In this paper, we propose an extremely efficient algorithm for visual re-ranking. By considering the original pairwise distance in the contextual space, we develop a feature vector called sparse contextual activation (SCA) that encodes the local distribution of an image. Hence, re-ranking task can be simply accomplished by vector comparison under the generalized Jaccard metric, which has its theoretical meaning in the fuzzy set theory. In order to improve the time efficiency of re-ranking procedure, inverted index is successfully introduced to speed up the computation of generalized Jaccard metric. As a result, the average time cost of re-ranking for a certain query can be controlled within 1 ms. Furthermore, inspired by query expansion, we also develop an additional method called local consistency enhancement on the proposed SCA to improve the retrieval performance in an unsupervised manner. On the other hand, the retrieval performance using a single feature may not be satisfactory enough, which inspires us to fuse multiple complementary features for accurate retrieval. Based on SCA, a robust feature fusion algorithm is exploited that also preserves the characteristic of high time efficiency. We assess our proposed method in various visual re-ranking tasks. Experimental results on Princeton shape benchmark (3D object), WM-SRHEC07 (3D competition), YAEL data set B (face), MPEG-7 data set (shape), and Ukbench data set (image) manifest the effectiveness and efficiency of SCA.