Foreword

Multimedia is a technology that allows us to present text, sound, images, animation and film in an interactive way that has the potential to create a tremendous impact on all different aspects of our day-to-day activities. We are witnessing an explosive growth in the use of multimedia in varied applications such as entertainment, communication, collaborative work, electronic commerce and university courses. The application of multimedia has extended to home libraries, magazines and newspapers, classroom teachings, games and multimedia interactive kiosks, etc. It is multimedia that is making possible a way for consumers to remain in their homes and shop for products and services of their choice at prices of their liking. Businesses can now understand their markets more in depth than ever before enabling them to improve quality of production, products, services and consumer satisfaction.

Evolution and interactivity: Throughout the history of digital technologies, multimedia has always existed in some form. In the initial days, multimedia was understood to be a combination of images with sounds. Users were presented with information to listen and/or to read as passive witnesses without any form of interaction except to push a start button. Users had no choice of randomly accessing specific sections of any presentation, or skipping some known or unwanted sections.

Interactivity of human and machines has become a reality when discrete modules of content of different dynamic media (audio and video) could be stored in random access devices. Users are now able to select desired modules of content in order of their own specific interest. Multimedia improved significantly when it became a mix of elements of hyper-linked text, animation, graphics, video and audio in an interactive environment. Multimedia continued to improve as it was integrated into the communication environment. This combination has the potential to transform the 21st century audience from passive recipients of information to active participants in a media–rich learning process.

Applications: The field of education was one of the earliest and most active user of interactive multimedia. Computer-based training programs were developed to help teachers make lessons visual and more interesting to the students. The advent of multimedia played a great role in grabbing the attention of the learner – the first step of learning. The relationships between cognition, learning and education were

carefully analyzed to select multimedia blocks. Based on knowledge from the analysis, the educator could control the order of their presentations such that each media presentation had a planned impact on the major components of a learning cycle – attention, rehearsal, encoding, and retrieval. Opportunity to access the multimedia blocks in a controlled, but desired order addressed the approach of a learner for a new concept and process of remembering things. As multimedia provides substantial interaction with the user, the user establishes the concept in mind more firmly, which is an important step in learning and development. The avenues for multimedia applications have varied dimensions.

Today, multimedia applications have expanded to countless number of other areas including wireless technology. The increasing use of personal computers, with increasingly powerful innovative technology and video compression capabilities, is making full screen, full motion video and video on demand a reality. In applications like videoconferencing and videophone, the improvement in quality is amazing. Many advanced applications of multimedia, which were otherwise thought of as merely ideas, have now become a reality. Interactive television is a rapidly growing and progressive concept. Multimedia homes, once a future dream, are nearing a reality that will include virtual conference, portable newspapers and interactive televisions, virtual reality games and the home office, etc.

Wide use of multimedia across different fields has resulted in it meaning different things to different people. Some look at multimedia as a communication tool or an artistic medium, while others consider multimedia to be a teaching and learning tool or a way to complete a business transaction, etc. Multimedia may refer to a collection of all of these views by its use of variety of media to communicate messages, ideas and content, through a multi-sensory experience.

Nevertheless, while developing multimedia applications the target audience, the objective of the project, the structure of the application, the selection of multimedia building blocks for presentation of content, the desired degree of interactivity between the user and the application, and the expected level of user interaction need to be considered.

Major issues: Whatever the application area is, it is clear that the volume of information in multimedia data is vast and increasing. The major hurdle in the quest for building an Information Superhighway that would carry vast amounts of multimedia data is the bandwidth. With the advent of the Internet, the usage of multimedia applications has reached more people. Still bandwidth limitations exist. Removal of this limitation is necessary for boosting the usage by improving delay and jitter parameters. The real time applications suffer as the resulting delay can have large variations and could be unpredictable. Real-time distributed multimedia

environments, characterized by timing constraints and end-to-end quality of service (QoS) requirements, have set forth new challenges for efficient management mechanisms to respond to transient changes in the load or the availability of the resources.

Other important issues include interoperability, standardized protocol definitions and social impacts, etc., of multimedia systems. The applications need to be coded and developed in a standardized fashion for use in different end-systems. Uniform way of supporting real-time audio and video stream handling and synchronization is an important issue. From the social aspect, we need to find answers to how human behavior will change with so many facilities made readily available at home. People may not require meeting others at all or may meet only on rare occasions. For example, one may order food, household items or services through interactive television while watching a movie. One may complete most office requirements sitting on a home computer. We need to resolve several questions. For example, do we need to find a balance to benefit from the emerging multimedia technology?

So, in the process of realizing our technological ambitions, we need to address a number of technology, management, design, and social issues. We need to be familiar with promising emerging applications. It is impossible to track the magnitude and breadth of changes that multimedia and communication technology is bringing to us daily in many different ways across the globe. Consequently, this book presents an overview of expanding technologies in light of the ongoing and overriding issues. The purpose is, of course, identify techniques for addressing those issues. As we search for definite answers to different issues, it is certain that multimedia will make information and communication easy to access and use to an extent we had not thought before.

Mahbubur Rahman Syed
Editor