PREFACE

Objectives: The book is written with two main objectives in mind: to present (1) a comprehensive foundation knowledge resource about multimedia technologies in one single volume and (2) a suitable model to teach this subject with particular emphasis on field practice and active experimentation. We hope that the book will provide the necessary foundation concepts that will trigger the reader's curiosity to explore further.

Target Readers: The subject of multimedia is included in various undergraduate and professional courses. Thus the book is written with particular emphasis on catering to the special needs of the BTech (CS and IT), BCA, BSC (CS and IT) and MCA course syllabi. Sufficient foundation and practical orientation is provided so that students can gain a strong fundamental knowledge. In addition, information technologists, computer scientists, digital media professionals and others interested in multimedia will find the book to be stimulating and a good reference source.

Philosophy and Pedagogy: The field of Multimedia technology is the culmination of a number of technologies and disciplines. It covers almost all the areas of computer science (both hardware and software) and communications. Further, multimedia technology is characterised by fast developments in communication, Internet, hardware technologies and tools. In addition, the disciplines of management, psychology, art and creativity are also involved. Hence, the multi-disciplinary nature of the subject makes it a tough topic to teach. It is equally tough for the students to master all these technologies and concepts. The subject's depth and breadth are therefore the two fundamental problems in teaching and learning multimedia technology. Moreover, the following beliefs guided our plan for the book.

- A book's scope can never be large enough to teach everything that we believe that a learner ought to know. So we should guide him/her to learn the most important aspects—the fundamentals.
- Problem solving and hands-on experimentation is most important for the subject of multimedia technology. Therefore, support is to be provided for the learners on how to solve various kinds of problems. This can be achieved through the tutorials.
- It is important that the learners apply whatever they learn. Thus, they should be encouraged to articulate their interest through reviewing the concepts and implementing them through project development.

In order to tackle the dilemma of depth and breadth of coverage, the 80:20 statistical thumb rule has been adopted as the foundation philosophy for this book. The statistical principle de-

scribed by the Pareto Principle fits magnificently well in learning and teaching the subject of multimedia technology. We have attempted to cover the 20% that represent the kernel concepts defining the foundation of the subject. We believe that once the fundamentals become clear, the students continue to learn through creative impulses aided by reference sources. For this purpose, several online reference sources are made available to the readers:

(1) **Online Learning Centre for students and faculty**. This can be accessed at http://www. mhhe.com/banerji/fmt.

For the Student:
- Additional Questions
- Web References
- Real Life Case Studies
- Tutorials on Multimedia Technology
- Application Development Tools

For the Instructor:
- Solutions to Practice Exercises and Review Questions
- PowerPoint Slides
- Web References

(2) **Online forum** that any reader can participate in to discuss with the authors—eworld: http://groups.google.com/group/eworld.

In view of the dynamic nature of multimedia tools, we have attempted to remain neutral to specific developmental software. Further, in order to stimulate learning and for catering to the various learning styles, we have adopted varied presentation approaches. These include—practical orientation backed by theoretical foundations, examples, exercises and resources.

Model for Exploration: The information and communication model has been used as the foundation of this book's pedagogy and information presentation. The model is described in Chapter 1 and the following diagram explains it graphically. In Chapter 13, we have elaborated how this communication model helps to evolve human-human communication in a widely distributed context.
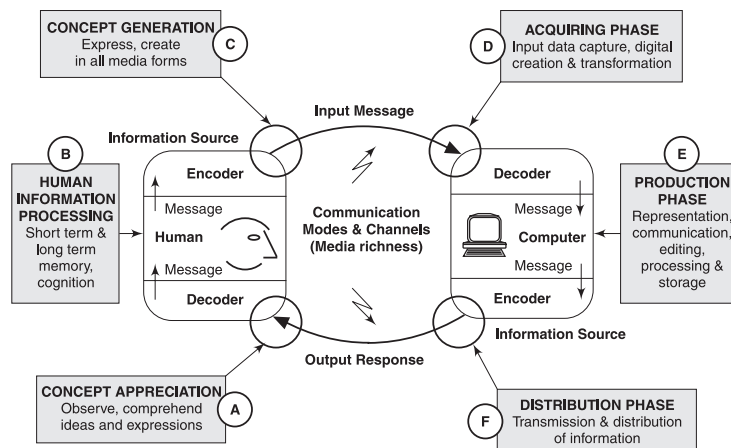
Organisation of the Book: The book is organised into six major sections. These are logically sequenced and are built on top of each other. The sections are: *Foundation topics*, *Visual media*, *Audio media*, *Audio-visual media*, *Media integration* and *Future direction*. Composition of the chapters and their structural relationship is shown in the following diagram.
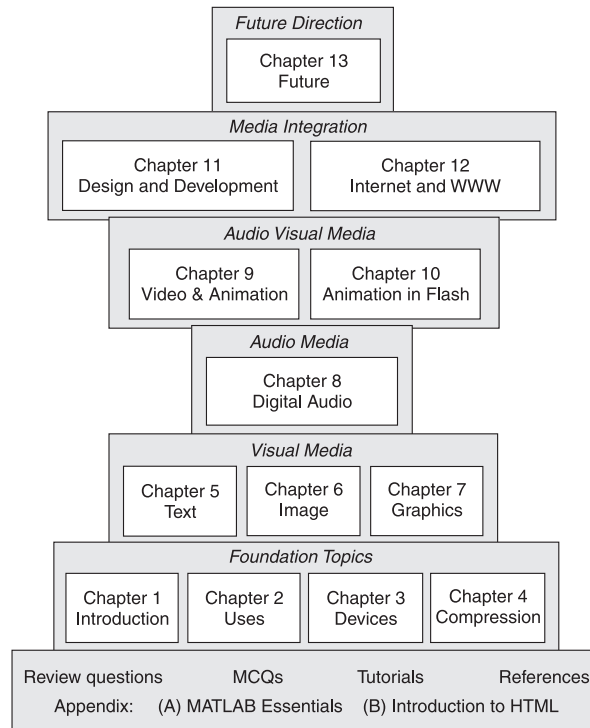
The *Foundation topics* will help the reader to appreciate: (a) the broad foundation of multimedia and human-computer interaction that defines the root of multimedia, (b) what its possible uses and applications are, (c) what multimedia and interaction technologies include and (d) the basis of computer technologies such as compression algorithms that have made multimedia possible. These topics are covered in Chapters 1 to 4. The discussions then moves on to *Visual media*. This includes text, image and graphics—the predominant media of human communication. The digital representation and processing of these are examined in Chapters 5, 6 and 7.

Chapter 8 covers the essentials of *Audio media*. This is followed by discussions on *Audio-visual media* covering video and animation in Chapter 9 and creating animation with Flash in Chapter 10. An introduction to ActionScript with examples is also provided along with Flash basics. Video and animation are called rich media because they include both visual media and audio media in a time-based synthesis. Then, we move onto *Media integration*. In Chapter 11, we describe the skills required to develop and manage multimedia projects. Chapter 12 discusses the Internet and WWW, which have now become the main vehicles for media integration and delivery. Finally, in Chapter 13, we will look into the emerging possibilities of computing technologies leading to enriched multimedia capabilities.

Features: The book will provide the much-needed theoretical foundation along with enough practical guidance for the reader to develop applications. Educational technology principles have been incorporated into the book by way of additional resources, exercises and assignments. In particular, MATLAB based assignments have been chosen so that the learners can easily test and experiment with the ideas presented, such as compression techniques. MATLAB is widely used in industry as well as in the academic world. The Student Version of this software provides an ideal computing environment for engineering students of different disciplines. Because of the flexible and easy-to-use environment, MATLAB is chosen for this book. Adobe Flash and ActionScript is also introduced because of their wide applications in Internet and the contemporary nature of skill demands for Flash developers.

The book includes extensive examples and references based on teaching and experiences of various projects handled by the authors. We hope that this book will be useful to practitioners interested in Multimedia as well. However, please remember the underlying philosophy of the book is to take you to the first floor with the objective to facilitate in learning the fundamentals of multimedia technology.

The authors are indebted to the following distinguished panel of reviewers for their extremely pertinent and valuable suggestions that helped to shape the book in its current form.

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Tribute

In writing the book, I fondly remember and pay my respects to several persons who have inspired me over the years: *Late Dr Bholanath Banerji*, my father who was my foremost teacher; *Prof. Philip Barker* who triggered my interest in the topic and scientific exploration; my friend and former colleague, Mr Francis Chan of Interactive Multimedia Center, Singapore Polytechnic who cajoled me to design the first course on Multimedia for Business besides initiating several industrial multimedia R&D work; *Prof. Jamini Das*, former Director of CEMK, who entrusted me with organising the courses and laboratory practices on Multimedia in the early days of the Institute; and Dr Glenda Scales of Virginia Polytechnic and State Institute who has been my friend and virtual colleague in many intellectual explorations for about two decades. Lastly, I pay homage to all my teachers and mentors for setting me in the path of learning and this book is a tribute to them.

Ashok Banerji