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KLUWER ACADEMIC PUBLISHERS
New York / Boston / Dordrecht / London / Moscow

eBook ISBN: 0-306-47033-0
Print ISBN: 0-792-37944-6

©2002 Kluwer Academic Publishers
New York, Boston, Dordrecht, London, Moscow

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Massachusetts

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Contents

Preface

Due to the rapid advances in computing and communication technologies, human beings are constantly being inundated by information in form of text, image, audio, video and spatial data. There is an overwhelming need for an integrated multimedia system to reduce the work and information overload for people. The technologies for handling multimedia data are most important and most challenging: our society is increasingly generating vast amount of multimedia data by means of cameras, satellites, etc.; the complexity and variety of multimedia data are beyond one's imagination.

It is quite natural for us human beings to recall multimedia information by content. We recognize our friends by their appearances. The story of one video may remind us of the ones similar to that. Therefore, content-based access to multimedia is of primary importance. This book deals with various aspects of content-based multimedia systems.

Formalization of the whole paradigm of content-based retrieval to bring it to a sufficient level of consistency and integrity is essential to the success of the field. After introduction, we will discuss the formalism of content-based multimedia systems, which is proposed and developed by the authors of the book. With the formalism, a reconfigurable retrieval engine can be developed.

For the content-based retrieval of a large multimedia database, a unified feature space (referred to as vector space in information retrieval community) is desirable. In such a unified feature space, data items can be represented and measures of similarity can defined.

Unlike conventional databases, where primary data types are well handled by standard query languages such as SQL, the retrieval of multimedia databases is approximate, and is not likely able to be handled by a single language like SQL. In the fourth chapter, we will present methods for content-based indexing for visual browsing, fuzzy retrieval method, customizable similarity retrieval, and case-based reasoning.

As show cases, three application examples will be presented. A face database is a typical image database where each data item share the same structure. Many concepts can be demonstrated using this system. Because of the diversity of the trademarks, the retrieval of conflicting trademarks

relies on several properties of those trademarks. These include the word, phonetics, shape and interpretation of the trademark image. The system retrieval engine should be able to find feature spaces to accommodate those properties in order to define proper similarity functions. The medical database example is used to illustrate case-based reasoning. Digital photo album is a very practical application as digital cameras become popular.

This book covers the research results supported by Kent Ridge Digital Labs (KRDL), Singapore and funded by Real World Computing Partnership (RWCP), Japan. The authors sincerely appreciate the support and help given by the management and colleagues from these two organizations.

The following people made contributions to the book: Chian Prong Lam (Chapter 10 and 11), Fuchun Shang (Chapter 4, 7 and 12), Xinding Sun (Chapter 5), Bin Wang (Chapter 6), and Harro Stokman (Chapter 7). We would also like to thank Ms. Anuradha Srinivasan for the proofreading help.

Jian-Kang WU