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- (71) **Applicant:** HEWLETT PACKARD ENTERPRISE DEVELOPMENT LP [US/US]; 11445 Compaq Center Drive West, Houston, TX 77070 (US).
- (72) **Inventor:** LUCENTE, David; 701 Cool Springs Blvd, Franklin, Tennessee 37067 (US).
- (74) **Agents:** FEBBO, Michael A. et al.; Hewlett Packard Enterprise, 3404 E. Harmony Road, Mail Stop 79, Fort Collins, CO 80528 (US).

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[Continued on next page]

- (54) **Title:** CONTINUOUS VIEWING MEDIA

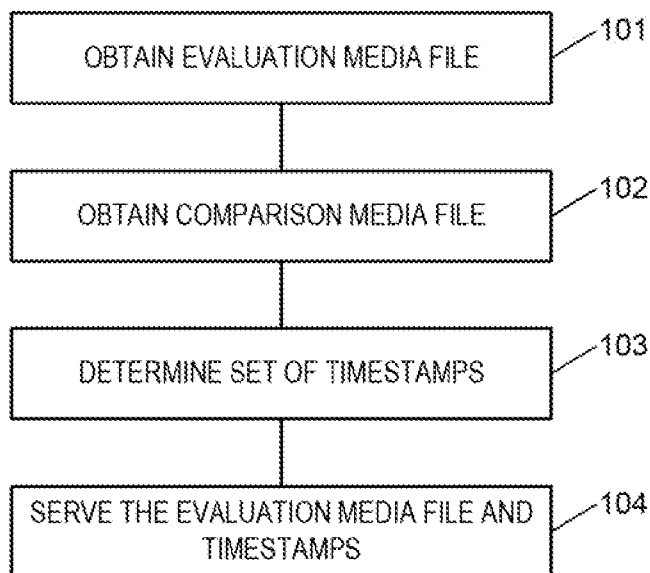


FIG. 1

- (57) **Abstract:** A system may obtain an evaluation media file and a comparison file. The system may compare the evaluation media file to the comparison file to determine a continuous viewing version of the evaluation media file. In a continuous viewing mode, the system may serve the continuous viewing version to a viewing client.

**Declarations under Rule 4.17:**

- *as to the identity of the inventor (Rule 4.17(i))*
- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

Published:

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CONTINUOUS VIEWING MEDIA

BACKGROUND

[0001] Various content providers provide various episodic media to content consumers. For example, a television provider or an online media provider may transmit media such as episodes of television series or movies of a movie series to clients. Such episodic media may have similarities between episodes. For example, episodes may share identical or similar opening or closing sequences, such as opening or closing credits.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] Figure 1 illustrates an example method of performing a continuous viewing mode.

[0003] Figure 2 illustrates an example system including a converter to convert an evaluation media file to a continuous viewing version.

[0004] Figure 3 illustrates an example system including a non-transitory computer readable medium storing instructions for generating and serving a continuous viewing version of a media file.

DETAILED DESCRIPTION OF SPECIFIC EXAMPLES

[0005] Some media consumers may “binge watch” by watching multiple episodes of a single series in a sitting. For example, a viewer may request that an on-demand media provider such as a cable or satellite television provider or an online streaming media provider automatically play the next episode after a current episode is finished playing. In such cases, the viewer may be shown a repetitive opening or closing sequence, such as an opening or closing credit sequence, each time a new episode is played.

[0006] Aspects of the present disclosure provide a continuous viewing mode for on-demand media providers. During the continuous viewing mode, repetitive sequences of video frames are removed from the media being viewed, improving the consumer experience. For example, the repetitive sequences may be opening or closing credit sequences. In some cases, a continuous viewing mode version of a media file is created for serving during

the continuous viewing mode. In other cases, during continuous viewing mode, a standard version of the file is served along with timestamps to allow the viewing client to skip or remove the repetitive sequences.

[0007] Figure 1 illustrates an example method of performing a continuous viewing mode. For example, the illustrated method may be performed by a media provider such as a cable or satellite television provider or an online streaming media provider.

[0008] The example method may include block 101. Block 101 may include obtaining an evaluation media file. The evaluation media file may be a recording of an episode of a series that will be sent to a viewer during a continuous viewing mode. For example, the evaluation media file may be obtained from a storage system, such as a storage area network (SAN). As another example, the evaluation media file may be obtained from a content distributor.

[0009] The example method may also include block 102. Block 102 may include obtaining a comparison file. The comparison file may be a media file corresponding to a recording of a different episode of the series than the evaluation media file. For example, the comparison file may be obtained from a storage system, such as a SAN, or from a content distributor. In some implementations, the comparison file may be one of a set of comparison files. For example, the set of comparison files may be a set of different episodes of the series, such as a season of the series or the entire production run of the series.

[0010] The example method may also include block 103. Block 103 may include comparing the evaluation media file to the comparison file to determine a set of timestamps for a repetitive frame sequence. For example, the set of timestamps may be a beginning timestamp and an end timestamp of the repetitive frame sequence. For instance, the set of timestamps may be a first timestamp marking the first frame of an opening credit sequence and a second timestamp marking the last frame of the opening credit sequence. As another example, the set of timestamps may be a first pair of timestamps delimiting an opening credit sequence and a second pair of timestamps delimiting a closing

credit sequence. In some series, the opening sequence may begin at the very start of each episode, or the ending sequence may end at the very end of each episode. In such cases, the set of timestamps may be a single timestamp marking the last frame of the opening sequence or the first frame of the end credits.

[0011] In various implementations, block 103 may include comparing the comparison file to the evaluation media file to determine repetitions between the evaluation media file and the comparison media file. For example, block 103 may include cross-correlating video frames of the evaluation media file and the comparison to determine a pair of frame sequences from the two files that have at least a threshold level of cross-correlation. The timestamps of the first and last frames of the frame sequence from the evaluation media file may be used as the set of timestamps. The threshold level of cross-correlation may be set differently for different series. For example, a first series may have the same opening sequence in each episode, while a second series may have similar but different opening sequences. The levels of desired cross-correlation may be higher in the first case than the second.

[0012] As another example, block 103 may include comparing the audio tracks of the evaluation media file and the comparison media file to determine the timestamps. For example, in a series, the opening or closing credits may include a theme song or other audio sequence that occurs in each episode but with different opening or closing video sequences in different episodes.

[0013] In other implementations, block 103 may include comparing a set of comparison files to determine an indicator of an opening or closing sequence and using the indicator to determine the set of timestamps. For example, block 103 may include comparing the set of comparison files to determine a set of images that are displayed during the opening or closing sequence. Block 103 may then include inspecting the evaluation media file to determine when images from the set are displayed in the evaluation media file. The first and last of such frames may be used to determine the timestamps.

[0014] The example method may also include block 104. Block 104 may include serving the evaluation media file and the set of timestamps to a viewing

client. For example, block 104 may be performed during a continuous viewing mode. The continuous viewing mode may be an operating mode where the client automatically plays a next episode after a current episode is finished playing. For example, the continuous viewing mode may be based on a client request for a next episode after a current episode. Such a request may include a request for timestamps. As another example, the continuous viewing mode may be an operating mode where the server automatically serves the next episode after a current episode is finished. The viewing client may then use the set of timestamps to view the evaluation media file without viewing the repetitive frame sequence. For example, the viewing client may use the set of timestamps to skip the opening and closing credits of the evaluation media file. As another example, the viewing client may use the timestamps to alter playback during the repetitive frame sequences. For example, the viewing client may use the set of timestamps to speed playback during the repetitive frame sequences.

[0015] In some implementations, timestamps may be included with second and subsequent episodes, but not included with the first episode during a viewing session. This may allow the viewing client to play opening and closing credits at least once per viewing session. In other implementations, timestamps may be included with all episodes during a continuous viewing mode.

[0016] Figure 2 illustrates an example system 201 including a converter 203 to convert an evaluation media file to a continuous viewing version. For example, the illustrated system 201 may be a component within a content distribution network (CDN) for serving media to viewing clients. As another example, the illustrated system 201 may be a system utilized by a content distributor to generate a continuous viewing version for distribution to content providers. Although illustrated in a single physical system 201, in some implementations, the components of the system 201 may be distributed throughout a network or collocated on a single machine. In various cases, the illustrated functional modules may be implemented in software executed by one

or more processors and stored on a non-transitory computer readable medium, in hardware, or a combination thereof.

[0017] The example system 201 may include a storage 202. For example, the storage 202 may be a hard disk, flash memory storage volume, network attached storage (NAS) or storage volume of a SAN. The storage 202 may store an evaluation media file and a comparison media file. In some implementations, the storage 202 may be a temporary cache that stores the evaluation media file and the comparison media file during generation of a continuous viewing version of the evaluation media file. The evaluation media file may be a recording of an episode of a series that will be sent to a viewer during a continuous viewing mode. The comparison file may be a media file corresponding to a recording of a different episode of the series than the evaluation media file. In further implementations, the comparison media file may be one of a set of comparison media files, and the storage 202 may store the entire set.

[0018] The example system 201 may further include a converter 203. The converter 203 may retrieve the media files from the storage 202 and convert the evaluation media file to a continuous viewing version using the comparison media file. For example, the converter 203 may perform block 103 of Figure 1 to determine a set of timestamps associated with an opening or closing sequence.

[0019] In some cases, the converter 203 may generate the continuous viewing version by associating the set of timestamps with the evaluation media file. For example, the set of timestamps may be packaged with evaluation media file or stored as metadata in the evaluation media file.

[0020] In other cases, the converter 203 may generate the continuous viewing version by removing the portions of the evaluation media file that are delimited by the set of timestamps. In some implementations, the converter 203 may first generate the timestamps and then remove the portions. In other implementations, the converter may remove the portions instead of generating the set of timestamps.

[0021] In some implementations, the converter 203 may compare a set of comparison media files to determine an indicator of an opening or closing sequence. The converter may use the indicator to convert the evaluation media file to the continuous viewing version. For example the indicator may be an image or set of images that are displayed during the opening or closing sequence. For example, the indicator may be a text overlay that is displayed during the sequence. In some implementations, the converter 203 may convert the evaluation media file to the continuous viewing version by removing clips that include the indicators. In other implementations, the converter 203 may use the indicators to generate timestamps for the opening or closing sequences and associate those timestamps with the evaluation media file.

[0022] In some implementations, the converter 203 may provide the continuous viewing version to a server 204. In other implementations, the converter 203 may store the continuous viewing version in the storage 202 and the server 204 may retrieve the version from the storage 202.

[0023] The server 204 may serve the continuous viewing version of the evaluation media file during a continuous viewing mode. For example, the server 204 may serve the continuous viewing version to a viewing client or to a downstream node in a CDN. As an example, the server 203 may serve the continuous viewing version by serving the set of timestamps associated with the opening or closing sequence with the evaluation media file. The viewing client may then use those timestamps to remove or speed playback of the repetitive content. As another example, the server 204 may serve continuous viewing version by using the associated timestamps to skip the opening or closing sequence to serve the evaluation media file with the opening or closing sequence skipped.

[0024] Figure 3 illustrates an example system 301 including a non-transitory computer readable medium 304 storing instructions 305-307 for generating and serving a continuous viewing version of a media file. For example, the example system 301 may be an implementation of a system 201 described with respect to Figure 2. As another example, the example system 301 may perform the method described with respect to Figure 1. In some

implementations, the non-transitory computer readable medium 304 may include memory, such as random access memory, a storage volume, or a combination thereof.

[0025] The medium 304 may store a first instruction set 305. The first instruction set 305 may be executable by a processor 303 to obtain an evaluation media file and to obtain a comparison media file. For example, the instructions 305 may be executable by the processor 303 to obtain the files via a network interface 302. For example, the files may be obtained from an upstream node in a CDN, a content distributor, or a network storage volume on a SAN. As another example, the instructions 305 may be executable by the processor 303 to obtain the files from a storage volume attached to the system 301. In some implementations, the instructions 305 may be further executable to obtain a set of comparison media files.

[0026] The medium 304 may further store a second instruction set 306. The instructions 306 may be executable by the processor 303 to generate a continuous viewing version of the evaluation media file. For example, the instructions 306 may be executable to compare the evaluation media file to the comparison media file to determine the continuous viewing version. For example, the instructions 306 may be executable to compare the comparison media file to the evaluation media file to determine a repeated sequence, such as an opening or closing sequence that is present in both files.

[0027] In some implementations, the instructions 306 may be executable to determine the continuous viewing version by determining a set of timestamps associated with an opening or closing sequence and associating the set of timestamps with the evaluation media file.

[0028] In further implementations, the instructions 306 may be executable to compare a set of comparison media files to determine an indicator of an opening or closing sequence and to use the indicator to convert the evaluation media file to the continuous viewing version.

[0029] The medium 304 may further store a third instruction set 307. The instructions 307 may be executable by the processor 303 to serve the continuous viewing version of the evaluation media file during a continuous

viewing mode. For example, the instructions 307 may be executable by the processor 303 to serve the continuous viewing version to a client during a continuous viewing mode. As another example, the instructions 307 may be executable by the processor 303 to serve the continuous viewing version to a downstream node in a CDN. In some implementations, the instructions 307 may be executable to serve the continuous viewing version by using the associated timestamps to skip the opening or closing sequence to serve the evaluation media file with the opening or closing sequence skipped. In other implementations, the instructions 307 may be executable by the processor 303 to serve the continuous viewing version by serving the associated timestamps with the evaluation version.

[0030] In the foregoing description, numerous details are set forth to provide an understanding of the subject disclosed herein. However, implementations may be practiced without some or all of these details. Other implementations may include modifications and variations from the details discussed above. It is intended that the appended claims cover such modifications and variations.

CLAIMS

1. A method, comprising:
 - obtaining an evaluation media file;
 - obtaining a comparison file;
 - comparing the evaluation media file to the comparison file to determine a set of timestamps for a repetitive frame sequence;
 - in a continuous viewing mode, serving the evaluation media file and the set of timestamps to a viewing client.
2. The method of claim 1, wherein comparing the evaluation media file to the comparison file comprises:
 - comparing a set of comparison files to determine an indicator of an opening or closing sequence and using the indicator to determine the set of timestamps.
3. The method of claim 1, wherein comparing the evaluation media file to the comparison file comprises:
 - comparing the comparison file to the evaluation media file to determine repetitions between the evaluation media file and the comparison media file.
4. A system, comprising:
 - a storage to store an evaluation media file and a comparison media file;
 - a converter to convert the evaluation media file to a continuous viewing version using the comparison media file; and
 - a server to serve the continuous viewing version of the evaluation media file in a continuous viewing mode.
5. The system of claim 4, wherein the converter is to convert the evaluation media file to the continuous viewing version by determining a set of timestamps associated with an opening or closing sequence and associating the set of timestamps with the evaluation media file.
6. The system of claim 5, wherein the server is to serve the continuous viewing version by serving the set of timestamps associated with the opening or closing sequence with the evaluation media file.

7. The system of claim 5, wherein the server is to serve continuous viewing version by using the associated timestamps to skip the opening or closing sequence to serve the evaluation media file with the opening or closing sequence skipped.
8. The system of claim 4, wherein the converter is to compare a set of comparison media files to determine an indicator of an opening or closing sequence and to use the indicator to convert the evaluation media file to the continuous viewing version.
9. The system of claim 4, wherein the converter is to compare the comparison media file to the evaluation media file to determine a repeated sequence.
10. A non-transitory computer readable medium storing instructions to:
 - obtain an evaluation media file;
 - obtain a comparison media file;
 - compare the evaluation media file to the comparison media file to determine a continuous viewing version of the evaluation media file;
 - serve the continuous viewing version of the evaluation media file.
11. The non-transitory computer readable medium of claim 10, storing instructions to:
 - to determine the continuous viewing version by determining a set of timestamps associated with an opening or closing sequence and associating the set of timestamps with the evaluation media file.
12. The non-transitory computer readable medium of claim 11, storing instructions to:
 - serve the continuous viewing version by using the associated timestamps to skip the opening or closing sequence to serve the evaluation media file with the opening or closing sequence skipped.
13. The non-transitory computer readable medium of claim 10, storing instructions to:
 - compare a set of comparison media files to determine an indicator of an opening or closing sequence and to use the indicator to convert the evaluation media file to the continuous viewing version.

14. The non-transitory computer readable medium of claim 10, storing instructions to:

compare the comparison media file to the evaluation media file to
determine a repeated sequence.

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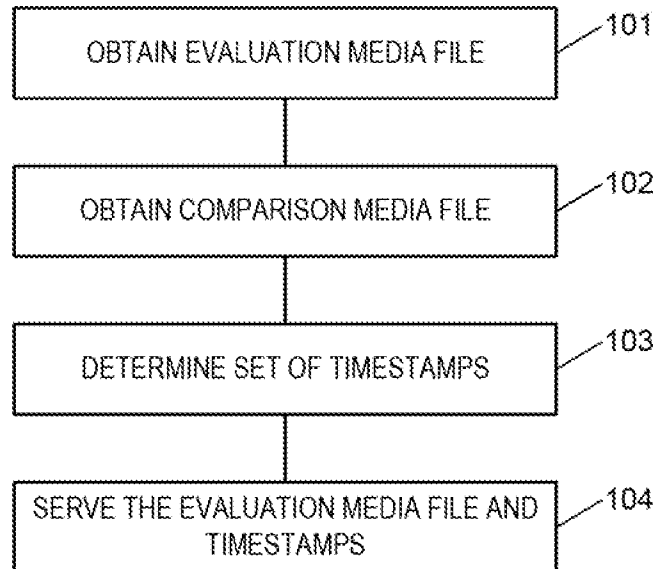


FIG. 1

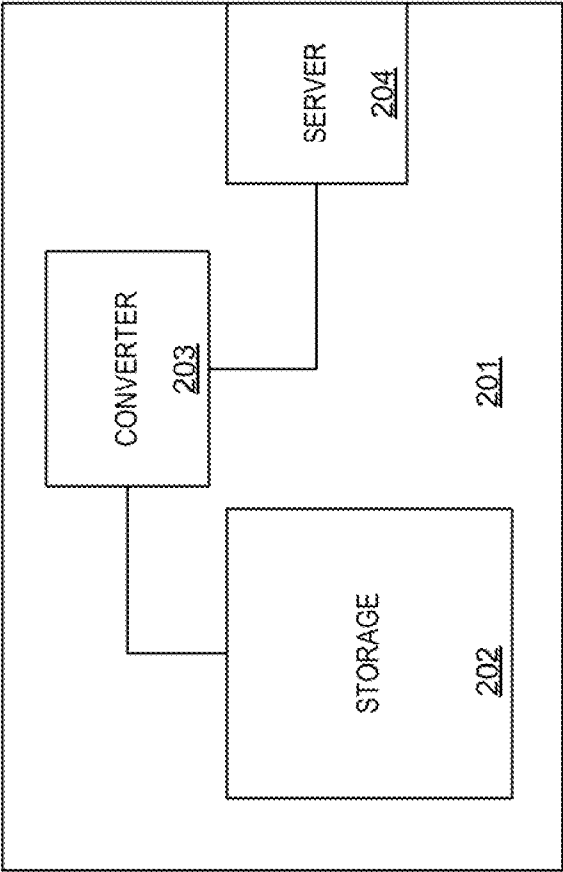


FIG. 2

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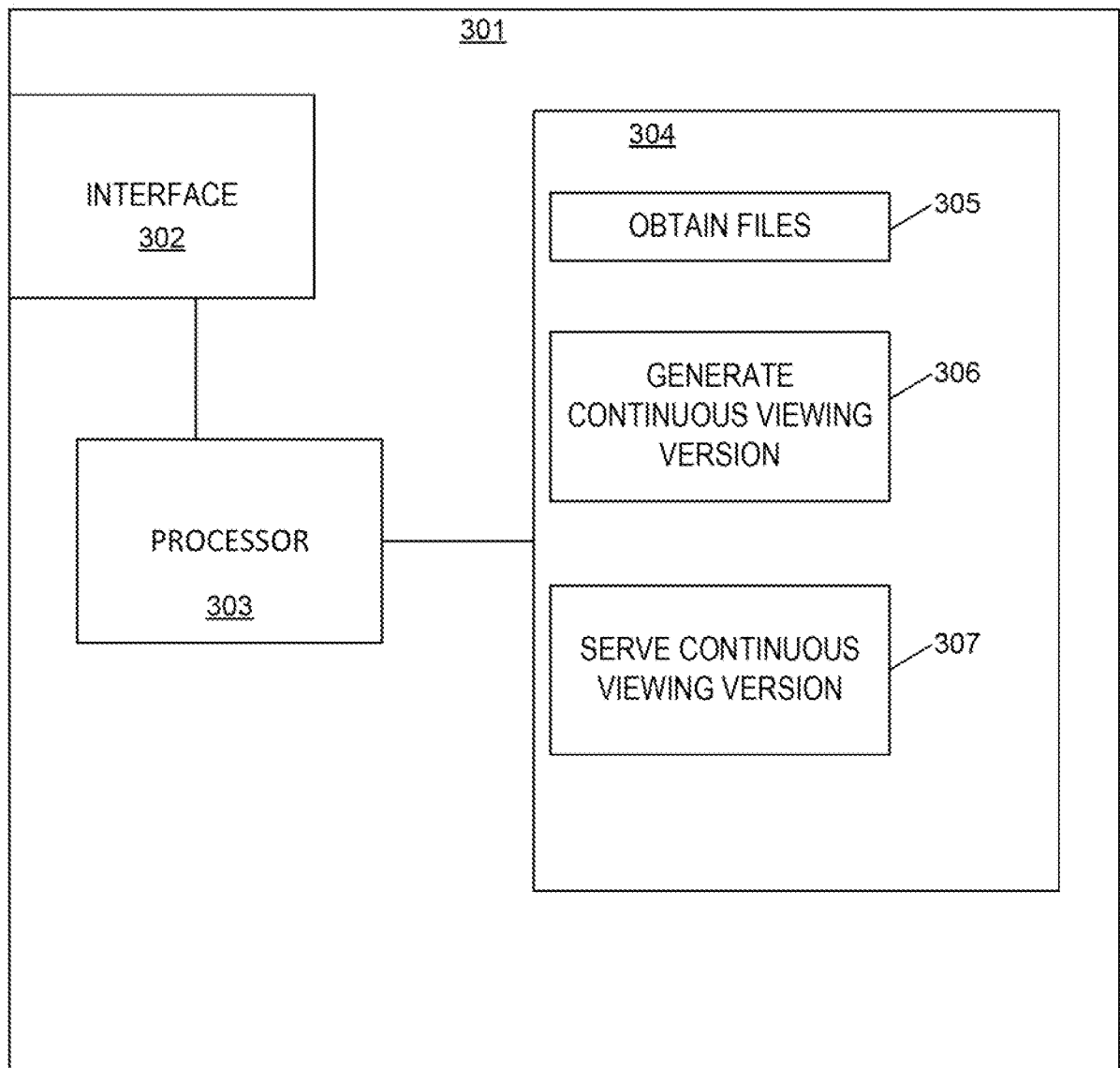


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/016392**A. CLASSIFICATION OF SUBJECT MATTER****H04N 21/45(2011.01)i, H04N 21/462(2011.01)i, H04N 21/242(2011.01)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 21/45; H04N 5/93; H04N 5/91; H04N 7/24; H04L 29/06; H04N 7/00; G11B 27/00; H03M 7/40; H04N 21/462; H04N 21/242

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

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: continuous viewing mode, evaluation media file, comparison file, timestamp, repetitive frame sequence, converter, server, skip

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2011-0097058 A1 (SHIH WU FAN JIANG et al.) 28 April 2011 See paragraphs [0027]-[0040]; claims 1-2, 6; and figure 2.	1-14
A	US 2014-0289375 A1 (MOBI TV, INC.) 25 September 2014 See paragraphs [0043]-[0044]; claims 1, 10; and figure 7.	1-14
A	US 2005-0083218 A1 (SHANKAR REGUNATHAN et al.) 21 April 2005 See paragraphs [0102]-[0113]; claims 1-8; and figure 7.	1-14
A	US 2008-0075417 A1 (MASAYOSHI MIZUNO) 27 March 2008 See paragraphs [0072]-[0090]; claims 1-4; and figure 8.	1-14
A	EP 1162828 B1 (ORACLE CORPORATION) 02 May 2007 See paragraphs [0089]-[0091], [0095]-[0097]; claim 1; and figure 5.	1-14



Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

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International Application Division
Korean Intellectual Property Office
189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan City, 302-701,
Republic of Korea

Facsimile No. +82-42-472-7140

Authorized officer

LEE, Jin Ick

Telephone No. +82-42-481-5770



INTERNATIONAL SEARCH REPORT

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