Preface

With the explosive growth of multimedia databases in terms of both size and variety, effective and efficient indexing and searching techniques for large-scale multimedia databases have become an urgent research topic in recent years.

For data organization, the conventional approach is based on keywords or text description of a multimedia datum. However, it is tedious to give all data text annotation and it is almost impossible for people to capture as well. Moreover, the text description is also not enough to precisely describe a multimedia datum. For example, it is unrealistic to utilize words to describe a music clip; an image says more than a thousand words; and keywords-based video shot description cannot characterize the contents for a specific user. Therefore, it is important to utilize the content based approaches (CbA) to mine the semantic information of a multimedia datum.

In the last ten years, we have witnessed very significant contributions of CbA in semantics targeting for multimedia data organization. CbA means that the data organization, including retrieval and indexing, utilizes the contents of the data themselves, rather than keywords provided by human. Therefore, the contents of a datum could be obtained from techniques in statistics, computer vision, and signal processing. For example, Markov random fields could be applied for image modeling; spatial-temporal analysis is important for video representation; and the Mel frequency cepstral coefficient has been shown to be the most effective method for audio signal classification.

Apart from the conventional approaches mentioned above, machine learning also plays an indispensable role in current semantic mining tasks, for example, random sampling techniques and support vector machine for human computer interaction, manifold learning and subspace methods for data visualization, discriminant analysis for feature selection, and classification trees for data indexing.

The goal of this IGI Global book is to provide an introduction about the most recent research and techniques in multimedia semantic mining for new researchers, so that they can go step by step into this field. As a result, they can follow the right way according to their specific applications. The book is also an important reference for researchers in multimedia, a handbook for research students, and a repository for multimedia technologists.

The major contributions of this book are in three aspects: (1) collecting and seeking the recent and most important research results in semantic mining for multimedia data organization, (2) guiding new researchers a comprehensive review on the state-of-the-art techniques for different tasks for multimedia database management, and (3) providing technologists and programmers important algorithms for multimedia system construction.

This edited book attracted submissions from eight countries including Canada, China, France, Japan, Poland, Singapore, United Kingdom, and United States. Among these submissions, 19 have been accepted. We strongly believe that it is now an ideal time to publish this edited book with the 19 selected
chapters. The contents of this edited book will provide readers with cutting-edge and topical information for their related research.

Accepted chapters are solicited to address a wide range of topics in semantic mining from multimedia databases and an overview of the included chapters is given below.

This book starts from new multimedia information representations (Video Representation and Processing for Multimedia Data Mining) (Image Features from Morphological Scale-spaces) (Face Recognition and Semantic Features), after which learning in multimedia information organization, an important topic in semantic mining, is studied by four chapters (Shape Matching for Foliage Database Retrieval) (Similarity Learning For Motion Estimation) (Active Learning for Relevance Feedback in Image Retrieval) (Visual Data Mining Based on Partial Similarity Concepts). Thereafter, four schemes are presented for semantic analysis in four chapters (Image/Video Semantic Analysis by Semi-Supervised Learning) (Content-Based Video Semantic Analysis) (Semantic Mining for Green Production Systems) (Intuitive Image Database Navigation by Hue-sphere Browsing). The multimedia resource annotation is also essential for a retrieval system and four chapters provide interesting ideas (Hybrid Tagging and Browsing Approaches for Efficient Manual Image Annotation) (Active Video Annotation: To Minimize Human Effort) (Image Auto-Annotation by Search) (Semantic Classification and Annotation of Images). The last part of this book presents other related topics for semantic mining (Association-Based Image Retrieval) (Compressed-domain Image Retrieval based on Colour Visual Patterns) (Multimedia Resource Discovery using Mobile Agent) (Multimedia Data Indexing).

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