

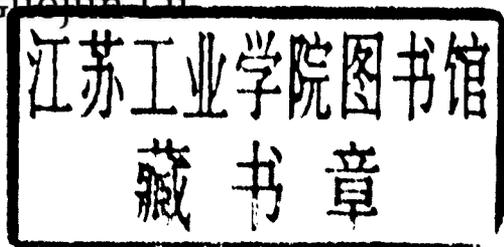
**COMMUNICATION
AND COMPUTING
FOR DISTRIBUTED
MULTIMEDIA
SYSTEMS**

GUOJUN LU



Communication and Computing for Distributed Multimedia Systems

Guojun Lu



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Preface

There have been many research and development activities in multimedia computing and communications in recent years. Multimedia computing and communications are becoming a specialized area encompassing many technology fields such as digital signal processing, computing, and telecommunication. In the last few years, publications, including conference papers, journal papers, and books (mostly edited), on multimedia applications and technology have flourished. But sources that provide systematic treatment to distributed multimedia technology are hard to find. This book is an attempt to fill this gap and to contribute to formalizing multimedia computing and communications into a formal discipline.

This book deals with the technical aspects of multimedia computing and communications. The main differences in system requirements between multimedia computing and communications systems and conventional computing and data communications systems stem from the differences between characteristics of multimedia data and alphanumeric data. Due to these requirement differences, multimedia computing and communications need special support from all components and subsystems of a computing and communications system, including capturing, processing, storage, transmission, and presentation subsystems. To organize the book along this line of thinking, the book first describes the characteristics of various types of information media, then explains the main differences of systems requirements between multimedia computing and communications and traditional computing and data communications, describes issues and problems arising from these differences, and finally describes current techniques and systems to overcome these problems.

To capture and guarantee the requirements of multimedia data and applications, the quality of service (QOS) paradigm is used throughout the book. Simply stated, the QOS paradigm is like a contract: applications specify QOS requirements and the system should meet these requirements if the applications are accepted. So the important issues are how to specify these requirements, how to transfer these application requirements into system resource requirements, and how to guarantee these requirements efficiently and effectively. This QOS framework applies to all levels or subsystems of a distributed multimedia system. If all subsystems can provide QOS guarantees, the overall system will be able to meet the overall application QOS requirements, and distributed multimedia applications can be developed systematically.

To provide QOS guarantees to applications is just one aspect of the central issue of multimedia technology; the other aspect is to use system resources efficiently by taking advantage of the characteristics of multimedia data and applications. The latter aspect makes distributed multimedia systems more challenging and different from conventional

dedicated real-time systems and communications systems using dedicated circuits or channels. In distributed multimedia systems, most resources, such as CPU time, memory, secondary storage, and communication channels are shared among many applications, so the central issue is how to provide QOS guarantees to applications while system resources are used efficiently.

This book is intended for the following groups of readers:

- University students at senior levels and postgraduate students. Many universities around the world have started or will start to offer subjects related to multimedia technology. This book serves as a text for such subjects.
- Researchers. This book describes the issues and current technology of distributed multimedia computing. It also provides direction in many research issues.
- Other professionals who want to know technical issues and current status of distributed multimedia computing.

I would like to thank my colleagues and friends in Gippsland School of Computing and Information Technology of Monash University and the School of Computing and Mathematics of Deaking University for their support during the writing of this book. I sincerely thank Catherine Lang and Albert Goodman who read chapters of the draft of this book and corrected many mistakes for me.

Professor Gordon Blair of Lancaster University reviewed the book and provided many helpful comments and suggestions, for which I am most grateful.

I dedicate this book to my wife Fengxia, sons James and Colin, parents, and parents-in-law, without whose support and understanding the writing of this book would not be possible.

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