



- (51) **International Patent Classification:**
H04N 7/18 (2006.01) *G06F 17/30* (2006.01)
- (21) **International Application Number:**
PCT/US2015/066553
- (22) **International Filing Date:**
18 December 2015 (18.12.2015)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
14/587,258 31 December 2014 (31.12.2014) US
- (71) **Applicant:** MOTOROLA SOLUTIONS, INC. [US/US];
1303 East Algonquin Road, Schaumburg, Illinois 60196 (US).
- (72) **Inventors:** BEKIARES, Tyrone D.; 131 S. Lincoln Avenue, Park Ridge, Illinois 60068 (US). TINE, Steven D.; 510 Crown Point Drive, Buffalo Grove, Illinois 60089 (US).
- (74) **Agents:** BESTOR, Daniel R. et al.; 1301 East Algonquin Road, IL02/SH5, Schaumburg, Illinois 60196 (US).
- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,

[Continued on next page]

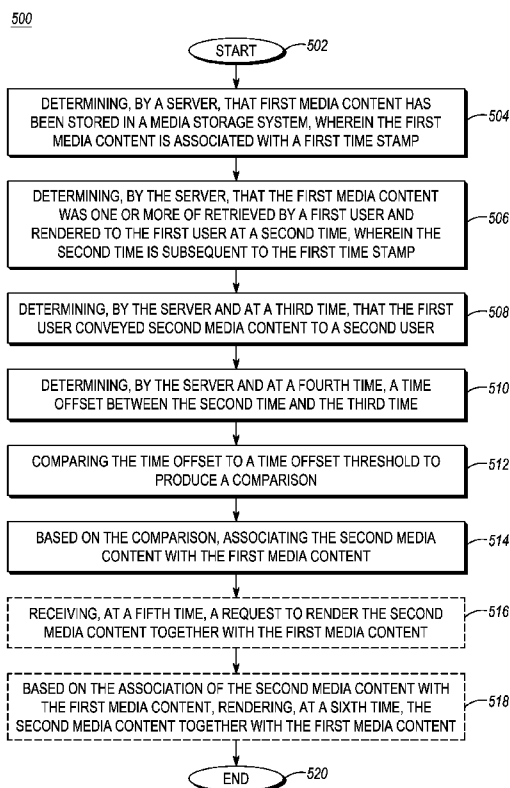
(54) **Title:** METHOD AND APPARATUS FOR ANALYSIS OF EVENT-RELATED MEDIA

FIG. 5

(57) **Abstract:** A communication system is provided that analyzes event-related media by correlating various media content based on the media being time-wise proximate to each other. Thereby, the communication system provides an informational tool for law enforcement agencies to correlate different media content that all relate to a same event, such as subject matter media with related discussion media. For example, the subject matter media may comprise video, video stills, biometrics, sensor data, Automatic Vehicle Location (AVL) data, pictures, BOLO (Be On the LookOut) bulletins, and the like, while the related discussion media may comprise Push-to-Talk talkbursts, telephone conversations, Instant Messaging (IM), emails, and other forms of discussion media. By correlating such media content, the communication system facilitates event or incident reconstruction by providing related media together when providing event or incident playback.

WO 2016/109241 A1



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, **Published:**
GW, KM, ML, MR, NE, SN, TD, TG).

— *with international search report (Art. 21(3))*

METHOD AND APPARATUS FOR ANALYSIS OF EVENT-RELATED MEDIA

FIELD OF THE INVENTION

The present invention relates generally to event-related media aggregation systems and, in particular, to a method and apparatus for analyzing event-related media.

BACKGROUND OF THE INVENTION

Public safety event-related communications are typically comprised of multiple intents of communications media. For example, one such intent of event communications media may be 'subject matter media'. Subject matter media is any modality of media which captures a portion of an event. Subject matter media is typically consumed by public safety personnel in an on-demand fashion. That is, some media may be watched or read by a public safety officer at a time that is convenient to the officer, as opposed to watching or reading the media live, that is, at the time the media is captured. For example, a public safety officer may review surveillance video, camera-captured images, documents, and public safety bulletins, for example, a BOLO ('Be on the Lookout') bulletin, long after the media is captured or made available. Another intent of event communications media may be 'discussion media'. Discussion media is any modality of media which is used to discuss subject matter media. Discussion media, by its very nature, is consumed by public safety personnel in real time. For example, a public safety officer may participate in a group call, instant messaging, or a telephone call in real time to discuss certain subject matter media during incident response.

Generally, public safety agencies log or record all intents and modalities of communications media. When the media is subsequently retrieved by a public safety practitioner for incident review, the media is displayed time-wise in a purely linear fashion, where media is arranged according to its time of capture. As noted, discussion media is often used to discuss on-demand subject matter media. If logged media is presented linearly strictly according to time of capture, it becomes

impossible to associate discussion media with the relevant subject matter media under discussion.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying figures, where like reference numerals refer to identical or functionally similar elements throughout the separate views, together with the detailed description below, are incorporated in and form part of the specification, and serve to further illustrate embodiments of concepts that include the claimed invention, and explain various principles and advantages of those embodiments.

FIG. 1 is a block diagram of an exemplary communication system in accordance with an embodiment of the present invention.

FIG. 2 is a block diagram of a user terminal of the communication system of FIG. 1 in accordance with some embodiments of the present invention.

FIG. 3 is a block diagram of a data capture device of the communication system of FIG. 1 in accordance with some embodiments of the present invention.

FIG. 4 is a block diagram of a server of the communication system of FIG. 1 in accordance with some embodiments of the present invention.

FIG. 5A is a logic flow diagram illustrating a method performed by communication system of FIG. 1 in analyzing event-related media accordance with some embodiments of the present invention.

FIG. 5B is a continuation of the logic flow diagram of FIG. 5A illustrating a method performed by communication system of FIG. 1 in analyzing event-related media accordance with some embodiments of the present invention.

Skilled artisans will appreciate that elements in the figures are illustrated for simplicity and clarity and have not necessarily been drawn to scale. For example, the dimensions and/or relative positioning of some of the elements in the figures may be exaggerated relative to other elements to help to improve

understanding of various embodiments of the present invention. Also, common but well-understood elements that are useful or necessary in a commercially feasible embodiment are often not depicted in order to facilitate a less obstructed view of these various embodiments of the present invention. It will further be appreciated that certain actions and/or steps may be described or depicted in a particular order of occurrence while those skilled in the art will understand that such specificity with respect to sequence is not actually required. Those skilled in the art will further recognize that references to specific implementation embodiments such as “circuitry” may equally be accomplished via replacement with software instruction executions either on general purpose computing apparatus (e.g., CPU) or specialized processing apparatus (e.g., DSP). It will also be understood that the terms and expressions used herein have the ordinary technical meaning as is accorded to such terms and expressions by persons skilled in the technical field as set forth above except where different specific meanings have otherwise been set forth herein.

DETAILED DESCRIPTION OF THE INVENTION

A communication system is provided that analyzes event-related media by correlating various media content based on the media being time-wise proximate to each other. Thus, the communication system provides an informational tool for correlation of different media content that all relate to a same event, such as subject matter media with related discussion media. For example, the subject matter media may comprise video, video stills, biometrics, sensor data, Automatic Vehicle Location (AVL) data, pictures, BOLO (Be On the LookOut) bulletins, and the like, while the related discussion media may comprise Push-to-Talk talkbursts, telephone conversations, Instant Messaging (IM), emails, and other forms of discussion media. By correlating such media content, communication system 100 facilitates event or incident reconstruction by providing related subject matter and discussion media together when providing event or incident playback.

Generally, an embodiment of the present invention encompasses a method for analyzing event-related media. The method includes receiving first media

content associated with an event, storing the first media content in association with a first time stamp and an identifier of the first media content, determining that the first media content was one or more of retrieved by a user or rendered to the user at a second time, wherein the second time is subsequent to the first time stamp, determining that the user, at a third time overlapping with or subsequent to the second time, conveyed second media content, determining a time offset between the second time and the third time, and when the time offset is less than a time offset threshold, associating the second media content with the first media content.

Another embodiment of the present invention encompasses a server comprising an interface, a processor, and an at least one memory device. The at least one memory device is configured to store a set of instructions that, when executed by the processor, cause the processor to perform the following functions: receive first media content associated with an event; store the first media content in association with a first time stamp and an identifier of the first media content; determine that the first media content was one or more of retrieved by a user or rendered to the user at a second time, wherein the second time is subsequent to the first time stamp; determine that the user, at a third time overlapping with or subsequent to the second time, conveyed second media content; determine a time offset between the second time and the third time; and when the time offset is less than a time offset threshold, associate the second media content with the first media content.

Turning now to the drawings, the present invention may be more fully described with reference to FIGs. 1-5B. FIG. 1 is a block diagram of an exemplary communication system 100 in accordance with some embodiments of the present invention. Communication system 100 includes multiple remote terminals 1002-105, such as user terminals 102-104 (three shown) and one or more data capture devices 105 (one shown). Each remote terminal 102-105 is connected to a server 120 via a data network 110. Data network 110 may comprise a wide area network (WAN), a local area network (LAN), a telephone

network such as a Public Switched Telephone Network (PSTN), the Internet, a privately operated data network such as an enterprise network, a wireless network such as a cellular network or a Wireless LAN (WLAN), a Public Safety network, or a combination of networks.

5 Server 120 may be any type of computer device that collects, logs, or records media of various modalities and intents. For example, Server 120 may comprise a Records Management System (RMS) or a Content Management System (CMS) utilized by public safety agencies. Server 120 includes an event-related media database 122 that may be searched by user terminals 102-104.
10 More particular, server 120 includes a server entity that may collect, process, and maintain data in event-related media database 122, and further includes a search engine 124 that may search the database, or other databases that may be internal or external to the server, in response to receiving a query from a user terminal 102-104 or an operator of the server. Server 120 may be connected to data
15 network 110 via any of a wireless, wireline, or optical connection, or any other connection known in the art, and together server 120 and data network 110 may be referred to as an infrastructure of communication system 100. Event-related media database 122 is a repository of event-related subject matter and discussion media content, such as video recordings, audio recordings, emails, instant
20 messaging (IM), tweets, and/or any other event-related media content. In other embodiments of the present invention, event-related media database 122 may be external to, and in communication with, server 120.

 User terminals 102-104 may be any kind of user device into which a user may enter a data query and which includes a display for displaying results of that
25 query. For example, each of user terminals 102-104 may be a wireless mobile device, such as a cellular telephone, a radio telephone, a smart phone, or a personal digital assistant (PDA) with radio frequency (RF) capabilities, may be a personal computer, a laptop computer, or a tablet computer with or without radio frequency (RF) capabilities, or may be a communication console, such as used in
30 a computer-assisted dispatch (CAD) system or Real-Time Information Console

(RTIC), for example, a Public Safety system. Data capture device 105 is an audio/video device that is capable of capturing ambient audio and/or video, such as a camera phone that may be used by a user to capture ambient audio and/or video and/or still images, or a camera or sensor such as microphone, etc., that may be mounted on a vehicle or on a suitable structure, such as a building or post. For example, each of user terminals 102-104 may operate as a data capture device.

Referring now to FIG. 2, a block diagram is provided of a user terminal 200, such as user terminals 102-104, in accordance with some embodiments of the present invention. User terminal 200 includes a processor 202, such as one or more microprocessors, microcontrollers, digital signal processors (DSPs), combinations thereof or such other devices known to those having ordinary skill in the art. The particular operations/functions of processor 202, and thus of user terminal 200, is determined by an execution of software instructions and routines that are stored in a respective at least one memory device 204 associated with the processor, such as random access memory (RAM), dynamic random access memory (DRAM), and/or read only memory (ROM) or equivalents thereof, that store data and programs that may be executed by the corresponding processor. However, one of ordinary skill in the art realizes that the operations/functions of processor 202 alternatively may be implemented in hardware, for example, integrated circuits (ICs), application specific integrated circuits (ASICs), a programmable logic device such as a PLD, PLA, FPGA or PAL, and the like, implemented in the user computer device. Based on the present disclosure, one skilled in the art will be readily capable of producing and implementing such software and/or hardware without undue experimentation.

User terminal 200 further includes a user interface 206 via which a user may input data into the user terminal or output data from the user terminal and a network interface 210 for connecting to data network 110, which user interface and network interface each is coupled to processor 202. Network interface 210 may be a wireless, wireline, or optical interface that is capable of conveying messaging, such as data packets, to, and receiving messaging from, the data

network. User interface 206 includes a display screen 208 for displaying a data query and results of a corresponding data search, which display screen may or may not comprise a capacitive touchscreen, and further may include a keypad, buttons, a touch pad, a joystick, a mouse, an additional display, or any other device useful for providing an interface between a user and an electronic device such as user terminal 200. Display screen 208 may be a liquid crystal display (LCD), a light emitting diode (LED) display, a plasma display, or any other means for visually displaying information.

User terminal 200 further may include a camera 212 for capturing images and video, audio output circuitry 220 for audio output for listening by a user of the MS, and audio input circuitry 230 for allowing a user to input audio signals into the MS or to collect ambient audio noise. Audio output circuitry 220 includes a speaker 222 that receives the audio signals and allows audio output for listening by a user. Audio input circuitry 230 includes a microphone 232 that allows a user to input audio signals into the MS.

Referring now to FIG. 3, a block diagram is provided of an exemplary data capture device 105 in accordance with some embodiments of the present invention. Data capture device 105 includes a processor 302 such as one or more microprocessors, microcontrollers, digital signal processors (DSPs), combinations thereof or such other devices known to those having ordinary skill in the art. Processor 302 may control the operation of data capture device 105 according to data and instructions stored in at least one memory device 304, such as random access memory (RAM), dynamic random access memory (DRAM), and/or read only memory (ROM) or equivalents thereof, that stores data and programs that may be executed by processor 302 so that the data capture device may perform the functions described herein. Optionally, least one memory device 304 may further include an image processing module 306 comprising data and programs that, when executed by processor 302, are able to recognize a particular feature in a received image.

Data capture device 105 further includes an image sensor 308 and context-aware circuitry 310 that are each coupled to processor 302. Image sensor 308 electronically captures a sequence of video frames (that is, a sequence of one or more still images), with optional accompanying audio, in a digital format. Although not shown, the images or video captured by the image/video sensor 308 may be stored in the at least one memory device 304, or may be sent directly to a server 120 via a network interface 312. Context-aware circuitry 310 may comprise any device capable of generating information used to determine a current Field of View (FOV). During operation, context-aware circuitry 310 provides processor 302 with information needed to determine a FOV. Processor 302 then determines a FOV and provides the FOV to a server 120 via network interface 312. In a similar manner, processor 302 provides any image/video obtained by image sensor 308 a server 120 via network interface 312 for storage. However, in another embodiment of the present invention, data capture device 105 may have recording capabilities, for example, data capture device 105 may comprise a digital video recorder (DVR) wherein processor 302 stores images/video obtained by image sensor 308 in at least one memory device 304.

Referring now to FIG. 4, a block diagram is provided of server 120 in accordance with some embodiments of the present invention. Server 120 includes a processor 402 such as one or more microprocessors, microcontrollers, digital signal processors (DSPs), combinations thereof or such other devices known to those having ordinary skill in the art. Processor 402 may control the operation of server 120 according to data and instructions stored in at least one memory device 404, such as random access memory (RAM), dynamic random access memory (DRAM), and/or read only memory (ROM) or equivalents thereof, that stores data and programs that may be executed by processor 402 so that the server may perform the functions described herein.

Server 120 further includes event-related media database 122, which database is in communication with processor 402 and which database stores event-related media content captured, or downloaded, by a remote terminal. The

event-related media content is stored in association with one or more attributes associated with the event-related media content. However, in another embodiment of the present invention, event-related media database 122 may maintained in an infrastructure element external to, and accessible, by the server.

5 At least one memory device 404 includes search engine 122 comprising data and programs that, when executed by processor 402, is able to search event-related media database 122 based on the attributes associated with the event-related media.

The event-related media content stored in event-related media database
10 122 is stored in association with one or more attributes of the content. An event-related media content attribute may be any descriptor of the content that may be searched by a database search engine. For example, such attributes may be: a ‘source,’ that is, an identifier of a source (for example, a person or remote terminal) of the content; a ‘content location,’ that is, a location associated with the
15 occurrence of an event depicted in the content (for example, any one or combination of location parameters, such as a discrete location like a jewelry store and or a pub, a street intersection, a city, or Global Positioning Satellite (GPS) coordinates); a ‘source location,’ that is, a location associated with the source when recording the content, a ‘content time,’ that is, a time associated with the
20 occurrence of an event depicted in the content; a ‘recording time,’ that is, a time that the content was recorded or received by the server; a ‘victim,’ that is, a victim of an event depicted in the content; a ‘perpetrator,’ that is, a ‘perpetrator’ of an event depicted in the content; an ‘event,’ that is, the event associated with the content (for example, a concert, an athletic event, a car theft, a robbery, or a
25 shooting);. This list of attributes is provided to illustrate the principles of the present invention and is not intended to be a comprehensive listing of all attributes that may be associated with event-related media content.

Server 400 further includes one or more network interfaces 406 for connecting to data network 110 and, via the data network, to other devices of
30 communication system 110, such as user terminals 102-104 and data capture

device 105. Additionally, server 400 may include a user interface 408 via which an operator may input data into the server. Each of the one or more network interfaces 406 and user interface 408 is coupled to processor 402. The one or more network interfaces 406 may include a wireless, a wireline, and/or an optical interface that is capable of conveying messaging, such as data packets, to, and receiving messaging from, the data network. User interface 408 includes a display screen 410 for displaying a data query and results of a corresponding data search, which display screen may or may not comprise a capacitive touchscreen, and further may include a keypad, buttons, a touch pad, a joystick, a mouse, an additional display, or any other device useful for providing an interface between a user and an electronic device such as server 120. Display screen 410 may be a liquid crystal display (LCD), a light emitting diode (LED) display, a plasma display, or any other means for visually displaying information.

Referring now to FIGs. 5A and 5B, a logic flow diagram 500 is provided that illustrates a method performed by communication system 100 in analyzing event-related media in accordance with some embodiments of the present invention. Logic flow diagram 500 begins (502) when a first remote terminal, such as data capture device 105 or any of user terminals 102-104, captures (504) and conveys (506) to server 120, and the server receives from the remote terminal, first media content associated with an event, such as an emergency incident and/or criminal incident. For example, the first media content may be subject matter media such as video, video stills, biometrics, sensor data, Automatic Vehicle Location (AVL) data, pictures, BOLO (Be On the LookOut) bulletins, and the like. Further, the remote terminal may determine a time, that is, a first time, associated with the capturing of the first media content and conveys a time stamp, indicating the time that the first media content was captured, to server 120. For example, the remote terminal may embed the time stamp in the first media content or may otherwise attach the time stamp to the first media content and convey the embedded or otherwise attached time stamp to server 120.

In response to receiving the first media content, server 120 generates (508) a first time stamp associated with the received first media content and stores (510) the first media content, in association with a first time stamp and an identifier of the event/incident, in event-related media database 122. The first time stamp may be the time stamp received from the remote terminal along with the first media content, or may be a time stamp determined by server 120 and associated with a time at which the server received the first media content. In various embodiments of the present invention, the first time stamp may be the time stamp received from the remote terminal or may be a time stamp determined by server 120 and associated with a time at which the server received the first media content. The identifier of the event/incident comprises one or more attributes that may serve to identify the content. Further, the event-related media content stored in database 122 may be stored in association with one or more other attributes that may serve to identify the content. An event-related media content attribute may be any descriptor of the content that may be searched by search engine 122. For example, such attributes may be: a 'source,' that is, an identifier of a source (for example, a person or a remote terminal 102-105) of the content; a 'content location,' that is, a location associated with the occurrence of an event depicted in the content (for example, any one or combination of location parameters, such as a discrete location like a jewelry store and or a pub, a street intersection, a city, or Global Positioning Satellite (GPS) coordinates); a 'source location,' that is, a location associated with the source when recording the content, a 'content time,' that is, a time associated with the occurrence of an event depicted in the content; a 'recording time,' that is, a time that the content was recorded or received by the server.

At some point in time, server 120 receives (512) from a first user associated with one or more of user terminals 102-104, and via the corresponding user terminal such as user terminal 102, a request to render the first media content (subject matter media) to the first user. For example, the user may request to receive a playback of media content stored by the server, for example, a video clip

or a video still. Accordingly, such a request may be received hours or day after the subject matter media was originally captured.

The request includes an identifier of the first media content, for example, one or more particular values for the associated attributes. For example, a value associated with a 'source' attribute may be an identifier (ID) of the source, such as a camera ID or a user terminal ID such as a mobile station ID (MS_ID) or a user equipment ID (UE_ID), a value associated with 'content location' or 'source location' attribute may be an intersection, a specific store, a store-type (e.g., a jewelry store), a neighborhood, a city, or GPS coordinates with respect to location. By way of another example, a value associated with a 'content time' or 'recorded time' attribute may be, for example, a time of day, a date, a month, and/or a year. By way of yet another example, a value associated with a 'source,' victim,' or 'perpetrator' parameter may be a name, a face, or any other identifier that may uniquely identify a person.

In response to receiving the request and based on the included identifier, server 120 retrieves (514) the first media content from event-related media database 122 and renders, that is, conveys (516), the first media content to the first user, that is, to user terminal 102. Further, server 120 determines (518), and stores in at least one memory device 404, a time, that is, a second time, at which the first media content was retrieved for and/or rendered to the user, which second time is subsequent to the first time and, correspondingly, to the first time stamp.

Server 120 then determines (520), at a third time that overlaps with or is subsequent to the second time, that the first user conveyed second media content, such as text or audio, to the server and/or to another, second user. For example, the second media content may be discussion media related to the first media content, the subject matter media, such as Push-to-Talk talkbursts, telephone conversations, Instant Messaging (IM), emails, and other forms of discussion media wherein a user may discuss the first media content. Server 120 then determines (522) a time offset, that is, a difference in time, between the second time and the third time and compares (524) the difference/time offset to a time

offset, or difference, threshold to produce a comparison. When the time offset is less than the time offset threshold, server 120 associates (526) the second media content, conveyed by the first user at the third time, with the first media content, which was retrieved for and/or rendered to the first user at the second time, and logic flow 500 then ends (532).

In other words, when the second media content is conveyed by the first user at a time that is proximate to, and more particularly within a time offset threshold of, the time of rendering of the first media content to the first user, the server determines that the second media content is related to the first media content and correlates, or associates, the first and second media content. For example, the second media content may be textual, audio, or email comments on the first media content, for example, a video, provided to the first user.

In various embodiments of the present invention, in associating the second media content with the first media content, server 120 may store, in one or more of at least one memory device 404 and event-related media database 122, the second media content in association with an identifier of the first media content, may store an identifier of the second media content in association with the first media content, may store an identifier of the second media content in association with an identifier of the first media content, or may store any kind of association between the first media content and second media content that indicates that they are related to each other. For example, server 120 may store an association between the source ID and a time attribute (for example, the time stamp) associated with the first media content and a talkgroup ID (for example, the second media content may be sent to all members of talkgroup session) and a time attribute (for example, the third time) associated with the second media content. In another example, the first user may convey an implicit or explicit relationship between the first media content and the second media content by way of interaction with a first media content. For example, the first user may have the first media content displayed in a window receiving focus on their device when generating second media content.

In other embodiments of the present invention, server 120 may associate the second media content with the first media content further based on detecting, in the second media content, a reference to the first media content. For example, the reference may be an explicit reference to the first media content, such as a reference to a media type of the first media content, for example, a video, or may be a reference to an attribute of the first media content, such as to an event, a person, or a location depicted in the first media content. In another example, a first user may verbally mention a first media content via a second media content. Server 120 may apply voice recognition technology known in the art to detect a verbal reference to a second media content, and generate an explicit association between the two media content.

In still other embodiments of the present invention, based on the association of the second media content to the first media content, server 120 may, at a fifth time that is subsequent to the third time and based on the association between the second media content and the first media content, render (530) the second media content together with the first media content. Such a rendering may or may not include an indication of a relationship between the first media content and the second media content, as such a relationship may be implicit in the rendering of the first and second media content together. For example, server 120 may receive (528), at a fourth time that is subsequent to the third time and from a third user, a request to render the first media content. In response to receiving the request and based on the stored indication that the first and second media content are related, server 120 then may render (530), at the fifth time, both the first media content and second media content to the third user. Thus, the third user may review the requested first media content, the subject matter media, for example, a video captured at a given time, along other second media content, the discussion media, such as comments communicated via talkbursts, but captured at a subsequent time and stored by the server, that are related to the video.

Thus, by correlating various media content based on the media being time-wise proximate to each other, communication system 100 provides an

informational tool, for example, for law enforcement agencies, to correlate different media intents that all relate to a same event, such as subject matter media with related discussion media. For example, the subject matter media may comprise video, video stills, biometrics, sensor data, pictures, BOLO (Be On the LookOut) bulletins, or other such documents, while the related discussion media may comprise Push-to-Talk talkbursts, telephone conversations, Instant Messaging (IM), emails, and other forms of discussion media. By correlating such media content, communication system 100 facilitates event or incident reconstruction by providing related media together when providing event or incident playback

In the foregoing specification, specific embodiments have been described. However, one of ordinary skill in the art appreciates that various modifications and changes can be made without departing from the scope of the invention as set forth in the claims below. Accordingly, the specification and figures are to be regarded in an illustrative rather than a restrictive sense, and all such modifications are intended to be included within the scope of present teachings.

The benefits, advantages, solutions to problems, and any element(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential features or elements of any or all the claims. The invention is defined solely by the appended claims including any amendments made during the pendency of this application and all equivalents of those claims as issued.

Moreover in this document, relational terms such as first and second, top and bottom, and the like may be used solely to distinguish one entity or action from another entity or action without necessarily requiring or implying any actual such relationship or order between such entities or actions. The terms "comprises," "comprising," "has", "having," "includes", "including," "contains", "containing" or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises, has, includes, contains a list of elements does not include only those elements but may

include other elements not expressly listed or inherent to such process, method, article, or apparatus. An element preceded by “comprises ...a”, “has ...a”, “includes ...a”, “contains ...a” does not, without more constraints, preclude the existence of additional identical elements in the process, method, article, or apparatus that comprises, has, includes, contains the element. The terms “a” and “an” are defined as one or more unless explicitly stated otherwise herein. The terms “substantially,” “essentially,” “approximately,” “about,” or any other version thereof, are defined as being close to as understood by one of ordinary skill in the art, and in one non-limiting embodiment the term is defined to be within 10%, in another embodiment within 5%, in another embodiment within 1% and in another embodiment within 0.5%. The term “coupled” as used herein is defined as connected, although not necessarily directly and not necessarily mechanically. A device or structure that is “configured” in a certain way is configured in at least that way, but may also be configured in ways that are not listed.

The Abstract of the Disclosure is provided to allow the reader to quickly ascertain the nature of the technical disclosure. It is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims. In addition, in the foregoing Detailed Description, it can be seen that various features are grouped together in various embodiments for the purpose of streamlining the disclosure. This method of disclosure is not to be interpreted as reflecting an intention that the claimed embodiments require more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive subject matter lies in less than all features of a single disclosed embodiment. Thus the following claims are hereby incorporated into the Detailed Description, with each claim standing on its own as a separately claimed subject matter.

WHAT IS CLAIMED IS:

1. A method of analyzing event-related media, the method comprising:
receiving first media content associated with an event;
storing the first media content in association with a first time stamp and
an identifier of the first media content;
determining that the first media content was one or more of retrieved by
a user or rendered to the user at a second time, wherein the second time is
subsequent to the first time stamp;
determining that the user, at a third time overlapping with or
subsequent to the second time, conveyed second media content;
determining a time offset between the second time and the third time;
and
when the time offset is less than a time offset threshold, associating the
second media content with the first media content.
2. The method of claim 1, wherein the identifier of the first media content
is an identifier of the event.
3. The method of claim 1, wherein the user is a first party and wherein
determining that the user conveyed the second media content comprises
determining that the user conveyed the second media content to a second party.
4. The method of claim 1, wherein the first media content is video content
and the second media content comprises one or more of text and audio.
5. The method of claim 1, wherein associating the second media content
with the first media content comprises associating the second media content
with the identifier of the first media content, and storing the second media
content in association with the identifier of the first media content.

6. The method of claim 1, wherein associating the second media content with the first media content comprises:

determining that the user is interacting with a first media content and associating the second media content with the first media content based on the determination of the user interacting with the first media content while generating the second media content.

7. The method of claim 1, further comprising:

at a fourth time subsequent to the third time, receiving a request to render the first media content; and

in response to receiving the request, rendering the second media content together with the first media content.

8. The method of claim 1, further comprising:

at a fifth time subsequent to the third time and based on the association of the second media content with the first media content, rendering the second media content together with the first media content, wherein rendering comprises indicating a relationship between the first media content and the second media content.

9. The method of claim 1, wherein associating the second media content with the first media content comprises:

detecting, in the second media content, a reference to the first media content; and

associating the second media content with the first media content based on the detection, in the second media content, of the reference to the first media content.

10. The method of claim 9, wherein the detected reference is a reference to a media type of the first media content.

11. An infrastructure element capable of analyzing event-related media, the server comprising:

an interface;

a processor; and

an at least one memory device that is configured to store a set of instructions that, when executed by the processor, cause the processor to perform the following functions:

receive first media content associated with an event;

store the first media content in association with a first time stamp and an identifier of the first media content;

determine that the first media content was one or more of retrieved by a user or rendered to the user at a second time, wherein the second time is subsequent to the first time stamp;

determine that the user, at a third time overlapping with or subsequent to the second time, conveyed second media content;

determine a time offset between the second time and the third time; and

when the time offset is less than a time offset threshold, associate the second media content with the first media content.

12. The infrastructure element of claim 11, wherein the identifier of the first media content is an identifier of the event.

13. The infrastructure element of claim 11, wherein the user is a first party and wherein the at least one memory device is configured to store a set of instructions that, when executed by the processor, cause the processor to determine that the user conveyed the second media content by:

determining that the user conveyed the second media content to a second party.

14. The infrastructure element of claim 11, wherein the first media content is video content and the second media content comprises one or more of text and audio.

5 15. The infrastructure element of claim 11, wherein the at least one memory device is configured to store a set of instructions that, when executed by the processor, cause the processor to associate the second media content with the first media content by:

10 associating the second media content with the identifier of the first media content, and

store the second media content in association with the identifier of the first media content.

16.

15 The infrastructure element of claim 11, wherein the at least one memory device is configured to store a set of instructions that, when executed by the processor, cause the processor to associate the second media content with the first media content by:

20 determining that the user is interacting with a first media content and associating the second media content with the first media content based on the determination of the user interacting with the first media content while generating the second media content.

25 17. The infrastructure element of claim 11, wherein the at least one memory device is configured to store a set of instructions that, when executed by the processor, cause the processor to:

at a fourth time subsequent to the third time, receive a request to render the first media content; and

30 in response to receiving the request, render the second media content together with the first media content.

18. The infrastructure element of claim 11, wherein the at least one memory device is configured to store a set of instructions that, when executed by the processor, cause the processor to:

5 at a fifth time subsequent to the third time and based on the association of the second media content with the first media content, render the second media content together with the first media content, wherein rendering comprises indicating a relationship between the first media content and the second media content.

10 19. The infrastructure element of claim 11, wherein the at least one memory device is configured to store a set of instructions that, when executed by the processor, cause the processor to associate the second media content with the first media content by:

15 detecting, in the second media content, a reference to the first media content; and

associating the second media content with the first media content based on the detection, in the second media content, of the reference to the first media content.

20 20. The infrastructure element of claim 19, wherein the detected reference is a reference to a media type of the first media content.

1/4

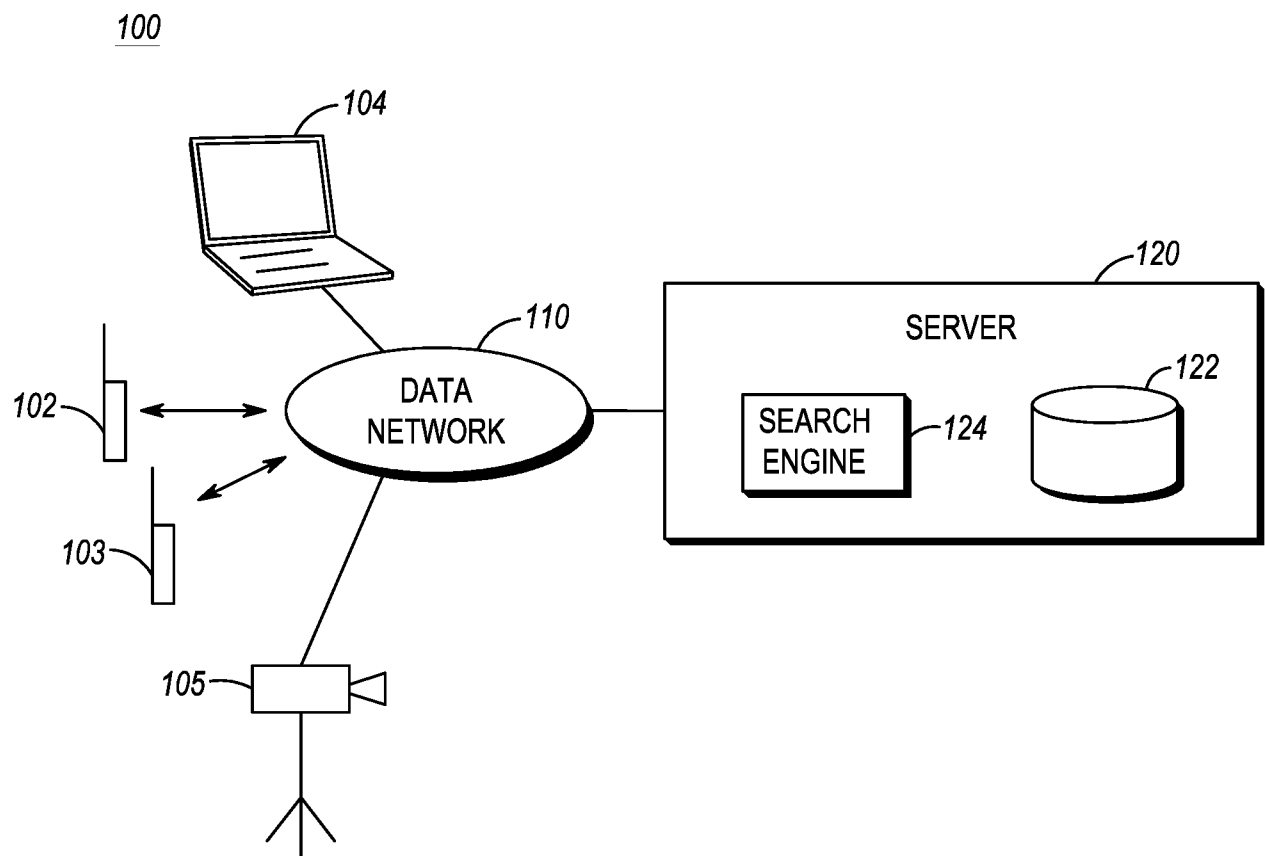


FIG. 1

2/4

200

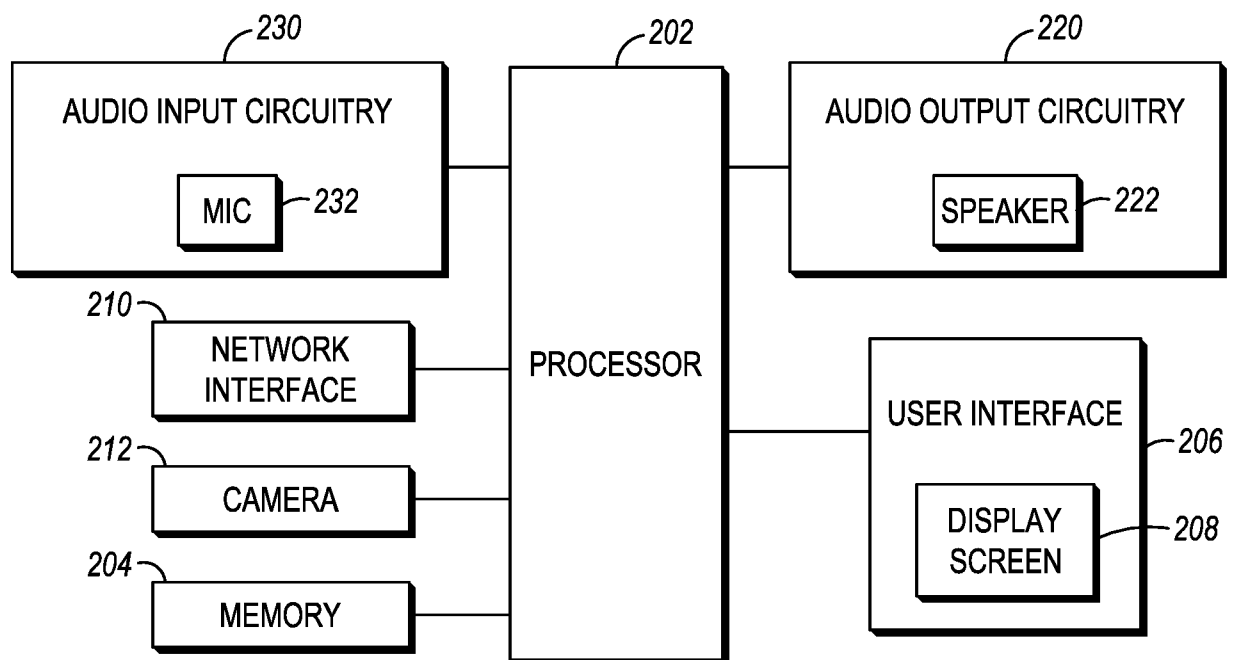


FIG. 2

105

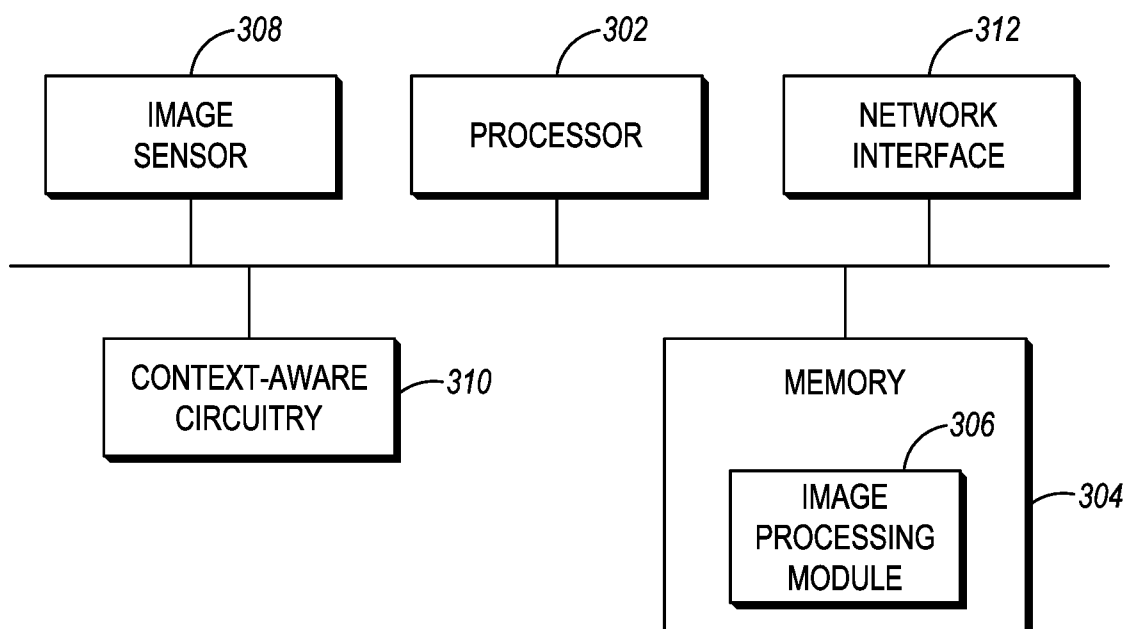
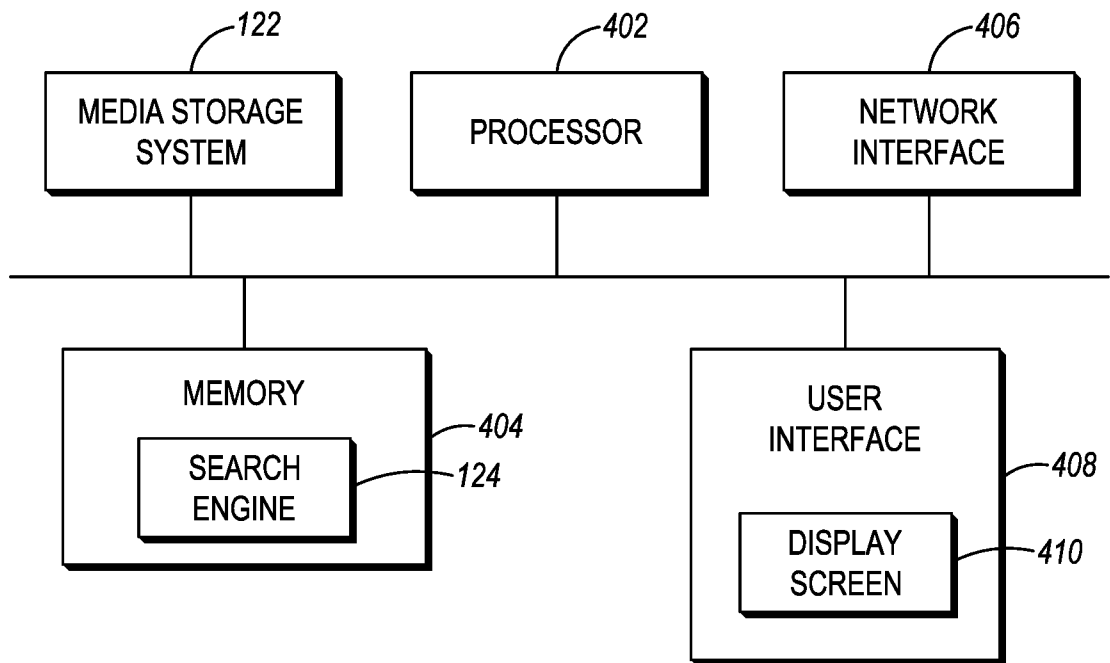


FIG. 3

3/4

120*FIG. 4*

4/4

500

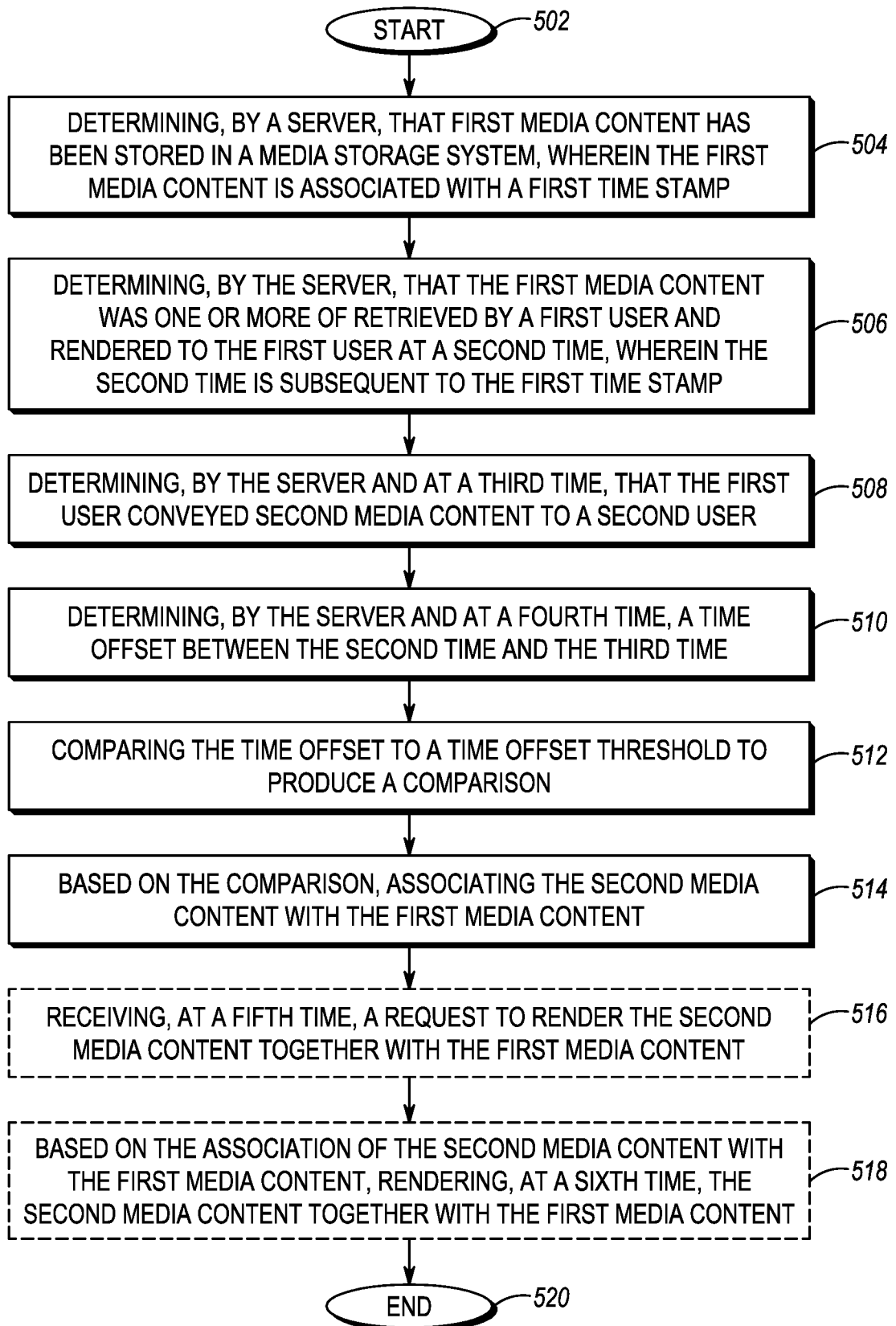


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2015/066553

A. CLASSIFICATION OF SUBJECT MATTER
 INV. H04N7/18 G06F17/30
 ADD.

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 G06F

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/093466 A1 (KIM MICHAEL HAN-YOUNG [US] ET AL) 21 April 2011 (2011-04-21) abstract figures 1,2,3 paragraph [0011] - paragraph [0015] paragraph [0017]	1-20
A	US 2014/040258 A1 (SCHWARTZ JOSHUA G [US] ET AL) 6 February 2014 (2014-02-06) abstract figure 6 paragraph [0071]	7,8,17,18
A	US 2009/164512 A1 (AIZENBUD-RESHEF NETTA [IL] ET AL) 25 June 2009 (2009-06-25) abstract paragraph [0005] figures 3,4 paragraph [0024] - paragraph [0051]	1-20



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 another 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

21 March 2016

Date of mailing of the international search report

30/03/2016

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer

Sery, Franck

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2015/066553

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011093466 A1	21-04-2011	US 2009248688 A1 US 2011093466 A1	01-10-2009 21-04-2011
US 2014040258 A1	06-02-2014	NONE	
US 2009164512 A1	25-06-2009	NONE	