

Weisi Lin, Dacheng Tao, Janusz Kacprzyk, Zhu Li, Ebroul Izquierdo, and
Haohong Wang (Eds.)

Multimedia Analysis, Processing and Communications

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Ebroul Izquierdo, and Haohong Wang (Eds.)

Multimedia Analysis, Processing and Communications

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Preface

The rapid advances in computing, communication and storage technologies have heralded a new age of explosive growth in multimedia applications, such as online image and video repository, mobile TV and IPTV, video on demand, interactive multimedia game, video blogging, and multimedia based social interaction. These applications open up new opportunities and present new challenges to the technologies in the area of multimedia computing architectures, audio/visual information processing, multimedia analysis and understanding, multimedia retrieval and mining, multimedia coding, communication and networking. During the recent years, considerable amounts of research activities in both industry and academia have been devoted to these topics and a key piece of puzzle is to develop novel and effective approaches in modeling and analyzing, representing and understanding, and encoding and distributing multimedia content, all of which will be the focus of this book.

This edited book provides an excellent forum for experts around the world to present their newest research results, exchange latest experiences and insights, and explore future directions in this important and rapidly evolving field. It aims at increasing the synergy between academic and industry professionals working in the field. It focuses on the state-of-the-art research in various essential areas related to emerging technologies, standards and applications on analysis, processing, computing, and communication of multimedia information.

The target audience of this book will be mainly researchers and engineers as well as graduate students working in various disciplines linked to multimedia analysis, processing and communications, e.g., computer vision, pattern recognition, information technology, image processing, and artificial intelligence. The book is also meant to a broader audience including practicing professionals working in image/video applications such as image processing, video surveillance, multimedia indexing and retrieval, and so on.

Since this book comprises different algorithmic advances and applications, it has been organized into three parts, as outlined and introduced as follows.

Part I: Image Processing and Analysis

The issues related to image processing and analysis are to be discussed in the first eight chapters. In particular, image processing is usually referred to as the mathematical operations on images, generally with digital computers, in order to make modifications, extract certain information or perform understanding and retrieval. The earliest techniques, such as medical imaging, character recognition

and image enhancement, can be traced back to 1960s. Throughout the years, with the proliferation of digital cameras and the advances of computing hardware, more and more image processing techniques are developed, and they are attracting the interests of multiple research communities. Nowadays, people are living with the surroundings of images and their processing. After capturing a photo, you can perform many meaningful modifications like segmentation, fusion and matting. When photos are uploaded to Facebook, face detection and recognition technology can help to organize these photos. One can also easily find images or photos he or she wants via content-based or text-based retrieval techniques. In this part, we cover image database visualization and browsing, human computer interactions in image retrieval, image watermarking, and sketch based face recognition, as well as some low level image processing techniques, e.g., image segmentation and deblurring. In each chapter, appropriate evaluation has been included for the introduced techniques and their applications in multimedia services.

Part II: Video Processing and Analysis

We then turn to discussion about video processing and analysis in Chapters 9 to 19. Today's fast developments in digital media processing capabilities and network speeds have made the dissemination of multimedia data more rapid and reliable, and attracted significant research attentions to action recognition, event detection, and video tracking and surveillance. The big improvements in digital multimedia processing are beneficial to the fast and reliable production, processing and dissemination of large amounts of digital data. However, this can easily become a time consuming and cumbersome problem. Therefore, the automated extraction of high level information (such as when and where activities occur, or who and what is in a video) using low-level image and video features (e.g. color, texture, shape, motion) is critical for the future development of multimedia research. Some specific video processing and analysis techniques like video frames localization, video shots detection and segmentation, and activity localization have attracted significant attention. In this part, we focus on the research works on object detection/tracking in surveillance videos, human action recognition based on different types of features, 2D and 3D pose recovery, domain driven video analysis, knowledge extraction with scalable ontological networks for video retrieval, visual quality assessment, and video recommendation. Examples in real world applications and computer simulation results are also presented to give convincing illustrations and help the readers to achieve a deeper insight in the related topics.

Part III: Communications Related Processing

In present age of information technology, multimedia data are ubiquitous in our daily life and work. Thus, multimedia research has become one of the central issues in the relevant research and development. The rapid growth of computer network and communication technology has pushed forward greatly the overall advance of multimedia technology. The study on multimedia data compression is

not only important for theoretical studies but also urgently needed in practice. Along with the development of digital video equipment, people take photos and videos with better quality. Moreover, people's continuously pursuing of better visual effect and experience promotes the emergence of high definition (HD) TV, HD video, etc. How to store and transfer these huge data becomes a critical issue for multimedia research. For example, when people need to share photos on the internet, they need a proper compression technique to maintain data quality. Therefore, communication related issues are important for multimedia research. In this part (Chapters 20 to 26), we introduce techniques related to multimedia signal coding, evaluation and transmission.

This book project has brought 26 groups of active researchers together in the areas which we really believe in and with the technology that is expected to have great impact in our work and life. The preparation of this book has been a long, arduous and difficult task. We would like to thank all the authors for their great effort and dedication in preparing their quality contributions. Also, all the reviewers of this Springer book deserve our utmost gratitude. We have enjoyed the whole process, and hope that the researchers, engineers, students and other professionals who read this book would find it informative, useful and inspirational toward their own work in one way or another.

November 2010

Weisi Lin
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