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

Prisana Mutchima and Parinya Sanguansat
prisanut@hotmail.com   sanguansat@yahoo.com
Faculty of Information Technology, Rangsit University, Thailand

Summary
This paper proposes the video similarity measurement approach for sports video classification by dimensionality reduction with random projection (RP) and distance space because 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. All frames of training videos are extracted by color histogram based method. After that, all features of videos are projected onto a low-dimensional subspace by RP for reducing the dimensionality of the data. Afterwards, 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. Finally, videos will be classified by term weighting and the nearest neighbor classifier. 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.

Key words:
Video Similarity Measurement, Random Projection, Distance Space, Sports Video Classification, Term Weighting