

Video Similarity Measurement Approach via Dimensionality Reduction with Distance Space and Random Projection: Application with Sports Video Classification

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Abstract

A critical issue of measuring video similarity is most video data are huge files, which vary in terms of length and amount of data, resulting in time-consuming data processing. Therefore, reducing the dimensionality of the data becomes a necessity. This paper proposes the video similarity measurement approach for sports video classification by dimensionality reduction with distance space and random projection (RP). All frames of training videos are extracted by color histogram based method. After that, the clustering technique is performed to provide the centroids of each cluster, called *reference vectors*. These vectors are used as a set of basis to create new space, called *distance space*. For any sequence in distance space, the new feature is represented by the frequencies of similar frame comparing with each reference vector. Afterwards, all features of videos are projected onto a low-dimensional subspace using a random projection. Finally, the nearest neighbor (NN) classifier is applied to compare the similarity of the videos between the training videos and the test videos in new space. Accordingly, the proposed approach helps enhance feature dimension reduction, resulting in faster data processing. The experimental results show that this approach is both efficient and effective in sports video similarity measurement.