# Chapter 1 Introduction

With the advances of broadband networks, high-powered workstations, and compression standards, the amount of multimedia data, such as television broadcasts and surveillance videos, increases rapidly in recent years. The best applications of multimedia data include distance learning, interactive television and digital libraries. Among different type of multimedia, video information is considered the most important one due to its rich content. It is obvious that the usefulness of a digital information is limited by the effectiveness of the access methods that can be applied to access it. Therefore, a video retrieval system that can effectively retrieve the videos similar to a given query video is most necessary in recent years.

The strategies that can be applied to perform video retrieval can be roughly categorized into two classes [1,2], one is annotation-based video retrieval [3] and the other is content-based video retrieval [4]. The former represents the visual contents in textual form (e.g., keywords and attributes) and then use these features to execute video retrieval. These keywords serve as indices to access the associated visual data. This approach has the advantage that visual database can be accessed using standard query languages such as SQL. However, this approach results in many drawbacks, such as it entails extra storage and needs a large amount of manual processing.

Moreover, from the reliability view point, the above mentioned descriptive data has several drawbacks. First, it cannot be transformed to a standard language. Second, it is very often inconsistent. Third, it cannot properly capture the content of image or video. Under the above circumstances, the retrieval results may not be satisfactory since the query is represented based on an insufficient set of features. As to the category of content-based video retrieval, its main concept is to index the video data based on visual features, such as color feature or motion feature. When users want to retrieve the similar videos from the database, they just show a query video and the visual features of the query video are extracted. The system will compute the degree of similarity between the query video and every video in the database. For those database videos that are similar to the query video are output and returned to the users. The advantages of a content-based video retrieval system are three-fold. First, it can retrieve target visual data solely based on their content. Second, it is domain independent. Third, the system is completely automated. There are many researches about the retrieval of video and image data based on their visual content such as color distribution, texture and shape [5]. These approaches are mainly based on similarity measurement. Examples include VisualSEEK [6], Photobook [7], Virage video engine [8],

and VideoQ [9]. In this thesis, we intend to propose a video retrieval system that bases its search criterion on color. Experiment results have supported that our system is indeed efficient and accurate.

The rest of this thesis is organized as follows. An overview of video retrieval system is presented in section 2.1 and our system model is described in section 2.2. In section 3, we propose a new key frame extraction approach. Our color feature extraction approach is presented in section 4. Section 5 shows the experiment and the powerfulness of our system. Concluding remarks will be drawn in section 6.