

## Abstract

E-learning has become an integral part in higher education in the last decade. The emerging multimedia information technologies allow researchers to identify new ways to store, retrieve, share, and manipulate complex information which are expected to be used for building exciting new e-learning applications. The key challenges in this field are related to data organization and integration, indexing and retrieval mechanisms, intelligent searching techniques, information browsing, content-based query processing, handling of heterogeneity etc.

This thesis reveals a profile based feature identification system for multimedia database systems which is designed to support the use of video clips for e-learning. The system creates profiles of presenters appearing in the video clips based on their facial features and uses these profiles to identify similar video segments based on the presenter profiles. The face recognition algorithm used by the system is based on the Principal Components Analysis (PCA) approach. The thesis addresses one of the main problems identified in profile construction over video key-frames which is the overlapping of key-frames in the eigenspace. It explains various tests carried out to explore the causes for this problem and then proposes a novel approach to overcome the problem by introducing a profile normalization algorithm. In particular, this method reveals the profile overlapping problem can be controlled by using certain parameters obtained by analyzing a collection of key-frames.