PREFACE

Multimedia computing and communications have emerged as a major research and development area. Multimedia computers in particular open a wide range of possibilities by combining different types of digital media such as text, graphics, audio and video. The emergence of the World Wide Web, unthinkable even two decades ago, also has fuelled the growth of multimedia computing.

There are several books on multimedia systems that can be divided into two major categories. In the first category, the books are purely technical, providing detailed theories of multimedia engineering, with an emphasis on signal processing. These books are more suitable for graduate students and researchers in the multimedia area. In the second category, there are several books on multimedia, which are primarily about content creation and management.

Because the number of multimedia users is increasing daily, there is a strong need for books somewhere between these two extremes. People with engineering or even non-engineering background are now familiar with buzzwords such as JPEG, GIF, WAV, MP3, and MPEG files. These files can be edited or manipulated with a wide variety of software tools. However, the curious-minded may wonder how these files work that ultimately provide us with impressive images or audio.

This book intends to fill this gap by explaining the multimedia signal processing at a less technical level. However, in order to understand the digital signal processing techniques, readers must still be familiar with discrete time signals and systems, especially sampling theory, analog-to-digital conversion, digital filter theory, and Fourier transform.

The book has 15 Chapters, with Chapter 1 being the introductory chapter. The remaining 14 chapters can be divided into three parts. The first part consists of Chapters 2-4. These chapters focus on the multimedia signals, namely audio and image, their acquisition techniques, and properties of human auditory and visual systems. The second part consists of Chapters 5-11. These chapters focus on the signal processing aspects, and are strongly linked in order to introduce the signal processing techniques step-by-step. The third part consists of Chapters 12-15, which presents a few select multimedia systems. These chapters can be read independently. The objective of including this section is to introduce readers to the intricacies of a few select frequently used multimedia systems.

The chapters in the first and second parts of the book have been organized to enable a hierarchical study. In addition to the Introductory Chapter, the following reading sequence may be considered.

i) Text Representation:	Chapter 6
ii) Audio Compression:	Chapters 2, 4, 5, 6, 7
iii) Audio Processing:	Chapters 2, 4, 5, 10
iv) Image Compression:	Chapters 3, 4, 5, 6, 7, 8
v) Video Compression:	Chapters 3, 4, 5, 6, 7, 8, 9
vi) Image & Video Processing:	Chapters 3, 4, 5, 11
vii) Television Fundamentals:	Chapters 3, 4, 5, 6, 7, 8, 9, 12

Chapters 13-15 can be read in any order.

A major focus of this book is to illustrate with examples the basic signal processing concepts. We have used MATLAB to illustrate the examples since MATLAB codes are very compact and easy to follow. The MATLAB codes of most examples, wherever appropriate, in the book are provided in the accompanying CD so that readers can experiment on their own.

Any suggestion and concern regarding the book can be emailed to the author at the email address: mandal@ee.ualberta.ca. There would be a follow-up website (http://www.ee.ualberta.ca/~mandal/book-multimedia/) where future updates will be posted.

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