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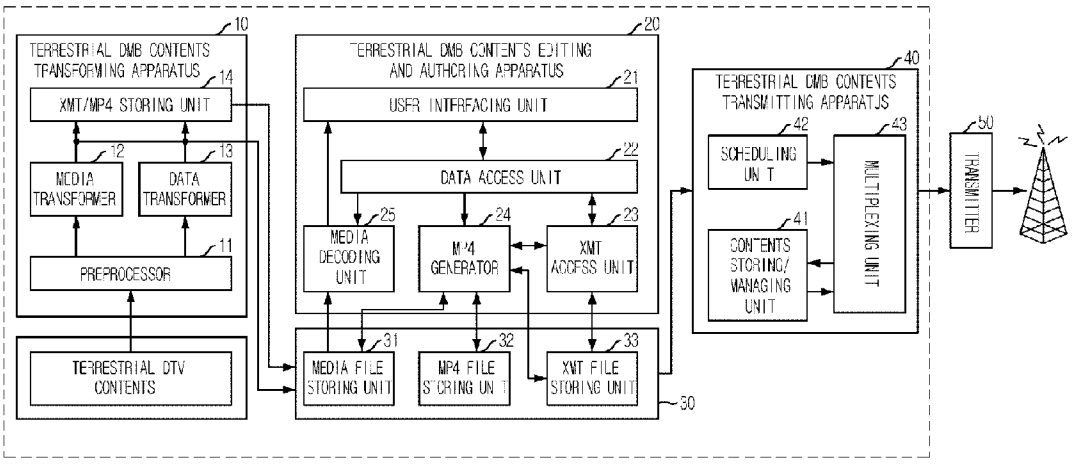

(57) Abstract: Provided are a terrestrial DMB contents editing and authoring apparatus and a terrestrial DMB contents providing system having the same. The terrestrial DMB contents providing system includes: a terrestrial DMB contents transforming apparatus for transforming a terrestrial digital television (DTV) contents to a predetermined data format to transmit as a terrestrial DMB; a terrestrial DMB contents editing and authoring apparatus for providing an interface to a user to edit and author the transformed format of terrestrial DMB interactive contents, and editing and authoring the terrestrial DMB interactive contents according to temporal/spatial arrangement and behavior events of objects based on editing and authoring information of the user; a terrestrial DMB contents storing apparatus for storing the terrestrial DMB interactive contents; and a terrestrial DMB contents transmitting apparatus for transmitting the stored terrestrial DMB contents to be suitable to a terrestrial DMB transmit format according to a transmit schedule.

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Description

APPARATUS FOR EDITING/AUTHORING TERRESTRIAL DMB CONTENTS, INTERACTIVE CONTENTS PROVIDING SYSTEM FOR TERRESTRIAL DMB

Technical Field

[1] The present invention relates to an apparatus for editing and authoring terrestrial digital multimedia broadcasting (DMB) contents and an interactive terrestrial DMB contents providing system; and more particularly, to a terrestrial DMB contents editing and authoring apparatus for transforming a terrestrial digital TV contents format to a terrestrial DMB contents format to allow a user to edit and author a terrestrial DMB contents, editing/authoring the terrestrial DMB contents according to editing/authoring information inputted from the user interface, and retransmitting the edited or authored terrestrial DMB contents.

[2]

Background Art

[3] The demands for mobile multimedia service have increased. In order to satisfy such demands, a terrestrial DMB service was commercialized.

[4] Current terrestrial DMB service is a one directional service to provide terrestrial DMB contents including audio and video to a user. A bidirectional service that allows a user to directly edit and author the terrestrial DMB contents is not provided yet. Also, a content transforming service to retransmit terrestrial DTV content as terrestrial DMB contents is not provided.

[5] Therefore, there is a demand for an interactive service for allowing a user to directly edit and author the terrestrial DMB contents in a current technology filed.

[6]

Disclosure of Invention

Technical Problem

[7] It is, therefore, an object of the present invention to a terrestrial DMB contents editing and authoring apparatus that allows a user to edit and author terrestrial DMB contents, and a terrestrial DMB interactive contents providing system using the same.

[8]

Technical Solution

[9] In accordance with one aspect of the present invention, there is provided a terrestrial DMB interactive contents providing system including: a terrestrial DMB contents transforming apparatus for transforming a terrestrial digital television (DTV)

contents to a predetermined data format to transmit as a terrestrial DMB; a terrestrial DMB contents editing and authoring apparatus for providing an interface to a user to edit and author the transformed format of terrestrial DMB interactive contents, and editing and authoring the terrestrial DMB interactive contents according to temporal/ spatial arrangement and behavior events of objects based on editing and authoring information of the user inputted through the interface; a terrestrial DMB contents storing apparatus for storing the terrestrial DMB interactive contents; and a terrestrial DMB contents transmitting apparatus for transmitting the stored terrestrial DMB contents to be suitable to a terrestrial DMB transmit format according to a transmit schedule.

[10] In accordance with another aspect of the present invention, there is provided a terrestrial DMB editing and authoring apparatus including: a user interfacing unit for providing an interface for allowing a user to edit temporal and spatial arrangements of media objects used in terrestrial DMB interactive contents and to easily author behaviors of objects in response to user's input; a data accessing unit for generally controlling an terrestrial DMB contents editing and authoring operation, providing an interface to access a first internal data structure, connecting the first internal data structure and the user interfacing unit, and connecting the first internal data structure and a second internal data structure of an extensible MPEG-4 textual format (XMT) accessing unit; an XMT accessing unit for providing an interface to access the second internal data structure, storing editing and authoring information stored in the first internal data structure of the data accessing unit in the second internal data structure, reading the stored information in the second internal data structure, and transferring the read information to the user interfacing unit through the data accessing unit; a transforming unit for transforming XMT file among stored terrestrial DMB interactive contents stored in an storing unit to MP4 files and transforming the MP4 file to the XMT file; and a media decoding unit for decoding media object among the terrestrial DMB interactive contents stored in the storing unit.

[11]

Advantageous Effects

[12] According to the embodiment of the present invention, a user can directly edit and author terrestrial DMB contents by transforming a terrestrial DTV contents format to a terrestrial DMB content format and editing and authoring the terrestrial DMB contents according to editing and authoring information inputted from a user.

[13]

Brief Description of the Drawings

[14] The above and other objects and features of the present invention will become apparent from the following description of the preferred embodiments given in

conjunction with the accompanying drawings, in which:

[15] Fig. 1 is a block diagram illustrating a terrestrial DMB interactive contents providing system in accordance with an exemplary embodiment of the present invention;

[16] Fig. 2 is a diagram illustrating a user graphic interface provided from a terrestrial DMB content editing and authoring apparatus in accordance with an embodiment of the present invention;

[17] Fig. 3 is a block diagram illustrating a data access unit in a terrestrial DMB contents editing and authoring apparatus in accordance with an embodiment of the present invention; and

[18] Fig. 4 is a flowchart illustrating a method for providing terrestrial DMB interactive contents in accordance with an embodiment of the present invention.

[19]

Best Mode for Carrying Out the Invention

[20] Other objects and aspects of the invention will become apparent from the following description of the embodiments with reference to the accompanying drawings, which is set forth hereinafter.

[21] Fig. 1 is a block diagram illustrating a terrestrial DMB interactive contents providing system in accordance with an exemplary embodiment of the present invention.

[22] Referring to Fig. 1, the terrestrial digital multimedia broadcasting (DMB) interactive contents providing system according to the present embodiment includes a terrestrial DMB contents transforming apparatus 10, a terrestrial DMB contents editing and authoring apparatus 20, a terrestrial DMB contents storing apparatus 30, and a terrestrial DMB contents transmitting apparatus 40. The terrestrial DMB contents transforming apparatus 10 transforms a terrestrial digital television (DTV) contents to a predetermined data format to transmit as a terrestrial DMB. For example, the predetermined data format is a format of storing contents employing the specifications of moving picture experts group - phase 4 (MPEG-4) Systems, such as extensible MPEG-4 textual format (XMT) or MP4 file format. The terrestrial DMB contents editing and authoring apparatus 20 provides an interface, for example, a graphic user interface (GUI), to a user to edit and author the transformed format of terrestrial DMB interactive contents, such as XMT or MP file format terrestrial DMB interactive DMB contents, and edits and authors the terrestrial DMB interactive contents according to temporal/spatial arrangement and behavior events of objects based on the editing and authoring information of the user inputted through the GUI. The terrestrial DMB contents storing apparatus 30 stores the terrestrial DMB interactive contents. The

terrestrial DMB contents transmitting apparatus 40 transmits the stored terrestrial DMB contents to be suitable to a terrestrial DMB transmit format, for example, MPEG-2 transport stream (TS), according to a transmit schedule.

[23] In the present embodiment, the terrestrial DMB contents are stored in a XMT format or a MP4 file format. The XMT format and the MP4 file format is a storing format of contents employing the specifications of MPEG-4 Systems. Since the terrestrial DMB contents employ the specifications of MPEG-4 Systems, the XMT format and the MP4 file format are used to store the terrestrial DMB contents in the present embodiment. Furthermore, the terrestrial DMB contents are finally transformed to a MPEG-2 TS format for transmission in the present embodiment because the transmission of the terrestrial DMB contents employs MPEG-2 TS format.

[24] However, the present invention is not limited by predetermined formats of the DTV contents or the terrestrial DMB contents.

[25] Hereinafter, the internal structure of the terrestrial DMB interactive contents providing system according to the present embodiment will be described in detail.

[26] The terrestrial DMB contents transforming apparatus 10 includes: a preprocessor 11 for receiving terrestrial DTV contents, analyzing program specific information (PSI), an application information table (AIT), and related descriptors, separating video streams, audio streams, and data streams therefrom, and controls transformation of terrestrial DMB contents; a media transformer 12 for transforming the MPEG-2 video stream of the terrestrial DTV contents to moving picture experts group - phase 4 advanced video coding (MPEG-4 AVC) stream, and transforming the audio coding-3 (AC-3) audio stream of the terrestrial DTV contents to moving picture experts group - phase 4 bit sliced arithmetic coding (MPEG-4 BSAC) audio stream for terrestrial DMB in response to the preprocessor 11; a data transformer 13 for transforming the advanced common application platform (ACAP) data stream of terrestrial DTV contents to predetermined formatted data for terrestrial DMB in response to the pre-processor 11; and an XMT/MP4 storing unit 14 for storing the transformed data in an XMT format or a MP4 format.

[27] Hereinafter, the constitutional elements of the terrestrial DMB content transforming apparatus 10 will be described in more detail.

[28] The preprocessor 11 receives terrestrial DTV contents and analyzes program specific information (PSI), an application information table (AIT), and related descriptors. Based on the analyzing result, the preprocessor 11 separates video streams, audio streams, and data streams therefrom, and integrally controls transformation of terrestrial DMB contents.

[29] The media transformer 12 transforms the MPEG-2 video stream of the terrestrial DTV contents to MPEG-4 AVC stream, and transforms the AC-3 audio stream of the

terrestrial DTV contents to MPEG-4 BSAC stream for terrestrial DMB in response to the preprocessor 11.

[30] The data transformer 13 transforms the ACAP data stream of terrestrial DTV contents to predetermined formatted data for terrestrial DMB in response to the pre-processor 13.

[31] The XMT/MP4 storing unit 14 stores the transformed data in an XMT format or a MP4 format.

[32] The transformed contents transformed by the terrestrial DMB contents transforming apparatus 10 are stored in the terrestrial DMB contents storing apparatus 30 in the XMT format or the MP4 format as described above. The MP4 format stored contents may be transmitted to a transmitter 50 through the terrestrial DMB contents transmitting apparatus 40. If the transforming result, however, is not satisfied, the XMT or MP4 formatted contents can be edited by the terrestrial DMB content editing and authoring apparatus 20. Then, the edited contents are transmitted to the transmitter 50 through the terrestrial DMB transmitting contents apparatus 40.

[33] The terrestrial DMB contents editing and authoring apparatus 20 includes: a user interfacing unit 21 for providing an interface for allowing a user to edit temporal and spatial arrangements of media objects used in terrestrial DMB interactive contents and to easily author events of objects in response to user's input; a data access unit 22 for generally controlling an editing and authoring operation, providing an interface to access an internal data structure 210 of Fig. 3, connecting the internal data structure 210 and the user interfacing unit 21, and connecting the internal data structure 210 and an XMT DOM (extensible MPEG-4 textual format document object model) that is used as internal data structure of an XMT access unit 23; an XMT access unit 23 for providing an interface to access XMT DOM that is an internal data structure of the XMT access unit 23, storing the editing and authoring information stored in the internal data structure 210 of the data access unit 22 to the XMT DOM, reading the stored information the XMT DOM, and transferring the read information to the user interfacing unit 21 through the data access unit 22; a MP4 generator 24 for transforming XMT file among stored terrestrial DMB interactive contents to MP4 files and transforming the MP4 file to the XMT file; and a media decoding unit 25 for decoding media object among the terrestrial DMB interactive contents stored in the terrestrial DMB contents storing apparatus 30.

[34] The terrestrial DMB content editing and authoring apparatus 20 enables a user to edit and author the terrestrial DMB interactive contents satisfying MPEG-4 Systems core2D profile through the user interfacing unit 21 that provides an interface to user to edit and author media objects used in the terrestrial DMB interactive contents. The terrestrial DMB content editing and authoring apparatus 20 supports MPEG-4 BSAC

and MPEG-4 AVC formats.

[35] Hereinafter, the constitutional elements of the terrestrial DMB contents editing and authoring apparatus 20 will be described.

[36] The user interfacing unit 21 provides an interface for allowing a user to easily and simply edit temporal and spatial arrangements of media objects used in terrestrial DMB interactive contents such as video, audio, still image, text, and 2 dimensional geometric objects including circle and rectangle, and to easily author events of objects in response to user's input inputted through a mouse or a keyboard.

[37] The data access unit 22 generally controls the terrestrial DMB contents editing and authoring apparatus 20, and provides an interface between the internal data structure of an object data storing unit 211, an event data storing unit 212, a scene data storing unit 213, and an editing data storing unit 214 shown in Fig. 3 and the user interfacing unit 21, and an interface between the internal data structure 210 and the XMT DOM that is an interface data structure of the data access unit 22.

[38] The XMT access unit 23 includes an XMT generator (not shown) for generating an XMT file based on the contents of the XMT DOM, and a XMT analyzing unit (not shown) for reading the contents of the XMT file to the XMT DOM. The XMT generator (not shown) converts edited or authored contents to an XMT format that is an MPEG-4 standard.

[39] The XMT access unit 23 uses the XMT DOM as an internal data structure, provides an application programming interface (API) to access the XMT DOM, stores the editing and authoring information stored in the internal data structure 210 of the data access unit 22 to the XMT DOM, reads the stored information the XMT DOM, and transfers the read information to the user interfacing unit 21 through the data access unit 22.

[40] The MP4 generator 24 transforms text type XMT file to binary type MP4 files, and transforms the MP4 file to the XMT file according to an embodiment.

[41] The media decoding unit 25 decodes media object such as video, audio, still images, texts and 2-D geometric objects, for example, circle and rectangle.

[42] The terrestrial DMB contents storing apparatus 30 includes a media file storing unit 31 for storing media file of terrestrial DMB interactive contents, a MP4 file storing unit 32 for storing terrestrial DMB interactive contents data in a MP4 format, and an XMT file storing unit 33 for providing stored XMT files to the MP4 generator 24 to transform the XMT file to the MP4 file.

[43] The terrestrial DMB contents transmitting apparatus 40 includes: a contents storing and managing unit 41 for receiving the terrestrial DMB interactive contents from the terrestrial DMB contents storing apparatus 30, storing and managing the received terrestrial DMB interactive contents; a scheduling unit 42 for managing a schedule for

transmitting the terrestrial DMB interactive contents stored in the contents storing and managing unit 41; and a multiplexing unit 43 for receiving the terrestrial DMB interactive contents from the contents storing and managing unit 41 and multiplexing the terrestrial DMB interactive contents to a transmission format of terrestrial DMB standard, for example, MPEG-2 TS, in response to the control of the scheduling unit 42.

[44] Hereinafter, the constitutional elements of the terrestrial DMB interactive apparatus 40 will be described.

[45] The contents storing and managing unit 41 reads the terrestrial DMB interactive contents stored in the terrestrial DMB contents storing apparatus 30, and stores and manages the read terrestrial DMB interactive contents. Also, the contents storing and managing unit 41 provides the information for managing the terrestrial DMB contents to the scheduling unit 42 and the multiplexing unit 43. For example, the storing format of the terrestrial DMB contents is a MP4 file format.

[46] The scheduling unit 42 manages or edits a schedule for transmitting the terrestrial DMB interactive contents stored in the contents storing and managing unit 41, and controls the terrestrial DMB contents storing and managing unit 41 and the multiplexing unit 43 to transmit the terrestrial DMB content according to a schedule.

[47] The multiplexing unit 43 receives the terrestrial DMB interactive contents to transmit from the contents storing and managing unit 41 in response to the control of the scheduling unit 42, and multiplexes the terrestrial DMB interactive contents to the transmission format of terrestrial DMB standard, for example, MPEG-2 TS. Then, the multiplexing unit 43 transmits the multiplexed terrestrial DMB contents to the transmitter 50 in order to transmit to a satellite.

[48] Fig. 2 is a diagram illustrating a user graphic interface provided from a terrestrial DMB content editing and authoring apparatus in accordance with an embodiment of the present invention.

[49] As shown in Fig. 2, the user interfacing unit 21 includes a menu bar 1, a tool bar 2, a media preview window 3 for providing a preview function for previewing media object such as video, a media explorer 4 for providing an explorer-like function, for example, showing a thumbnail view of media object, an attribute window 5 for showing the editing state of objects, a canvas window 6 for showing editing the spatial arrangement of objects, an event & action window 7 for showing editing behavior of objects, and a timeline window 8 for showing editing temporal arrangement of object.

[50] Fig. 3 is a block diagram illustrating a data access unit in a terrestrial DMB contents editing and authoring apparatus in accordance with an embodiment of the present invention.

[51] As shown in Fig. 3, the data access unit 22 includes: an internal data structure 210

for storing object data, event data, scene configuration data, and editing data of the terrestrial DMB contents editing and authoring apparatus 20 included in the terrestrial DMB contents; and an internal data structure managing unit for creating/ deleting/ correcting object data and event data, managing scene configuration data including structural locations of objects or events in a scene and related information thereof, and creating/ deleting/ correcting the editing information.

[52] The internal data structure 210 includes an object data storing unit 211 for storing information about objects forming the terrestrial DMB contents; an event data storing unit 212 for storing event data for each object; a scene data storing unit 213 for storing scene information of objects and events; and an editing data storing unit 214 for storing editing information of the terrestrial DMB contents editing and authoring apparatus 20.

[53] The object data storing unit 211 is a data structure having information about objects forming the terrestrial DMB contents. The event data storing unit 212 is a data structure having information about events for each object. The scene data storing unit 213 is a data structure having information about scene configuration of objects and events forming the terrestrial DMB contents. The editing data storing unit 214 is a data structure having editing information of the terrestrial DMB editing and authoring apparatus 20, such as UNDO/REDO information.

[54] The internal data structure managing unit 220 includes: an object processor 221 for managing the object data storing unit 211 and creating/correcting/deleting object data; an event processor for managing the event data storing unit 212 and creating/ correcting/deleting events such as the behavior of an object; an scene processor 223 for managing the scene data storing unit 213 and managing scene configuration data such as structural locations of objects or events in a scene; and an editing processor 224 for managing the editing data storing unit 214 and creating/correcting/deleting editing data.

[55] Fig. 4 is a flowchart illustrating a method for providing terrestrial DMB interactive contents in accordance with an embodiment of the present invention.

[56] At step S401, the terrestrial DMB contents transforming apparatus 10 receives the terrestrial DTV contents, analyzes a program specific information (PSI), an application information table (AIT), and related descriptors, and separates video streams, audio streams, and data streams therefrom.

[57] At step S402, the MPEG-2 video stream separated from the terrestrial DTV contents is transformed to MPEG-4 AVC data as a terrestrial DMB video format, the AC-3 audio stream separated from the terrestrial DTV contents is transformed to MPEG-4 BSAC data as a terrestrial DMB audio format, and the ACAP terrestrial DTV data stream separated from the terrestrial DTV contents to terrestrial DMB data. The transformed data is stored in an XMT format and a MP4 format at step S403.

[58] Then, the terrestrial DMB content editing and authoring apparatus 20 edits and authors terrestrial DMB contents according to editing and authoring information inputted from a user at step S404. The edited or authored terrestrial DMB contents are transformed to a XMT format and a MP4 format, and the transformed contents are stored in the terrestrial DMB contents storing apparatus 30 at step S405.

[59] The terrestrial DMB contents transmitting apparatus 40 reads the terrestrial DMB contents stored in the terrestrial DMB content storing apparatus 30 and stores the read contents at step S406, and creates a transmission schedule of the stored terrestrial DMB contents at step S407.

[60] Then, the terrestrial DMB interactive contents are multiplexed to a transmission format of terrestrial DMB standard, for example, MPEG-2 TS at step S408, and the multiplexed contents are transmitted to the transmitter 50 at step S409.

[61] The above described method according to the present invention can be embodied as a program and stored on a computer readable recording medium. The computer readable recording medium is any data storage device that can store data which can be thereafter read by the computer system. The computer readable recording medium includes a read-only memory (ROM), a random-access memory (RAM), a CD-ROM, a floppy disk, a hard disk and an optical magnetic disk.

[62] The present application contains subject matter related to Korean patent application Nos. 2005-0119959 and 2006-0069956, filed with the Korean Intellectual Property Office on December 8, 2005, and July 25, 2006, respectively, the entire contents of which is incorporated herein by reference.

[63] While the present invention has been described with respect to certain preferred embodiments, it will be apparent to those skilled in the art that various changes and modifications may be made without departing from the scope of the invention as defined in the following claims.

Claims

[1] A terrestrial digital multimedia broadcasting (DMB) interactive contents providing system, comprising:
a terrestrial DMB contents transforming means for transforming a terrestrial digital television (DTV) contents to a predetermined data format to transmit as a terrestrial DMB;
a terrestrial DMB contents editing and authoring means for providing an interface to a user to edit and author the transformed format of terrestrial DMB interactive contents, and editing and authoring the terrestrial DMB interactive contents according to temporal/spatial arrangement and behavior events of objects based on editing and authoring information of the user inputted through the interface;
a terrestrial DMB contents storing means for storing the terrestrial DMB interactive contents; and
a terrestrial DMB contents transmitting means for transmitting the stored terrestrial DMB contents to be suitable to a terrestrial DMB transmit format according to a transmit schedule.

[2] The terrestrial DMB interactive contents providing system as recited in claim 1, wherein the data format is a format of storing contents employing specification of moving picture experts group - phase 4 (MPEG-4) Systems including an extensible MPEG-4 textural format (XMT) and a MP4 file format.

[3] The terrestrial DMB interactive contents providing system as recited in claim 1, wherein the DMB transmission format is a MPEG-2 transport stream (TS) format.

[4] The terrestrial DMB interactive contents providing system as recited in claim 1, wherein the terrestrial DMB contents transforming means includes:
a preprocessing means for receiving terrestrial DTV contents, analyzing program specific information (PSI), an application information table (AIT), and related descriptors, separating video streams, audio streams, and data streams therefrom, and integrally controls transforming terrestrial DMB contents;
a media transforming means for transforming MPEG-2 video stream of the terrestrial DTV contents to moving picture experts group - phase 4 advanced video coding (MPEG-4 AVC) stream, and transforming audio coding-3 (AC-3) audio stream of the terrestrial DTV contents to moving picture experts group - phase 4 bit sliced arithmetic coding (MPEG-4 BSAC) stream;
a data transforming means for transforming advanced common application platform (ACAP) data stream of the terrestrial DTV contents to predetermined

formatted data for terrestrial DMB; and

an XMT/MP4 transferring means for storing the transformed data for the terrestrial DMB in an XMT format or a MP4 format.

[5] The terrestrial DMB interactive contents providing system as recited in claim 1, wherein the terrestrial DMB contents editing and authoring means includes:

a user interfacing means for providing an interface for allowing a user to edit temporal and spatial arrangements of media objects used in terrestrial DMB interactive contents and to easily author behaviors of objects in response to user's input;

a data accessing means for generally controlling an terrestrial DMB contents editing and authoring operation, providing an interface to access an internal data structure, connecting the internal data structure and the user interfacing means, and connecting the internal data structure and an extensible MPEG-4 textual format document object model (XMT DOM) that is an internal data structure of an XMT accessing means;

an XMT accessing means for providing an interface to access XMT DOM, storing editing and authoring information stored in the internal data structure of the data accessing means in the XMT DOM, reading the stored information in the XMT DOM, and transferring the read information to the user interfacing means through the data accessing means;

a transforming means for transforming XMT file among stored terrestrial DMB interactive contents to MP4 files and transforming the MP4 file to the XMT file; and

a media decoding means for decoding media object among the terrestrial DMB interactive contents stored in the terrestrial DMB contents storing means.

[6] The terrestrial DMB interactive contents providing system as recited in claim 5, wherein the XMT accessing means further includes a function for transforming the contents of the XMT DOM to an XMT file and storing the transformed XMT file, and a function for reading contents of XMT files stored in the terrestrial DMB contents storing means to the XMT DOM.

[7] The terrestrial DMB interactive contents providing system as recited in claim 6, wherein the terrestrial DMB contents storing means stores media files, MP4 files and XMT files of the terrestrial DMB interactive contents.

[8] The terrestrial DMB interactive contents providing system as recited in claim 5, wherein the terrestrial DMB contents transmitting means includes:

a contents storing and managing means for receiving terrestrial DMB interactive contents from the terrestrial DMB contents storing means, storing and managing the received terrestrial DMB interactive contents;

a scheduling means for managing a schedule for transmitting the terrestrial DMB interactive contents stored in the contents storing and managing means; and
a multiplexing means for receiving the terrestrial DMB interactive contents from the contents storing and managing means and multiplexing the terrestrial DMB interactive contents to a transmission format of terrestrial DMB standard, MPEG-2 TS, in response to the control of the scheduling means.

[9] The terrestrial DMB interactive contents providing system as recited in claim 5, wherein the data accessing means includes:
an internal data structure storing object data, event data, scene configuration data, and editing data of the terrestrial DMB contents editing and authoring means, which are stored in XMT files; and
an interface for creating/ deleting/ correcting the object data and event data, managing scene configuration data including structural locations of objects or events in a scene and related information thereof, and creating/ deleting/ correcting the editing information.

[10] A terrestrial DMB editing and authoring apparatus comprising:
a user interfacing means for providing an interface for allowing a user to edit temporal and spatial arrangements of media objects used in terrestrial DMB interactive contents and to easily author behaviors of objects in response to user's input;
a data accessing means for generally controlling an terrestrial DMB contents editing and authoring operation, providing an interface to access a first internal data structure, connecting the first internal data structure and the user interfacing means, and connecting the first internal data structure and a second internal data structure of an extensible MPEG-4 textual format (XMT) accessing means;
an XMT accessing means for providing an interface to access the second internal data structure, storing editing and authoring information stored in the first internal data structure of the data accessing means in the second internal data structure, reading the stored information in the second internal data structure, and transferring the read information to the user interfacing means through the data accessing means;
a transforming means for transforming XMT file among stored terrestrial DMB interactive contents stored in an storing means to MP4 files and transforming the MP4 file to the XMT file; and
a media decoding means for decoding media object among the terrestrial DMB interactive contents stored in the storing means.

[11] The terrestrial DMB editing and authoring apparatus as recited in claim 10, wherein the XMT accessing means wherein the XMT accessing means further

includes a function for transforming the contents of the XMT DOM to an XMT file and storing the transformed XMT file, and a function for reading contents of XMT files stored in the terrestrial DMB contents storing means to the XMT DOM.

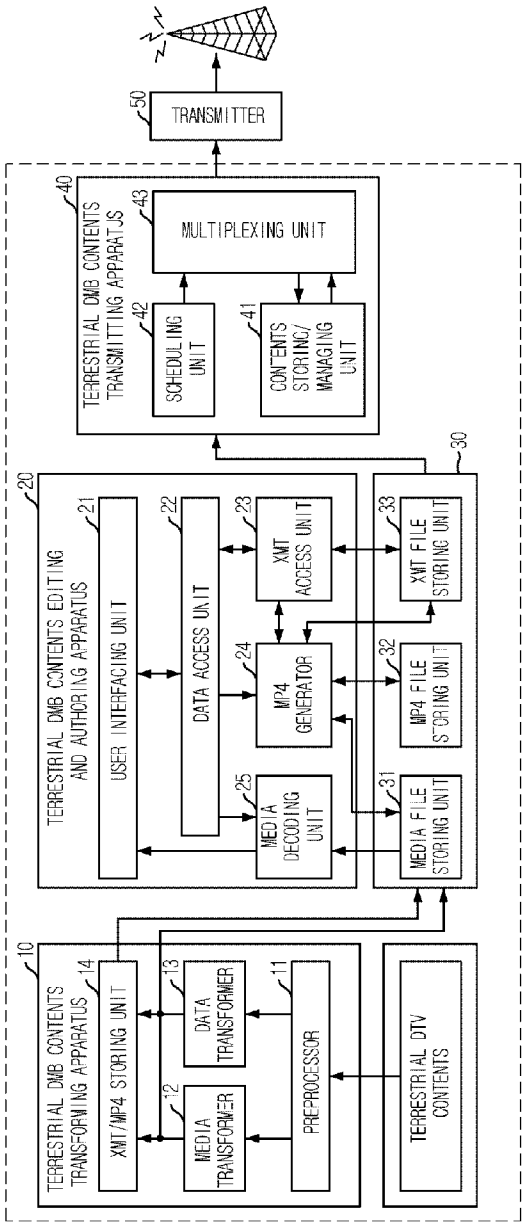
[12] The terrestrial DMB editing and authoring apparatus as recited in claim 11, wherein the storing means stores media files, MP4 files, and XMT files of the terrestrial DMB interactive contents.

[13] The terrestrial DMB editing and authoring apparatus as recited in claim 10, wherein data accessing means includes:

a first internal data structure storing object data, event data, scene configuration data, and editing data of the terrestrial DMB contents editing and authoring means, which are stored in XMT files; and

an interface for creating/deleting/correcting the object data and event data, managing scene configuration data including structural locations of objects or events in a scene and related information thereof, and creating/ deleting/ correcting the editing information.

[Fig. 1]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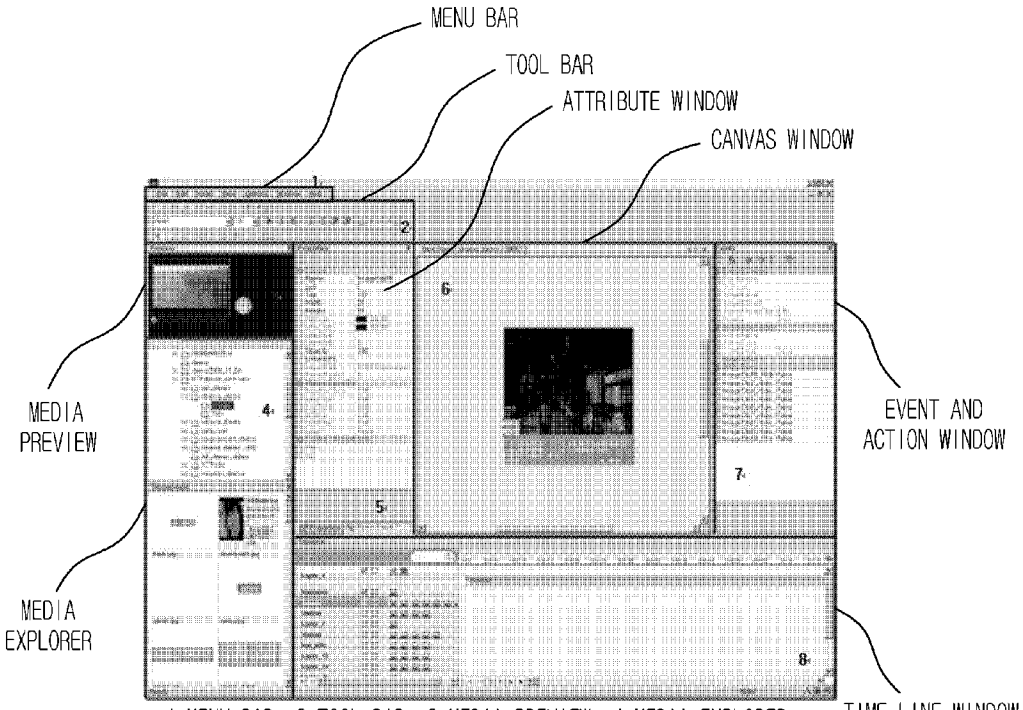
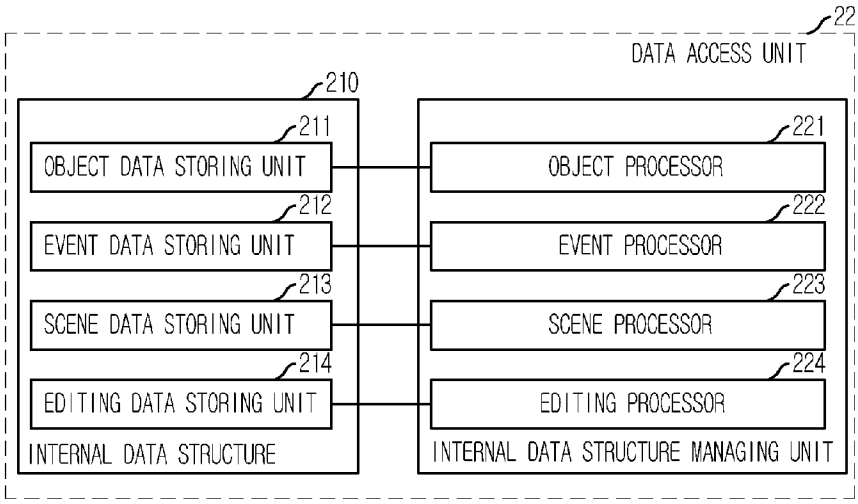
TRANSMITTER
40
TERRESTRIAL DMB CONTENTS TRANSMITTING APPARATUS
43
MULTIPLEXING UNIT
42
SCHEDULING UNIT
41
CONTENTS STORING/ MANAGING UNIT
30
20
TERRESTRIAL DMB CONTENTS EDITING AND AUTHORING APPARATUS
21
USER INTERFACING UNIT
22
DATA ACCESS UNIT
23
XMT ACCESS UNIT
24
MP4 GENERATOR
25
MEDIA DECODING UNIT
33
XMT FILE STORING UNIT
32
MP4 FILE STORING UNIT
31
MEDIA FILE STORING UNIT
10
TERRESTRIAL DMB CONTENTS TRANSFORMING APPARATUS
14
XMT/MP4 STORING UNIT
13
DATA TRANSFORMER
12
MEDIA TRANSFORMER
11
PREPROCESSOR
TERRESTRIAL DTV CONTENTS

[Fig. 2]


MENU BAR
TOOL BAR
ATTRIBUTE WINDOW
CANVAS WINDOW
MEDIA PREVIEW
EVENT AND ACTION WINDOW
MEDIA EXPLORER
TIME LINE WINDOW
1.MENU BAR 2.TOOL BAR 3.MEDIA PREVIEW 4.MEDIA EXPLORER
5.ATTRIBHTE WINDOW 6.CANVAS WINDOW
7.EVENT AND ACTION WINDOW 8.TIMELINE WINDOW

[Fig. 3]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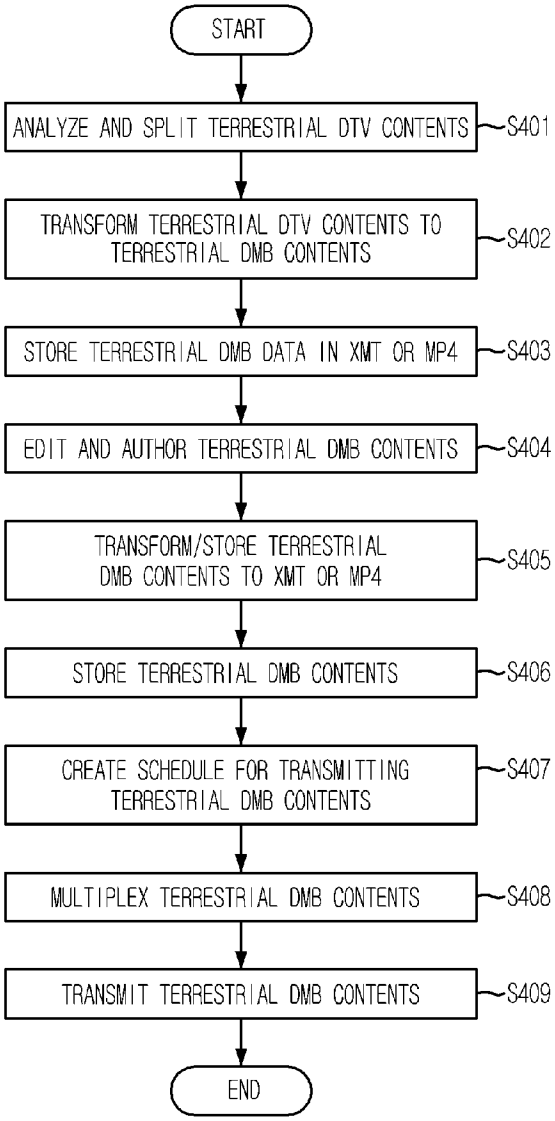
210
211
OBJECT DATA STORING UNIT
212
EVENT DATA STORING UNIT
213
SCENE DATA STORING UNIT
214
EDITING DATA STORING UNIT
INTERNAL DATA STRUCTURE
221
OBJECT PROCESSOR
222
EVENT PROCESSOR
223
SCENE PROCESSOR
224
EDITING PROCESSOR
INTERNAL DATA STRUCTURE MANAGING UNIT

[Fig. 4]


START
ANALYZE AND SPLIT TERRESTRIAL DTV CONTENTS
S401
TRANSFORM TERRESTRIAL DTV CONTENTS TO TERRESTRIAL DMB CONTENTS
S402
STORE TERRESTRIAL DMB DATA IN XMT OR MP4
S403
EDIT AND AUTHOR TERRESTRIAL DMB CONTENTS
S404
TRANSFORM/STORE TERRESTRIAL DMB CONTENTS TO XMT OR MP4
S405
STORE TERRESTRIAL DMB CONTENTS
S406
CREATE SCHEDULE FOR TRANSMITTING TERRESTRIAL DMB CONTENTS
S407
MULTIPLEX TERRESTRIAL DMB CONTENTS
S408
TRANSMIT TERRESTRIAL DMB CONTENTS
S409
END

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2006/005261

A. CLASSIFICATION OF SUBJECT MATTER

H04N 7/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Patents and applications for inventions since 1975.
Korean Utility models and applications for Utility models since 1975
Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)
eKIPASS(KIPO internal):"contents, editing, authoring, digital television, DMB"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 2002-048501 (ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE) 24 June 2002 Abstract, Fig.2-3	1-13
A	KR 2005-60447 (ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE)22 June 2005 Abstract, Fig.1-4	1-13
A	US 2004-0125148 A (Roy D. Pea et.al) 01 July 2004 Abstract, Fig.1	1-13
A	US 2001-52125 A (Moon-Young Kim) 13 Dec. 2001 Abstract, Fig. 1	1-13

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
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"E" earlier application or patent but published on or after the international filing date
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 MARCH 2007 (15.03.2007)	**16 MARCH 2007 (16.03.2007)**

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Republic of Korea
Facsimile No. 82-42-472-7140

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Telephone No. 82-42-481-5770

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR2006/005261

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