GLASS-Studio: An Open Authoring Environment for Distributed Multimedia Applications

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Abstract: Distributed multimedia applications recently gain a large attraction to the multimedia industry. The MHEG (Multimedia Hypermedia Expert Group) is developing an open international standard for the exchange of multimedia presentations and their work has become quite advanced now. This paper describes the MHEG standard and its implementation in the Berkom GLASS project and presents an open authoring environment for distributed multimedia applications in the MHEG context. Our so-called GLASS-Studio is an authoring environment employing the WYSIWYG (What You See Is What You Get) technique. The environment provides abstractions from the authoring domain and the underlying technical infrastructure of the GLASS system. GLASS-Studio supports rapid-prototyping and simulation capabilities, enabling an incremental and iterative design process. Real-world metaphors like direct manipulation and drag&drop provide an easy-to-learn user interface. We present a flexible cooperation scheme based on the blackboard metaphor and show how guidance and assistance for the author can be incorporated. Finally we give an overview of our generic tool named TNO which has been used for the implementation of GLASS-Studio.

Keywords: Multimedia interfaces, authoring, MHEG, human computer interaction, direct manipulation

1 Distributed Multimedia Applications

Distributed multimedia applications have recently become aroused strong interest with attraction to the multimedia industry. With multimedia services large potential is assumed for the consumer market such as Video-on-Demand, Pay-per-View, Tele-Shopping, Tele-Teaching and Entertainment. The technology for storing, compression and transmission seems mature enough to be put on the market. However, the most important problem of standardization has not yet been solved. Standardization is considered a key factor for success of multimedia applications. A lack of standardization leads to a delayed development of multimedia applications (and devices) because of the potential risk of huge investments in case of failure. The MHEG (Multimedia Hypermedia Expert Group) is developing open international standards for distributed multimedia applications and their work has become quite advanced now [7].
1.1 The forthcoming MHEG-Standard

The upcoming MHEG standard addresses the encoded representation of final-form multimedia and hypermedia objects that will be interchanged across services and applications. The objects are encoded in a binary format, which is specified by using ASN.1 (Abstract Syntax Notation, [4]). This allows the platform-independent exchange of multimedia data in heterogeneous environments. MHEG does not redefine exchange formats for content media types. Instead, existing standards like JPEG and MPEG are integrated and can be referenced when declaring content data types.

Fig. 1. MHEG object interchange

MHEG is not just a binary format, it also defines features for real-time interchange and behavior. The so-called MHEG engine interprets the interchanged objects and performs actions (see Fig. 1).

MHEG concepts

The encoding of MHEG is based on the architecture of the ISO/OSI presentation layer. Part of the future MHEG standard is a formal specification of all basic data structures. The abstract syntax (ASN.1) describes the data elements and data structures. The transfer syntax (Basic Encoding Rules, BER) describes the encoding of the data structures and enables the transfer and processing of the MHEG objects in heterogeneous environments. These definitions, together with the associated behavior are the so-called MHEG classes. The MHEG classes are used for the object-oriented design of multimedia presentations. At runtime, instances of the MHEG classes (MHEG objects) are created and interpreted by the MHEG engine. More MHEG objects are created at interpretation time or are retrieved by using the MHEG request/response protocol (MRP).

The basic MHEG classes provide all means for describing kind of content, behavior, user interaction style and composition.

Content

The content class is used to define the particular medium type and spatial or temporal attributes of the objects to be presented. The digital data (e.g. text, image, audio or