Deep Hashing for Scalable Image Search

Abstract:

In this paper, we propose a new deep hashing (DH) approach to learn compact binary codes for scalable image search. Unlike most existing binary codes learning methods, which usually seek a single linear projection to map each sample into a binary feature vector, we develop a deep neural network to seek multiple hierarchical non-linear transformations to learn these binary codes, so that the non-linear relationship of samples can be well exploited. Our model is learned under three constraints at the top layer of the developed deep network: 1) the loss between the compact real-valued code and the learned binary vector is minimized, 2) the binary codes distribute evenly on each bit, and 3) different bits are as independent as possible. To further improve the discriminative power of the learned binary codes, we extend DH into supervised DH (SDH) and multi-label SDH by including a discriminative term into the objective function of DH, which simultaneously maximizes the inter-class variations and minimizes the intra-class variations of the learned binary codes with the single-label and multi-label settings, respectively. Extensive experimental results on eight widely used image search data sets show that our proposed methods achieve very competitive results with the state-of-the-arts.