Neighborhood Graph-Optimized Preserving Discriminant Analysis for Image Feature Extraction

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Abstract : The image data collected in reality often have high dimensions, and it contains noise and redundant information. Therefore, it is necessary to extract the compact feature expression of the original perceived image. In this process, effective use of prior knowledge such as data structure distribution and sample label is the key to enhance image feature discrimination and robustness. Based on the above considerations, this paper proposes a local preserving discriminant feature learning model based on graph optimization. The model has the following characteristics: (1) Locality preserving constraint can effectively excavate and preserve the local structural relationship between data. (2) The flexibility of graph learning can be improved by constructing a new local geometric structure graph using label information and the nearest neighbor threshold. (3) The $L_{2,1}$ norm is used to redefine LDA, and the diagonal matrix is introduced as the scale factor of LDA, and the samples are selected, which improves the robustness of feature learning. The validity and robustness of the proposed algorithm are verified by experiments in two public image datasets.