Abstract: Provided are a meta data encoding/decoding method and apparatus. The meta data decoding method includes decoding a media signal containing a media object, and decoding meta data corresponding to the media object. During the decoding of the meta data signal, decoding of the meta data is skipped when the meta data that is to be decoded is identical to already decoded meta data.
Description

METHOD AND APPARATUS FOR ENCODING/DECODING METADATA

Technical Field

Methods and apparatuses consistent with the present invention relate to data encoding and decoding, and more particularly, to a method and apparatus for efficiently encoding/decoding metadata and a recording medium thereof.

Background Art

Advances in multimedia technologies has triggered development of methods of satisfying users’ various demands for multimedia contents. Meta data is used to quickly and precisely search for desired data out of a large amount of multimedia data. The meta data is allocated to content according to predetermined rules, and contains various information, such as the location and the details of the content, the details of a content producer, right conditions, usage conditions, and usage history. The meta data is used in order to represent data and fast search for data.

Disclosure of Invention

Technical Solution

The present invention provides an encoding/decoding method and apparatus capable of determining whether meta data has been updated or whether meta data is not changed without decoding the meta data.

Advantageous Effects

The present invention provides an encoding/decoding method and apparatus capable of determining whether meta data has been updated or whether meta data is not changed without decoding the meta data.

The present invention also provides an encoding method and apparatus for determining whether meta data has been updated or whether meta data is not changed by using either a cycle of inserting a meta data packet into a transmission stream or unique location information of the meta data.

The present invention also provides a decoding method and apparatus for determining whether meta data has been updated or whether meta data is not changed by using either a cycle of inserting a meta data packet into a transmission stream or unique location information of the meta data.

The present invention also provides an encoding/decoding method and apparatus and a data structure for preventing the same meta data from being redundantly decoded by determining whether the meta data has been updated or whether the meta data is not changed, and a computer readable medium having recorded thereon a program for
executing the method.

Description of Drawings

[8] The above and other features of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings in which:

[9] FIG. 1A is a diagram illustrating a case where the location information of meta data contained in a meta data signal is variable;

[10] FIG. 1B is a diagram illustrating a case where the location information of meta data contained in a meta data signal is invariable, according to an embodiment of the present invention;

[11] FIG. 2 is a diagram illustrating the structure of a meta data transmission stream according to an embodiment of the present invention;

[12] FIG. 3 illustrates a media meta data framework according to an embodiment of the present invention;

[13] FIG. 4 is a block diagram of a meta data encoding apparatus according to an embodiment of the present invention;

[14] FIG. 5 is a block diagram of a meta data encoding apparatus according to another embodiment of the present invention;

[15] FIG. 6 is a block diagram of a meta data decoding apparatus according to an embodiment of the present invention;

[16] FIG. 7 is a block diagram of a meta data decoding apparatus according to another embodiment of the present invention;

[17] FIG. 8 is a flowchart illustrating a meta data encoding method according to an embodiment of the present invention;

[18] FIG. 9 is a flowchart illustrating a meta data encoding method according to another embodiment of the present invention;

[19] FIG. 10 is a flowchart illustrating a meta data decoding method according to an embodiment of the present invention; and

[20] FIG. 11 is a flowchart illustrating a meta data decoding method according to another embodiment of the present invention.

Best Mode

[21] The present invention also provides an encoding method and apparatus for determining whether meta data has been updated or whether meta data is not changed by using either a cycle of inserting a meta data packet into a transmission stream or unique location information of the meta data.

[22] The present invention also provides a decoding method and apparatus for determining whether meta data has been updated or whether meta data is not changed by
using either a cycle of inserting a meta data packet into a transmission stream or
unique location information of the meta data.

The present invention also provides an encoding/decoding method and apparatus and
data structure for preventing the same meta data from being repeatedly decoded by
determining whether the meta data has been updated or whether the meta data is not
changed, and a computer readable medium having recorded thereon a program for
executing the method.

According to an aspect of the present invention, there is provided a method of
decoding meta data, the method including decoding a media signal containing a media
object; and decoding meta data corresponding to the media object, wherein if the meta
data that is to be decoded is identical to already decoded meta data, the decoding of the
meta data is skipped.

The decoding of meta data may include extracting location information of the corre-
sponding meta data from the media object; and decoding the meta data having the
location information by using the extracted location information. Whether the meta
data that is to be decoded is identical to the already decoded meta data may be de-
termined by comparing the extracted location information with location information of
the already decoded meta data, and the location information of the meta data may be a
unique identifier of the meta data. If at least one of the media object and the meta data
corresponding to the media object is changed, the location information of the meta data
may also change. The meta data may include object description data, wherein the
object description data contains information for decoding the media signal.

According to another aspect of the present invention, there is provided a method of
decoding meta data, the method including decoding a media signal containing a media
object; and decoding meta data corresponding to the media object by using location in-
formation of the meta data, which is extracted from the media object, wherein the
location information is a unique identifier of the meta data.

According to another aspect of the present invention, there is provided a method of
decoding meta data, the method including receiving a stream in which a media signal
containing a media object and meta data corresponding to the media object are mixed
together in the form of a packet; parsing the stream into the media signal and the meta
data signal; and decoding the parsed media signal and meta data signal, wherein the
meta data packet is inserted into the stream in a predetermined cycle, where the cycle
represents whether unique version information of the meta data is updated.

During the parsing of the stream, parsing the meta data packet may be skipped when
the cycle of inserting the meta data packet is identical to a previous cycle. The parsing
of the stream may include performing the meta data packet when the cycle of inserting
the meta data packet is not identical to a previous cycle.
Mode for Invention


[30] Exemplary embodiments of the present invention will now be described in greater detail with reference to the accompanying drawings.

[31] An encoding/decoding apparatus according to the present invention is capable of determining whether meta data has been updated or whether the meta data is not changed by using location information of meta data or a cycle of transmitting the meta data. Meta data contains unique version information, and a change in the version information means that the meta data has been updated. Hereinafter, if meta data has unique location information, a technique of determining whether the meta data has been updated by using the location information and a technique of indicating whether the meta data has been updated by changing a cycle of inserting a meta data packet into a meta data transmission stream, will be described.

[32] FIGS. IA and IB are drawings explaining the present invention using a meta data signal. In detail, FIG. IA illustrates a case where the location information of meta data contained in a meta data signal is variable, and FIG. IB illustrates the location information of meta data contained in a meta data signal is invariable according to an embodiment of the present invention.

[33] Referring to FIGS. IA and IB, each of meta data signals 100, 110, and 120 contains a plurality of pieces of meta data, and the pieces of the meta data are respectively contained in specific locations of the meta data signals 100, 110, and 120. The meta data signals 100, 110, and 120 may include an area for storing undefined meta data, which will now be referred to as a reserved area or a garbage area for convenience.

[34] In the case of FIG. IA, the locations of the pieces of the meta data contained in the meta data signal 100 are variable, i.e., can change. The movement of each piece of the meta data also changes the location information thereof. It is assumed that the meta data contains in a leftmost location 00 of the meta data signal 100 has been canceled because the meta data has been lost or damaged. In this case, the locations of the remaining meta data in the meta data signal 100 shift by one in the left direction since the location 00 is empty. Thus the meta data as originally being contained in a location 01 shifts to the location 00, and the location information thereof changes from 01' to 00'. Referring to FIG. IA, the meta data signal 110 is obtained when the locations of the pieces of the meta data shift by one in the left direction. Since the locations of the meta data are variable, it is not guaranteed that the location of meta data stored at a specific instant of time is maintained at another instant of time and that the same location information represents the same meta data.
In the case of FIG. IB, each of a plurality of pieces of meta data contained in the meta data signal 100 has unique location information. Thus unless the pieces of the meta data are not changed or deformed, their location information is not changed. As in the above example, it is assumed that the meta data contained in a leftmost location 00 of the meta data signal 100 has been deleted. In this case, the locations of the other pieces of the meta data in the meta data signal 100 do not shift even if the location 00 is empty. Thus even if some of the pieces of the meta data in the meta data signal 100 are lost, the unique location information of the remaining pieces of the meta data in a meta data signal 120 is maintained. That is, the location information of the meta data functions as an identifier thereof, and thus the same location information of the meta data represents the same meta data.

A change in a media signal results in a change in meta data corresponding to the media signal. If meta data is changed due to a change in the media signal or irrespective of the media signal, the changed meta data is not the same as the original meta data and thus the location information of the changed meta data also changes. If it is assumed that meta data in a location 00 is changed as illustrated in FIG. IB, the location of the changed meta data is also changed. In this case, the changed meta data may be contained in a reserved/garbage area. Referring to FIG. IB, the meta data in the location 00 is changed and then shifts to a location 20 in a reserved/garbage area.

Hereinafter, various embodiments of the present invention when the location information of meta data functions as an identifier thereof as illustrated in FIG. IB, will now be described in detail.

FIG. 2 illustrates the structure of a meta data transmission stream 200 according to an embodiment of the present invention. Referring to FIG. 2, in the meta data transmission stream 200, a plurality of media objects contained in a media signal and a plurality of pieces of meta data contained in a meta data signal are mixed together in the form of a packet. Referring to FIG. 2, audio packets, video packet, and meta data packets contained in the meta data transmission stream 200 are respectively indicated with "A", "V", and "M". An encoding apparatus (not shown) generates and encodes the media signal and the meta data signal, and then transforms them in the form of a packet. In this case, the meta data contained in the meta data signal is packed in a section structure and then is divided into units of packets. Version information is allocated to the section of each piece of the meta data. If a change in version information results in a change in the attributes of the meta data, and thus the version information functions as a unique identifier of the meta data. According to the present invention, a decoding apparatus (not shown) is capable of determining whether the meta data has been updated, using the version information. To this end, the encoding apparatus can indicate whether the version information of the meta data is not changed,
using a cycle of mixing a meta data packet. That is, a multiplexer (not shown) of the encoding apparatus can determine a ratio at which audio packets, video packets, and meta data packet are mixed to form a stream. The multiplexer may insert the meta data packets into the stream in a first cycle if the version of the meta data is not changed, and the meta data packets into the stream in a second cycle if the version of the meta data is changed, that is, if the meta data is updated. Referring to FIG. 2, the encoding apparatus sequentially inserts two audio packets, two video packets, and a meta data packet into a stream, and then sequentially inserts an audio packet, a video packet, and a meta data packet in to the stream in order to indicate that the meta data is updated. The encoding apparatus changes a cycle of inserting the meta data according to the version information thereof, inserts the meta data in the changed cycle, and then transmits the stream containing the meta data to the decoding apparatus.

FIG. 3 illustrates a media meta data framework according to an embodiment of the present invention. Referring to FIG. 3, the media meta data framework includes a media signal 300 and a meta data signal 310. The media meta data framework is obtained by composing meta data based on media objects. If contents are managed based on a meta data stream, it is difficult to change or capture some media objects from among the contents since meta data is composed in units of scenes, and damage to the meta data stream prevents scene composition during content streaming. Thus meta data is preferably composed based on media objects contained in a media signal. If meta data is composed based on media objects, each of the media objects contains information necessary for accessing the meta data, e.g., the location information of the meta data. The media objects can access meta data corresponding to the respective media objects by using the location information of the meta data.

The media signal 300 may contain an audio signal, a video signal, or an image signal, and a plurality of media objects. Each media object contains an audio frame, a video frame or an image frame for each media signal. Also, each media object has corresponding meta data, and unique location information of the corresponding meta data.

The meta data signal 310 contains a plurality of pieces of meta data. The meta data contains information regarding the media objects, or signs, characters or marks, which are defined for object processing and used to perform particular functions. The meta data signal 310 may further include object description data containing various profile information, such as information for decoding the media object, and media handling data containing information regarding a rendering location of the media objects or regarding transforming the media objects.

Each of the media objects may contain location information of the meta data, such as object description data, or media handling data which corresponds to each media object, such as location information of the meta data. Referring to FIG. 3, a number is
allocated to each of the media objects in the media signal 300. The allocated number may be used as version information of the corresponding meta data or in order to indicate the location of the meta data. Each piece of the meta data has unique version information, and particularly has unique location information according to the present invention. Thus, the version information and the location information have one to one correspondence to each other, and may be the same according to circumstances.

A decoding apparatus (not shown) can easily access meta data corresponding to the respective media objects by using the location information of the meta data. The pieces of the meta data contained in the meta data signal 310 are arranged according to the unique location information thereof.

The decoding apparatus decodes from the leftmost media object in the media signal 300 to the rightmost media object. In detail, the decoding apparatus first decodes the leftmost media object, and extracts location information 01 of the meta data from the decoded media object. The decoding apparatus accesses the meta data at a location corresponding to the location information 01 by using the extracted location information. As described above, according to the present invention, the location information of the respective pieces of the meta data respectively identify the pieces of the meta data. That is, the location information can be used as a unique identifier of the meta data.

The decoding apparatus can reproduce the media signal 300 by using the meta data for the media objects. A user can use the media signal 300 from a beginning or middle part thereof. Thus, while reproducing a media object having specific attributes, the decoding apparatus must repeatedly decode meta data corresponding to an identical media object. If media objects have the same attributes, meta data corresponding to the media objects are also the same. That is, the media objects have the same additional information, such as decoding type, rendering information, or title information thereof. Thus once decoding of the meta data for the media object having specific attributes is completed, it is not necessary to repeatedly decode the meta data for an identical media object having the same attributes. According to the present invention, the decoding apparatus can determine whether meta data that is to be decoded is identical to already decoded meta data by using unique location information for each piece of meta data.

Next the decoding apparatus decodes a second media object contained in the media signal 300, and extracts location information 01 of the meta data from the second media object. Then the decoding apparatus determines whether the extracted location information 01 is identical to the previously extracted location information 01. The decoding apparatus does not access and decode the meta data at a location corresponding to the location information 01 since the extracted location information 01 is identical to the previously extracted location information 01. That is, the already decoded meta data never be decoded thus skipping unnecessary decoding. Next the
decoding apparatus decodes a third media object in the media signal 300, and extracts location information 03 of the media object from the third media object. The decoding apparatus determines whether the extracted location information 03 is identical to the previously extracted location information 01. The decoding apparatus determines that the meta data is updated since the extracted location information 03 is not identical to the previously extracted location information 01. Then the decoding apparatus accesses the meta data at a location corresponding to the extracted location information 03 based on the extracted location information 03. Thereafter the decoding apparatus decodes the accessed meta data, extract attribution information for the media object from the meta data, and then reproduce the media object by using the attribution information.

FIG. 4 is a block diagram of an apparatus for encoding meta data according to an embodiment of the present invention. Referring to FIG. 4, the encoding apparatus includes a media signal generation unit 410, a media signal encoding unit 420, a location information generation unit 430, a meta data signal generation unit 440, a meta data signal encoding unit 450 and a multiplexer 460. The encoding apparatus allocates unique location information to meta data so that whether the meta data has been updated or is not changed can be easily determined.

The media signal generation unit 410 generates a media signal, such as an audio signal or a video signal. The media signal encoding unit 420 encodes the media signal and transmits it to the multiplexer 460. The meta data signal generation unit 440 generates meta data corresponding to each of media objects contained in the media signal. The meta data signal generation unit 440 generates a meta data signal by arranging each of a plurality of pieces of the meta data in a specific location. The meta data contains various profile information, such as the attributes and manufacturing date of the media signal, and information for decoding the media signal.

The location information generation unit 430 respectively receives the media signal and the meta data signal from the media signal generation unit 410 and the meta data signal generation unit 440, determines meta data corresponding to each of media objects contained in the media signal, and then generates location information indicating the location of each pieces of the meta data. As described above, the location information of the meta data enables the meta data to be identified. The location information generation unit 430 transmits the generated location information to the media signal generation unit 410 and the meta data signal generation unit 440. The media signal generation unit 410 generates a media signal by inserting the location information received from the location information generation unit 430 into the respective media objects.

The meta data signal encoding unit 450 encodes the meta data signal generated by
the meta data signal generation unit 440 and transmits the encoded meta data signal to
the multiplexer 460. The multiplexer 460 transforms the encoded media signal and
meta data signal in the form of a packet, mixes the packets together, and transmits the
mixed packets to a decoding apparatus (not shown).

FIG. 5 is a block diagram of an apparatus for encoding meta data according to
another embodiment of the present invention. Referring to FIG. 5, the encoding
apparatus includes a media signal generation unit 510, a media signal encoding unit
520, a meta data signal generation unit 530, a meta data signal encoding unit 540, and
a multiplexer 550. The media signal generation unit 510 generates a media signal and
transmits the media signal to the media signal encoding unit 520. The media signal
encoding unit 520 encodes the media signal and transmits the encoded media signal to
the multiplexer 550. The meta data signal generation unit 530 generates a meta data
signal corresponding to the media signal and transmits the meta data signal to the meta
data signal encoding unit 540. The meta data signal encoding unit 540 encodes the
meta data signal and transmits the encoded meta data signal to the multiplexer 550.
The multiplexer 550 transforms the encoded media signal and meta data signal that are
respectively received from the media signal encoding unit 520 and the meta data signal
encoding unit 540, so that they can be transmitted. The multiplexer 550 transforms
data contained in the media signal and the meta data signal in the form of a packet,
mixes the packets together, and transmits the mixed packets to a decoding apparatus
(not shown).

As described above, according to the present invention, version information or
location information given to meta data may be used in order to determine whether the
meta data is not changed. The encoding apparatus illustrated in FIG. 5 changes a cycle
of insertion of the meta data packet so that the decoding apparatus can determine
whether the meta data is not changed or whether the version information of the meta
data has been updated by using the version information. To this end, the multiplexer
550 of the encoding apparatus illustrated in FIG. 5 includes a cycle determination unit
551 and a signal mixer 553. The cycle determination unit 551 determines a cycle of
transmitting the meta data packet by determining a ratio at which the meta data packet,
audio packets and video packets are mixed together in order to indicate whether the
meta data is not changed, that is, whether the meta data has been updated by changing
the version thereof. The cycle determination unit 551 allows the meta data packet to be
inserted in a predetermined cycle if the version of the meta data is not changed, and the
meta data packet to be inserted in a changed cycle if the version of the meta data is
changed. The signal mixer 553 performs packet mixing using the cycle of insertion of
the meta data packet, which is determined by the cycle determination unit 551. The
signal mixer 553 generates a stream by inserting the meta data packet in the prede-
terminated cycle if the version of the meta data is not changed, and a stream by inserting
the meta data packet in a different cycle if the version is changed by updating. The
signal mixer 553 transmits the generated stream to the decoding apparatus.

[53] FIG. 6 is a block diagram of an apparatus for decoding meta data according to an em-
bodyment of the present invention. Referring to FIG. 6, the decoding apparatus
includes a demultiplexer 610, a media signal decoding unit 620, a meta data signal
processing unit 630 and a media signal reproducing unit 640. If unique location in-
formation is given to meta data, the decoding apparatus of FIG. 6 determines whether
the meta data is not changed, using the unique location information.

[54] The demultiplexer 610 parses an encoded media signal and a meta data signal
received from an encoding apparatus (not shown), and respectively transmits the media
signal and the meta data signal to the media signal decoding unit 620 and the meta data
signal processing unit 630. The media signal decoding unit 620 decodes the media
signal and transmits the decoded media signal to the media signal reproducing unit
640.

[55] The meta data signal processing unit 630 includes a location information extraction
unit 631, a location information comparison unit 633 and a meta data signal decoding
unit 635. The location information extraction unit 631 extracts location information
from media objects included in the media signal. The location information extraction
unit 631 transmits the extracted location information to the location information
comparison unit 633.

[56] The location information comparison unit 633 stores the extracted location in-
formation received from the location information extraction unit 631. If receiving the
location information of the new meta data from the location information extraction unit
631, the location information comparison unit 633 compares the stored location in-
formation with location information of the new meta data. The location information
comparison unit 633 transmits the result of comparison to the meta data signal
decoding unit 635. If the stored location information is not identical to the location in-
formation of the new meta data, the location information comparison unit 633
transmits the location information of the new meta data to the meta data signal
decoding unit 635. The meta data signal decoding unit 635 determines whether to
decode the meta data signal according to the result of comparison. If the location in-
formation of the meta data corresponding to the media object that is currently decoded
by the media signal decoding unit 620 is not identical to location information of meta
data corresponding to an already decoded media object, the meta data signal decoding
unit 635 accesses and decodes the meta data corresponding to the media object that is
currently decoded. The meta data signal decoding unit 635 transmits the decoded meta
data to the media signal reproducing unit 640. The media signal reproducing unit 640
reproduces the media signal by using the decoded media signal and meta data signal received from the media signal decoding unit 620 and the meta data signal decoding unit 635.

57. If the location information of the meta data corresponding to a media object that is currently decoded by the media signal decoding unit 620 is identical to the location information of already decoded meta data, the meta data signal decoding unit 635 skips decoding of the meta data having the same location information. That a plurality of pieces of meta data having the same location information is understood that the pieces of the meta data are identical to each other, and therefore, it is unnecessary to decode meta data whose version is the same as that of the already decoded meta data. Accordingly, it is possible to prevent unnecessary operation from being performed by skipping redundant decoding.

58. FIG. 7 is a block diagram of an apparatus for decoding meta data according to another embodiment of the present invention. Referring to FIG. 7, the decoding apparatus includes a demultiplexer 710, a media signal decoding unit 720, a meta data signal decoding unit 730 and a media signal reproducing unit 740. The decoding apparatus determines whether the meta data has been updated by using a cycle in which a meta data packet has been inserted into a stream transmitted from an encoding apparatus (not shown). To this end, the demultiplexer 710 includes a cycle sensing unit 711 and a parsing unit 713.

59. The cycle sensing unit 711 senses the cycle of the meta data packet being mixed together with the stream. The cycle sensing unit 711 stores the information regarding the meta data packet cycle, and determines whether a newly sensed meta data packet cycle is the same as the stored meta data packet cycle. The parsing unit 713 parses media signal packets, such as an audio packet and a video packet, transmits the parsed media signal packets to the media signal decoding unit 720, parses a meta data packet, and then transmits the parsed media data packets to the meta data signal decoding unit 730. The media signal decoding unit 720 decodes the media signal received from the parsing unit 713 and transmits the decoded media signal to the media signal reproducing unit 740. The parsing unit 713 determines whether the meta data packet must be parsed or not using the meta data packet cycle sensed by the cycle sensing unit 711. If the meta data packet cycle is changed, it means that the version information of the meta data is updated and thus the parsing unit 713 parses the meta data packet and transmits the parsed meta data packet to the meta data signal decoding unit 730. The meta data signal decoding unit 730 receives the meta data signal from the parsing unit 713 and transmits it to the media signal reproducing unit 740. If the meta data packet cycle is the same as a previous cycle, it means that the meta data is not changed and thus the parsing unit 713 does not parse the meta data packet. The meta data signal
decoding unit 730 need not repeatedly decode meta data having the same version information since the parsing unit 713 does not parse meta data having the same meta data packet cycle. The media signal reproducing unit 740 reproduces the media signal by using the decoded media signal and the decoded meta data signal received from the media signal decoding unit 720 and the meta data signal decoding unit 730.

FIG. 8 is a flowchart illustrating a method of encoding meta data according to an embodiment of the present invention. Referring to FIG. 8, a meta data encoding apparatus according to an embodiment of the present invention generates a media signal containing media objects (operation 810). Next, the meta data encoding apparatus generates meta data corresponding to the respective media objects, and a meta data signal containing a plurality of meta data signals (operation 820). The meta data encoding apparatus generates location information of the meta data corresponding to the respective media objects by using the media signal and the meta data signals (operation 830). Then the meta data encoding apparatus respectively inserts a plurality of pieces of the location information into the media objects (operation 840). Thereafter the meta data encoding apparatus encodes the media signal and the meta data signals and mixes them together.

FIG. 9 is a flowchart illustrating a method of encoding meta data according to another embodiment of the present invention. Referring to FIG. 9, a meta data encoding apparatus according to an embodiment of the present invention generates and encodes a media signal containing a media object (operation 910). The meta data encoding apparatus generates a meta data signal corresponding to the media object and encodes the meta data signal (operation 920). The meta data encoding apparatus transforms the media signal and the meta data signals in the form of a packet (operation 930). The meta data encoding apparatus generates a packet stream using the packets, and determines a cycle of inserting the meta data packet into the packet stream (operation 940). Next the meta data encoding apparatus generates a stream by inserting a meta data packet into the packet stream in the determined cycle (operation 950), and then transmits the stream to a decoding apparatus (not shown) (operation 960).

FIG. 10 is a flowchart illustrating a method of decoding meta data according to an embodiment of the present invention. Referring to FIG. 10, a meta data decoding apparatus according to an embodiment of the present invention decodes a media signal containing a media object (operation 1010). The meta data decoding apparatus extracts location information of meta data corresponding to the media object from the media object (operation 1020). The meta data decoding apparatus determines whether the extracted location information is identical to location information of already decoded meta data (operation 1030). If the extracted location information is not identical to the location information of the already decoded meta data, the meta data decoding
apparatus decodes the meta data of the extracted location information (operation 1040). If the extracted location information is identical to the location information of the already decoded meta data, the meta data decoding apparatus skips decoding of the meta data of the extracted location information. Thus it is possible to prevent an unnecessary operation from being performed by skipping redundant decoding of the same meta data, thereby reducing the complexity of the decoding apparatus.

FIG. 11 is a flowchart illustrating a method of decoding meta data according to another embodiment of the present invention. Referring to FIG. 11, a meta data decoding apparatus according to an embodiment of the present invention receives a packet stream (operation 1110). The meta data decoding apparatus senses a cycle in which a meta data packet has been inserted into the packet stream (operation 1120). The meta data decoding apparatus determines whether the sensed cycle is identical to a previous cycle (operation 1130). If the sensed cycle is not identical to the previous cycle, the meta data decoding apparatus parses the meta data packet and transmits the parsed meta data packet to the meta data signal decoding unit (operation 1140). In this case, the meta data decoding apparatus decodes the meta data signal packet. If the sensed cycle is identical to the previous cycle, the meta data decoding apparatus does not parse the meta data packet. Also, in this case, the meta data decoding apparatus also does not decode the meta data signal. Accordingly, if a packet cycle is identical to a previous cycle, the same meta data is not repeatedly decoded thus reducing the complexity of a decoding operation.

While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the following claims.
Claims

[1] A method of decoding meta data, comprising:
    decoding a media signal containing a media object; and
    performing one of not decoding a second meta data and decoding the second
    meta data corresponding to the media object,
    wherein if the second meta data is identical to a previously decoded first meta
    data, the second meta data is not decoded in the performing.

[2] The method of claim 1, wherein the performing the decoding of the second
    meta data comprises:
    extracting location information of the second meta data from the media object;
    and
    decoding the second meta data at the location information by using the extracted
    location information.

[3] The method of claim 2, wherein whether the second meta data is identical to
    the previously decoded first meta data is determined by comparing the extracted
    location information with location information of the previously decoded first
    meta data, and
    the extracted location information of the second meta data is a unique identifier
    of the second meta data.

[4] The method of claim 3, wherein if at least one of the media object and the
    second meta data corresponding to the media object is changed, the extracted
    location information of the second meta data also changes.

[5] The method of claim 1, wherein the second meta data comprises object descrip-
    tion data,
    wherein the object description data contains information for decoding the media
    signal.

[6] A method of decoding meta data, comprising:
    decoding a media signal containing a media object; and
    decoding meta data corresponding to the media object by using location in-
    formation of the meta data, which is extracted from the media object,
    wherein the location information is a unique identifier of the meta data.

[7] A method of decoding meta data, comprising:
    receiving a stream in which a media signal packet containing a media object and
    meta data packet corresponding to the media object are mixed together;
    parsing from the stream, the media signal packet; and
    decoding the media signal packet,
    wherein if the parsing from the stream further parses the meta data packet, the
A meta data packet is inserted into the stream in a predetermined cycle, and the predetermined cycle represents whether unique version information of the meta data is updated.

8. The method of claim 7, wherein during the parsing from the stream, parsing the meta data packet is not performed if the predetermined cycle is identical to a previous cycle.

9. The method of claim 7, wherein the parsing from the stream comprises parsing the meta data packet if the predetermined cycle is not identical to a previous cycle.

10. A method of encoding meta data, comprising:
encoding a media signal containing a plurality of media objects; and
encoding meta data corresponding to the respective plurality of media objects, wherein the plurality of media objects comprise location information of the corresponding meta data, and the location information are a unique identifiers of the meta data.

11. The method of claim 10, wherein the meta data comprise object description data for the corresponding plurality of media objects, where the object description data comprise information for encoding the media signal.

12. The method of claim 10, wherein if the plurality of media objects have the same attributes, the meta data corresponding to the respective plurality of media objects are identical to each other.

13. A method of encoding meta data, comprising:
generating a stream by mixing a media signal containing a media object packet and meta data packet for the media object together; and
indicating whether unique version information of the meta data packet is updated, using a cycle of inserting the meta data packet into the stream.

14. An apparatus for decoding meta data, comprising:
a media signal decoding unit which decodes a media signal containing a media object; and
a meta data signal processing unit which performs one of decoding a meta data signal containing second meta data corresponding to the meta object, and not decoding the meta data signal,
wherein if the second meta data is identical to a previously decoded first meta data, the meta data signal processing unit does not decode the meta data signal.

15. The apparatus of 14, wherein the meta data signal processing unit comprises a location information extraction unit which extracts location information of the second meta data corresponding to the media object from the media object;
a location information comparison unit which determines whether the extracted location information is identical to location information of the previously decoded first meta data; and

a meta data decoding unit which decodes the second meta data having the extracted location information if the extracted location information is not identical to the location information of the previously decoded first meta data.

16. An apparatus for decoding meta data, comprising:
a demultiplexer which receives a stream in which a media signal packet and a meta data packet corresponding to the media signal packet are mixed together, and parses from the stream, the media signal packet;
a media signal decoding unit which decodes the parsed media signal packet; and
a meta data signal decoding unit which decodes the parsed meta data packet, if the demultiplexer parses meta data packet,
wherein, if the meta data packet is parsed, the meta data packet is inserted into the stream in a predetermined cycle, wherein the predetermined cycle indicates whether unique version information of a meta data of the meta data packet is updated.

17. The apparatus of claim 16, wherein the demultiplexer comprises:
a cycle sensing unit which senses the predetermined cycle of inserting the meta data packet and determines whether the predetermined cycle is identical to a previous cycle of inserting the meta data packet into the stream; and
a parsing unit which parses from the stream the media signal, and the parsing unit parses the meta data packet if the predetermined cycle is not identical to the previous cycle.

18. The apparatus of claim 16, wherein the parsing unit does not parse the meta data packet if the predetermined cycle is identical to the previous cycle.

19. An apparatus for encoding meta data, comprising:
a media signal generation unit which generates a media signal containing a media object; and
a meta data signal generation unit which generates a meta data signal containing meta data corresponding to the media object,
wherein the media object comprises location information of the corresponding meta data, where the location information is a unique identifier of the meta data.

20. The apparatus of claim 19, wherein the meta data comprises object description data for the media object,
wherein the object description data comprises information for encoding the media signal.

21. The apparatus of claim 19, further comprising a location information
generation unit generating the location information of the meta data corresponding to the media object by using the media signal and the meta data signal.

22. An apparatus for encoding meta data, comprising:
a media signal encoding unit which encodes a media signal containing a media object;
a meta data signal encoding unit which encodes a meta data signal containing meta data corresponding to the media object; and
a multiplexer which generates a stream by mixing the encoded media signal and the encoded meta data signal together as a media signal packet and a meta data packet,
wherein the multiplexer changes a cycle of inserting the meta data into the stream to indicate whether unique version information of the meta data is updated.

23. The apparatus of claim 22, wherein the multiplexer comprises:
a cycle determination unit which determines the cycle of inserting the meta data into the stream to indicate whether the unique version information of the meta data is updated; and
a signal mixing unit which generates the stream by inserting the meta data packet into the stream in the determined cycle.

24. A computer readable medium having recorded thereon a method of decoding meta data, the method comprising:
decoding a media signal containing a media object; and
decoding meta data corresponding to the media object by using location information of the meta data, which is extracted from the media object,
wherein the location information is a unique identifier of the meta data.

25. A computer readable medium having recorded thereon a method of encoding meta data, the method comprising:
encoding a media signal containing a plurality of media objects; and
encoding meta data corresponding to the respective plurality of media objects,
wherein the plurality of media objects comprise location information of the corresponding meta data, where the location information are unique identifiers of the meta data.

26. A computer readable medium having recorded thereon a method of decoding meta data, comprising:
receiving a stream in which a media signal packet containing a media object and a meta data packet corresponding to the media object are mixed together;
parsing from the stream, the media signal packet and the meta data packet; and
decoding the parsed media signal packet and meta data packet,
wherein the stream indicates unique version information of the meta data contained in the meta data packet by using a cycle of inserting the meta data packet into the stream.

27. A computer readable medium having recorded thereon a method of encoding meta data, the method comprising:
generating a stream by mixing a media signal packet containing a media object and meta data packet for the media object together; and
indicating whether unique version information of the meta data packet is updated, using a cycle of inserting the meta data packet into the stream.
FIG. 3

TIME

MEDIA SIGNAL (300)

META DATA SIGNAL (310)

00 01 02 03 04 05 06 07
08 09 0A 0B 0C 0D 0E 0F
FIG. 8

START

GENERATE MEDIA SIGNAL CONTAINING MEDIA OBJECT

GENERATE META DATA CORRESPONDING TO THE MEDIA OBJECT, AND META DATA SIGNAL CONTAINING THE META DATA

GENERATE LOCATION INFORMATION OF THE META DATA

INSERT THE LOCATION INFORMATION INTO THE MEDIA OBJECT

END
FIG. 9

START

1. Encode media signal containing media object

2. Encode meta data signal corresponding to the media object

3. Transform the media signal and the meta data signal in the form of a packet

4. Generate packet stream using the packets, and determine cycle of inserting the meta data packet into the packet stream

5. Insert the meta data packet into the packet stream in the determined cycle

6. Transmit the packet stream

END
FIG. 10

START

1010

DECODE MEDIA SIGNAL CONTAINING MEDIA OBJECT

1020

EXTRACT LOCATION INFORMATION OF META DATA CORRESPONDING TO THE MEDIA OBJECT FROM THE MEDIA OBJECT

1030

IS THE EXTRACTED LOCATION INFORMATION IDENTICAL TO LOCATION INFORMATION OF ALREADY DECODED META DATA?

YES

NO

1040

DECODE THE META DATA HAVING THE EXTRACTED LOCATION INFORMATION

END
FIG. 11

START

RECEIVE PACKET STREAM 1110

SENSE CYCLE OF INSERTING META DATA PACKET INTO THE PACKET STREAM 1120

YES

IS THE SENSED CYCLE IDENTICAL TO PREVIOUS CYCLE? 1130

NO

PARSE THE META DATA PACKET AND TRANSMIT THE PARSED RESULT TO META DATA SIGNAL DECODING UNIT 1140

END
A. CLASIFICATION OF SUBJECT MATTER

H04N 7/24(2006.01)1

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)

IPC 8 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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 international search (name of data base and, where practicable, search terms used)

eKIPASS(KIPO internal) meta data, encoding, decoding, parsing, location information

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No</th>
</tr>
</thead>
</table>
See abstract, Claim 1,6,8,9,10, Fig 1-3 | 1-27 |
| A        | KR 2004/0055556 Al(JANG HYEON SEONG et al) 26 June 2004  
See abstract, Claims 1-8, Fig 2 | 1-27 |
See abstract | 1-27 |

Further documents are listed in the continuation of Box C

See patent family annex

* Special categories of cited documents
  "A" document defining the general state of the art which is not considered to be of particular relevance
  "E" earlier application or patent but published on or after the international filing date
  "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
  "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

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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  

Name and mailing address of the ISA/KR

Korean Intellectual Property Office  
Government Complex-Daejeon, 139 Seonsa-ro, Seogu, Daejeon 302-701, Republic of Korea

Facsimile No 82-42-472-7140

Authorized officer  
KU, Dae Sung

Telephone No 82-42-481-8192

Form PCT/ISA/210 (second sheet) (July 2008)
<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>EP 1920607 A1</td>
<td>14.05.2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1935183 A1</td>
<td>25.06.2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KR 20070011094 A</td>
<td>24.01.2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1587063 A2</td>
<td>19.10.2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KR 20060045675 A</td>
<td>17.05.2006</td>
</tr>
</tbody>
</table>