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## Preface

Recent years have brought many changes to the world of mass media. The Internet and mobile communications technology have provided consumers with interactive digital services. Television is catching up with this trend through the digitalization process. Digital television is a hybrid platform combining elements from classical analog television and the Internet, providing modern multimedia services on a familiar platform. In short, digital TV is a gateway to the world of interactive digital media.

Digital TV brings the consumer into the television service arena and offers him new degrees of freedom. However, as the service and multimedia content types diversify and the services and their content increase, television is facing many of the same challenges of complexity and information overflow faced by other digital media.

Metadata can handle the diverse services and content of digital TV efficiently and in a consumer-friendly way. Metadata means that the data are accompanied by other data which describe them. As data about data, metadata can provide an insight into syntactically and semantically complex data by distilling their essence to a set of simple descriptors. Metadata also helps to structure and manage information in diverse settings. The use of metadata in broadcast multimedia should not be restricted to being merely a tool for coping with the challenges of a complex networked multimedia environment. Instead, metadata offers new opportunities for the development of innovative services.

The research done by the *broadcasting multimedia group* at the Digital Media Institute (Institute of Signal Processing, Tampere University of Technology, Finland) has given us considerable experience and expertise with broadband multimedia. Our search for novel types of interactive service led to our applying metadata to digital TV. Metadata assists in bringing existing services to a new level and creating more advanced types.

Our research has focused on applying selected metadata standards to digital TV. The search for a unified solution for integrating metadata into the television service space showed MPEG-21 to be a good candidate solution for

the creation, delivery and consumption of metadata enabled services. The *digital broadcast item model (DBIM)* catalyzes the digital item methodology of MPEG-21 into a new converging concept for deploying metadata-based services in digital TV. The idea of the digital broadcast item model (DBIM) goes back to the year 2001, when the IEEE standard for the *learning object model (LOM)* was presented at a conference in Tampere, Finland. LOM introduced unified metadata structures for e-learning content. The authors realized that a similar structure was missing from the domain of digital TV. MPEG-21 was then identified as the natural starting point for the development of a unified metadata model for broadcast multimedia.

Our subsequent research work has focused on the development of a digital broadcast model, its accompanying service architecture and the services it can offer. The research work culminated in the establishment of an MPEG *ad hoc* group “MPEG-21 in broadcasting” in 2003, chaired by the senior author of this book, to promote standardization within ISO/IEC.

This book describes how the use of the unified metadata model in digital broadcasting enhances traditional television service. Starting with a comprehensive overview of broadcast multimedia and related metadata, architectural design principles are presented for creating and using the digital TV platform services with a unified multimedia asset model within a metadata processing framework.

The digital broadcast item model (DBIM) represents a technical framework and a set of guidelines for managing services throughout the broadcast life-cycle. In short, it is a new converging concept for metadata in broadcasting. This is described in detail with emphasis on new innovative services and pathways that are likely to emerge over the next few years.

This book was written at the Digital Media Institute (Prof. Hannu Eskola, director), Institute of Signal Processing (Prof. Moncef Gabbouj, head) of the Tampere University of Technology, Finland. Our institute has provided a stimulating and open environment for the development of novel research ideas. We thank all our friends and colleagues for their discussions and companionship. Special credit goes to the members of the project teams of the broadcasting multimedia group, namely: Heikki Lamminen, Mathew Anurag Mailaparampil, Florina Tico, Mikko Oksanen, Perttu Rautavirta, Jussi Lyytinen, Heikki Mattila and Kirsi Keskiroosi.

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More information, book errata, software and other novelties can be found on our web-page at: <http://www.digitalbroadcastitem.tv>.

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