is evaluated quantitatively with different artificially generated types and levels of noise (including Gaussian, salt and pepper, and speckle noise) in natural texture images.