Method and System for Enabling Access to a Multimedia Document

This invention relates to a method and a system for enabling access to a multimedia document via a communications network, said access being possible from access means based on different platforms.

In present-day multimedia systems, many heterogeneous subscriber stations based on different technologies with different platforms, such as IBM-compatible PC, Apple Macintosh, or Unix workstations, are interconnected via communications networks. Servers with complex databases store contents for multimedia documents which can be accessed by a subscriber from his/her subscriber station, which represents a means of gaining access to the multimedia documents.

From T. Meyer-Boudnik et al, "MHEG Explained", IEEE Multimedia, Spring 1995, pages 26 to 38, the Multimedia and Hypermedia Information Coding Experts Group (MHEG) standard is known, which is to insure system-independent interaction between the different technologies. The MHEG standard permits a description of complex data from which a multimedia document (pictures, sound, text, video, ...) is assembled, and makes available a formal syntax with which the interrelationship between these data and their dynamic behavior can be described. "Dynamic behavior" means,

for example, interactivity or synchronization of different pieces of information which form part of the multimedia document but are stored in different servers. The complex data from which the multimedia document is constructed are referred to as MHEG objects. An MHEG object may, in turn, be composed of a tree of different other MHEG objects.

According to the MHEG standard, descriptions of MHEG objects from which a multimedia document is assembled are stored in an object-oriented database in a database-specific programming language. This object-oriented database can be accessed by an MHEG server. For the transfer of one of the MHEG objects from the MHEG server to one of the access means, which represents an MHEG client, the MHEG object must be encoded into a transfer language. This transfer language is the Abstract Syntax Notation 1 (ASN.1). In the MHEG client, the encoded MHEG object must be decoded. The MHEG client must have information on the control of the dynamic behavior of the MHEG object, since this information is not transferred between the MHEG server and the MHEG client. In a separate process, the dynamic connections between the MHEG objects, which describe the dynamic behavior, must be established and activated in the MHEG client.

It is a disadvantage of the system according to the MHEG standard that the encoding and decoding processes may take much time, so that the real-time processing of the MHEG objects is adversely affected. In addition, the MHEG client needs information on the

control of the dynamic behavior of one of the MHEG objects. The MHEG client must therefore have a certain intelligence.

It is therefore the object of the present invention to provide a method and a system for enabling simple and effective access to a multimedia document.

This object is attained by the technical teachings of claims 1 and 7, respectively.

According to the invention, the objects from which a multimedia document is assembled are stored in a server in a platform-independent programming language. The encoding and decoding processes required with the use of the transfer language ASN.1 are advantageously replaced by a simple interpretation phase.

It is an advantage of the invention that the information for controlling the dynamic behavior of an object is contained in the respective object itself, so that an access means to which this object is transferred requires no separate information for controlling the dynamic behavior of this object.

According to advantageous aspects of the invention, the objects are objects according to the MHEG standard and are stored in the platform-independent programming language JAVA. According to a further advantageous aspect of the invention, the binary code for defining the objects is stored in the server in file form. This

eliminates the need for complicated object management as is required in conventional databases.

Further advantageous aspects of the invention are defined in the dependent claims.

The invention and its advantages will become more apparent from the following description of an embodiment when taken in conjunction with the accompanying drawing, whose single figure shows one embodiment of the system according to the invention, in which the method according to the invention can be carried out.

Referring to the figure, there is shown a first server DS in which a plurality of objects from which multimedia documents are constructible are stored. In this embodiment, the objects stored in the first server DS are objects according to the MHEG standard. Substitutionally for the stored MHEG objects, one object OB is depicted in the figure. The system further comprises several servers in which content data for the multimedia documents are stored. Substitutionally for these servers, a second server VS is depicted in the figure. This second server VS contains content data for video films. The other servers may contain associated audio information, for example.

The MHEG objects stored in the first server DS contain references to document contents stored in the second server VS and the other servers. The system further

comprises a plurality of access means which may have different platforms. Substitutionally, one access means TM is depicted in the figure. The first server DS, the second server VS, and the access means ZM are connected to a communications network N. In this embodiment, the communications network N is the Internet. It is possible to use other communications networks, such as a communications network based on the Asynchronous Transfer Mode (ATM) standard, etc., provided that the devices communicating with one another via these communications networks are suitably adapted.

The figure further shows an MHEG object OA which is being transferred from the first server DS to the access means ZM via the Internet N.

The MHEG objects in the first server DS are stored in byte code in the JAVA programming language in the form of files. JAVA is an object-oriented, platform-independent programming language which allows the JAVA code to be executed on different platforms without the need for recompilation.

In object-oriented technology, an object is an instance of a specific class. A class is composed of attributes, which describe its contents, and methods, which describe its dynamic behavior. The MHEG objects stored in the JAVA programming language in the first server DS contain, besides information on the static behavior of the MHEG object, e.g., on the composition of the object, the location of the respective object

within the multimedia document, the interrelationships between the various objects, etc., information on the dynamic behavior of the respective object. This means that the respective MHEG object also contains the information on the control of its dynamic behavior, such as temporal relationships between the different objects or information on synchronizations with other objects. One example of information on the dynamic behavior of an object is the duration of the display of an image on a screen of the access means for 10 seconds.

For the transfer of the MHEG object OA from the first server DS via the Internet N to the access means ZM, no encoding and decoding is necessary. The object OA is transferred to and received at the access means ZM in the JAVA programming language. In the access means ZM, the JAVA code of the object OA must be interpreted, i.e., it is translated by a JAVA interpreter into the machine language of the access means ZM. This JAVA interpreter is an interface between the independent JAVA code and the platform on which this JAVA code must be executed. The result of this interpretation is the execution of the JAVA program. Such a JAVA interpreter may, for example, be a JAVA-capable World Wide Web browser, such as Netscape 2.X. This insures in an advantageous manner that for the implementation of the present invention, a widely used man-machine interface can be employed.

The MHEG objects which are transferred to the access means ZM contain all information for assembling and

executing the multimedia document in the access means ZM. The access means ZM itself does not require any further information for handling the received object.

In the embodiment shown in the accompanying figure, in a first step 10, the access means ZM accesses the first server DS by means of a network-transparent request according to the Hypertext Transfer Protocol (HTTP). With this HTTP request, the access means ZM specifies the address of the file containing the objects of the desired multimedia document in the first server DS. In a step 20, the corresponding objects are then transferred from the first server DS to the access means ZM, where they are interpreted by the JAVA interpreter. In a subsequent step 30, the document content specified in the objects, which is stored in the second server VS, is requested and transferred from the second server VS to the access means ZM. The access means ZM can then assemble and execute the multimedia document.

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Claims

1. A method for enabling access to a multimedia document composed of a tree of objects (OA, OB)

wherein the access is possible from access means (ZM) having different platforms,

wherein objects (OA, OB) are stored in a server (DS) in a platform-independent programming language,

wherein the objects (OA, OB) contain information on the control of the dynamic behavior of the respective object (OA, OB),

wherein the objects (OA, OB) are transmitted from the server (DS) over a communications network (N) to one of the access means (ZM), and

wherein an interpreter for the platform-independent programming language translates the objects (OA, OB) into machine language.

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2. A method as claimed in claim 1, characterized in that the objects (OA, OB) are objects according to the Multimedia and Hypermedia Information Coding Experts Group (MHEG) standard.

3. A method as claimed in claim 1, characterized in that the platform-independent programming language is the JAVA programming language.

4. A method as claimed in claim 1, characterized in that the communications network (N) is the Internet.

5. A method as claimed in claim 1, characterized in that the objects (OA, OB) are stored in the server (DS) in files.

6. A method as claimed in claim 5, characterized in that the access means (ZM) access the server (DS) by means of a request according to the hypertext transfer protocol (HTTP).

7. A system for enabling access to a multimedia document composed of a tree of objects (OA, OB) which contain information on the control of the dynamic behavior of the respective object (OA, OB), comprising:

access means (ZM) having different platforms;

a server (DS) in which the objects (OA, OB) are stored in a platform-independent programming language;

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a communications network (N) for transferring objects (OA, OB) from the server (DS) to one of the access means (ZM); and

an interpreter for translating the objects (OA, OB) in the platform-independent programming language into machine language.

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