(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 April 2014 (24.04.2014)

WIPO | PCT

(10) International Publication Number
WO 2014/062520 Al

(51) **International Patent Classification:**
G06F 3/048 (20 13.0 1) *G06F 3/01* (2006.0 1)

(21) **International Application Number:**
PCT/US20 13/064697

(22) **International Filing Date:**
11 October 2013 (11.10.201 3)

(25) **Filing Language:** English

(26) **Publication Language:** English

(30) **Priority Data:**
13/653,236 16 October 2012 (16. 10.2012) U S

(71) **Applicant: REALNETWORKS, INC.** [US/US]; 1501 1st Avenue S., Suite 600, Seattle, W A 98134 (US).

(72) **Inventors: RATHNAVELU, Kadir;** 1501 1st Avenue S., Suite 600, Seattle, W A 98134 (US). **MUZZY, Alec;** 1501 1st Avenue S., Suite 600, Seattle, W A 98134 (US). **MCK-EE, Christine;** 1501 1st Avenue S., Suite, Seattle, W A 98134 (US).

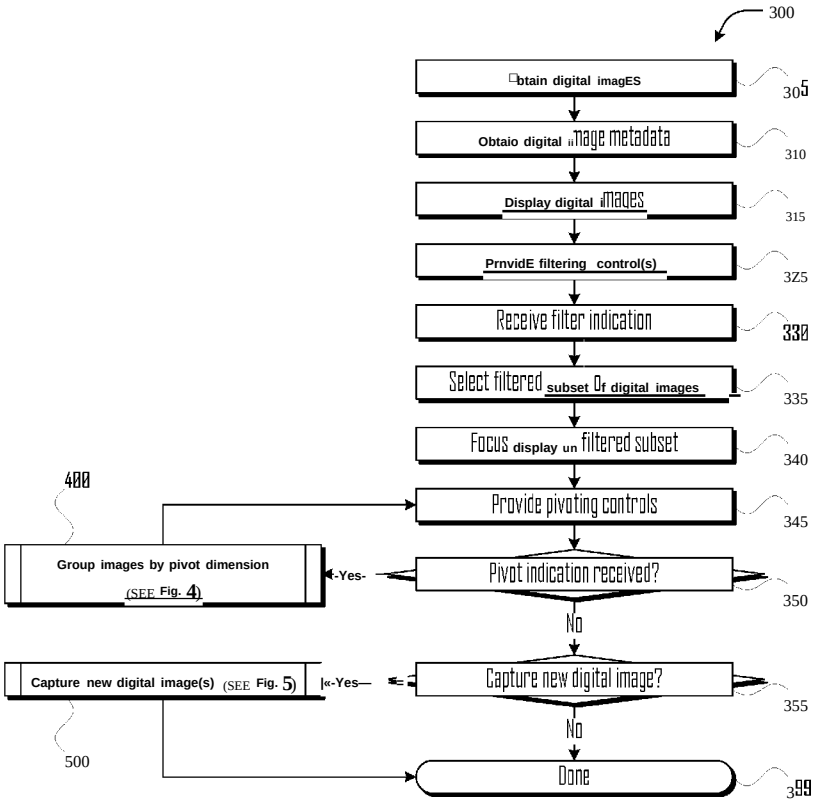
(74) **Agent: PHILIPP, Adam, L.K.;** ^ON Law, 1218 3rd Av¬ enue, Suite 2100, Seattle, W A 98101 (US).

(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, LT, 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, 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,

[Continued on nextpage]

(54) **Title:** USER-SPECIFIED IMAGE GROUPING SYSTEMS AND METHODS



(57) **Abstract:** Digital images may be filtered according to a first user-select¬ able filtering metadata dimension. The filtered digital images may also be grouped according to a second user- se¬ lectable pivoting metadata dimension. A group of the filtered digital images may additionally be selected and fo¬ cused on. The focused group of filtered digital images may be further filtered and grouped according to further user-selectable metadata dimensions.

WO 2014/062520 A1

MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

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

USER-SPECIFIED IMAGE GROUPING SYSTEMS AND METHODS

BACKGROUND

[Para 01] Since 2002, digital cameras have outsold film cameras. In more recent years, smart phones have been integrated with increasingly capable cameras, and millions of people regularly share digital photos via the World Wide Web.

[Para 02] As digital photography has become ubiquitous, more and more people have developed a need to organize and curate their personal digital image collections. Consequently, many software applications for organizing and curating digital-images have been developed. Such software applications typically allow a user to select groups of digital images according to some criterion.

[Para 03] For example, the user may be able to select subsets of digital images that were taken during a certain period of time or at a certain place, that depict certain people, that the user has tagged as being associated with a certain event, or the like.

[Para 04] However, existing software applications do not allow the user to perform further automatic grouping or selection operations on a selected subset of digital images.

BRIEF DESCRIPTION OF THE DRAWINGS

[Para 05] Figure 1 illustrates a system in accordance with one embodiment.

[Para 06] Figure 2 illustrates several components of an exemplary client device in accordance with one embodiment.

[Para 07] Figure 3 illustrates a routine for filtering and grouping digital images, such as may be performed by a client device in accordance with one embodiment.

[Para 08] Figure 4 illustrates a subroutine for grouping a filtered subset of digital images according to a given pivot indication, such as may be performed by a client device in accordance with one embodiment.

[Para 09] Figure 5 illustrates a subroutine for capturing a new digital image, such as may be performed by a client device in accordance with one embodiment.

[Para 10] Figure 6 illustrates a multiplicity of digital images displayed on a client device, in accordance with one embodiment.

[Para 11] Figure 7 illustrates a filtered subset of a multiplicity of digital images displayed on a client device, in accordance with one embodiment.

[Para 12] Figure 8 illustrates a plurality of grouped image collections displayed on a client device, in accordance with one embodiment.

[Para 13] Figure 9 illustrates a plurality of digital images, displayed on a client device, that are associated with an indicated location and date, in accordance with one embodiment.

DESCRIPTION

[Para 14] In various embodiments, as described further herein digital images may be filtered according to a first user-selectable filtering metadata dimension. The filtered digital images may also be grouped according to a second user-selectable pivoting metadata dimension. A group of the filtered digital images may additionally be selected and focused on. The focused group of filtered digital images may be further filtered and grouped according to further user-selectable metadata dimensions.

[Para 15] As the term is used herein, "filter", "filtered", "filtering", and the like are used to refer to a process of selecting from a set of digital images a smaller subset that includes only those digital images that match a certain criterion based on metadata associated with the digital images. For example, as the term is used herein, a set of digital images may be "filtered" to obtain a subset of only those digital images that are associated with a given date or dates, with a given person or people, with a given event or events, or with some other similar dimension of metadata.

[Para 16] The term "filter" (and variants thereof) is not used herein in its signal-processing or digital-image-processing sense. In other words, the term "filter" (and variants thereof) does not refer herein to a device or process that removes from an image some unwanted component or feature, such as to blur, sharpen, color-correct, enhance, restore, compress, or otherwise process an image as if it were a two-dimensional signal.

[Para 17] The phrases "in one embodiment," "in various embodiments," "in some embodiments," and the like are used repeatedly. Such phrases do not necessarily refer to the same embodiment. The terms "comprising," "having," and "including" are synonymous, unless the context dictates otherwise.

[Para 18] Reference is now made in detail to the description of the embodiments as illustrated in the drawings. While embodiments are described in connection with the drawings and related descriptions, there is no intent to limit the scope to the embodiments disclosed herein. On the contrary, the intent is to cover all alternatives, modifications and equivalents. In alternate embodiments, additional devices, or combinations of illustrated devices, may be added to, or combined, without limiting the scope to the embodiments disclosed herein.

[Para 19] Figure 1 illustrates a system in accordance with one embodiment. Image-processing server 105 and client device 200 are connected to network 150.

[Para 20] In various embodiments, image-processing server 105 may comprise one or more physical and/or logical devices that collectively provide the functionalities described herein. In some embodiments, image-processing server 105 may comprise one or more replicated and/or distributed physical or logical devices. In some embodiments, image-processing server 105 may comprise one or more computing resources provisioned from a "cloud computing" provider.

[Para 21] In various embodiments, network 150 may include the Internet, a local area network ("LAN"), a wide area network ("WAN"), a cellular data network, and/or other data network.

[Para 22] In various embodiments, client device 200 may include desktop PC, mobile phone, laptop, tablet, or other computing device that is capable of connecting to network 150 and displaying digital images as described herein.

[Para 23] Figure 2 illustrates several components of an exemplary client device in accordance with one embodiment. In some embodiments, client device 200 may include many more components than those shown in Figure 2. However, it is not necessary that all of these generally conventional components be shown in order to disclose an illustrative embodiment.

[Para 24] Client device 200 also includes a processing unit 210, a memory 250, and a display 240, all interconnected along with the network interface 230 via a bus 220. The memory 250 generally comprises a random access memory ("RAM"), a read only memory ("ROM"), and a permanent mass storage device, such as a disk drive. The memory 250 stores program code for a routine 300 for filtering and grouping digital images (see Fig. 3,

discussed below). In addition, the memory 250 also stores an operating system 255 and optionally, calendar data 260, which in some embodiments may be a local copy of calendar data that client device 200 periodically synchronizes with a remote calendar service.

[Para 25] These and other software components may be loaded into memory 250 of client device 200 using a drive mechanism (not shown) associated with a non-transient computer readable storage medium 295, such as a floppy disc, tape, DVD/CD-ROM drive, memory card, or the like. In some embodiments, software components may alternately be loaded via the network interface 230, rather than via a non-transient computer readable storage medium 295.

[Para 26] In some embodiments, client device 200 includes one or both of a geo-location sensor 205 (e.g., a Global Positioning System ("GPS") receiver, a Wi-Fi-based positioning system ("WPS"), a hybrid positioning system, or the like) and a digital-image sensor 215 (e.g. a Complementary metal-oxide-semiconductor ("CMOS") image sensor, a charge-coupled device ("CCD") image sensor, or the like).

[Para 27] Figure 3 illustrates a routine 300 for filtering and grouping digital images, such as may be performed by a client device 200 in accordance with one embodiment. In block 305, routine 300 obtains a multiplicity of digital images. For example, in one embodiment, a user may capture the multiplicity of digital images via an image capture device associated with client device 200. In other embodiments, routine 300 may obtain the multiplicity of digital images from a remote server (e.g. image-processing server 105).

[Para 28] In block 310, routine 300 obtains digital-image metadata. For example, in one embodiment, routine 300 may obtain digital-image metadata from a remote server (e.g. image-processing server 105). In various embodiments, digital-image metadata may include metadata such as some or all of the following:

- location metadata indicating a geographic location associated with each digital image;
- event metadata indicating an event associated with each digital image;
- person metadata indicating a person associated with each digital image;
- time metadata indicating a date and/or time associated with each digital image; and

- social metadata indicating a social relationship associated with each digital image.

[Para 29] In various embodiments, routine 300 may obtain digital-image metadata including values such as some or all of the following:

```
{ "id": 1,
  "result": {
    "33466" : {
      "flash" : false,
      "type" : "p",
      "serviceName": "facebook" ,
      "id": "33466" ,
      "dateTaken ": "2012-08-07T00 :00:00.000z",
      "name": "332271930198865 .jpg" ,
      "lat" : 47.6146503 ,
      "peoplelDs" : [12345 , 23456] ,
      "lon" : -122 .3530623 ,
      "lastupdated" : "2012 -09-12T21: 09: 01. 979Z",
      "url ": "https ://imageserver .s3.amazonaws .com/233/l..." } } }
```

[Para 30] In block 315, routine 300 displays (e.g., on client device 200) a multiplicity of digital images obtained in block 305. See, e.g., Figure 6, below.

[Para 31] In block 325, routine 300 displays (e.g., on client device 200) one or more user-actionable filtering controls, each being associated with a metadata dimension. See, e.g., filtering controls 605A-C of Figure 6, discussed below. For example, in one embodiment, a filtering control associated with a location metadata dimension may allow a user to select from a list of locations that are associated with one or more of the multiplicity of digital images. For example, if some digital images of the multiplicity of digital images were taken in Seattle and other digital images were taken in San Francisco, the filtering control may allow the user to select among options such as 'Seattle', 'San Francisco', or 'All locations'. Similarly, if some digital images of the multiplicity of digital images were taken by or depict John Smith and other digital images were taken by or depict Mary Jones, a filtering control may allow the user to select among options such as 'John Smith', 'Mary Jones', or 'All people'.

[Para 32] In other embodiments, filtering controls may allow a user to select among different time frames (e.g., to focus on digital images taken on different days, in different months, years, or the like); among different events (e.g., to focus on digital images taken at,

depicting, or otherwise associated with events such as parties, conventions, meetings, sporting events, vacations, or the like); and among other such metadata dimensions.

[Para 33] In block 330, routine 300 receives a filter indication via one of the filtering controls provided in block 325. For example, in one embodiment, a user may select a location metadata option such as 'Seattle', 'San Francisco', or the like; a time metadata option such as 'this month', 'September 2012', '2011', or the like; a person metadata option such as 'John Smith', 'Mary Jones', or the like; a social metadata option such as 'Friends', 'Close friends', 'Friends of friends', or the like; or other such metadata option.

[Para 34] In block 335, routine 300 selects from among the multiplicity of digital images a filtered subset of digital images that match a metadata criterion associated with the selected filter indication. For example, if the user selects a location metadata option such as 'Seattle', routine 300 may select a filtered subset of digital images that were taken in or are otherwise associated with Seattle. Similarly, if the user selects a time metadata option such as 'this month', routine 300 may select a filtered subset of digital images that were taken in or are otherwise associated with the current month.

[Para 35] In block 340, routine 300 focuses the image display on the filtered subset of digital images that were selected in block 335. See, e.g., Figure 7, discussed below.

[Para 36] In block 345, routine 300 displays (e.g., on client device 200) one or more user-actionable pivoting controls, each being associated with a metadata dimension. See, e.g., pivoting controls 705A-C of Figure 7, discussed below. For example, in one embodiment, a pivoting control associated with a location metadata dimension may allow a user to select from a list of locations that are associated with one or more of the multiplicity of digital images. For example, if some digital images of the multiplicity of digital images were taken in Seattle and other digital images were taken in San Francisco, the pivoting control may allow the user to select among options such as 'Seattle', 'San Francisco', or 'All locations'. Similarly, if some digital images of the multiplicity of digital images were taken by or depict John Smith and other digital images were taken by or depict Mary Jones, a pivoting control may allow the user to select among options such as 'John Smith', 'Mary Jones', or 'All people'.

[Para 37] In other embodiments, pivoting controls may allow a user to select among different time frames (e.g., to group digital images into collections taken on different days,

in different months, years, or the like); among different events (e.g., to group digital images into collections taken at, depicting, or otherwise associated with events such as parties, conventions, meetings, sporting events, vacations, or the like); and among other such metadata dimensions.

[Para 38] In decision block 350, routine 300 determines whether a pivot indication has been received (e.g., via one of the pivoting controls provided in block 345). If so, then routine 300 proceeds to subroutine block 400, discussed below. Otherwise, routine 300 proceeds to decision block 355, discussed below.

[Para 39] In subroutine block 400, routine 300 calls subroutine 400 (see Fig. 4, discussed below) to group the filtered subset of digital images according to a pivot dimension corresponding to the pivot indication determined to be received in decision block 350.

[Para 40] In decision block 355, routine 300 determines whether a user has indicated a desire to capture a new digital image. For example, in one embodiment, the user may activate a control provided by routine 300, the control activation indicating the user's desire to capture a new digital image. If routine 300 determines that the user has indicated a desire to capture a new digital image, then routine 300 proceeds to subroutine block 500, discussed below. Otherwise, if routine 300 determines that the user has not indicated a desire to capture a new digital image, then routine 300 proceeds to ending block 399.

[Para 41] In subroutine block 500, routine 300 calls subroutine 500 (see Fig. 5, discussed below) to capture a new digital image.

[Para 42] Routine 300 ends in ending block 399.

[Para 43] Figure 4 illustrates a subroutine 400 for grouping a filtered subset of digital images according to the given pivot indication, such as may be performed by a client device 200 in accordance with one embodiment. In block 405, subroutine 400 determines a metadata dimension corresponding to the given pivot indication. In some embodiments, the given pivot indication may be received when a user activates one of the pivoting controls provided in block 345 (see also pivoting controls 705A-C of Figure 7, discussed below). For example, when a user activates pivot control 705B, subroutine 400 may determine that a location metadata dimension corresponds to the given pivot indication. Similarly, when a user activates one of pivot controls 705A or 705C, subroutine 400 may

determine that the given pivot indication corresponds to a person or event metadata dimension, respectively.

[Para 44] In block 410, subroutine 400 groups the filtered subset of digital images into two or more pivoted image collections according to the metadata dimension determined in block 405.

[Para 45] In block 420, subroutine 400 displays the image collections that were grouped in block 410. In some embodiments, the image collections may be depicted as simulated stacks or piles of images. See, e.g., image collections 805A-C of Figure 8, discussed below.

[Para 46] In block 430, subroutine 400 provides collection-selection controls by which a user may select among the image collections displayed in block 420. In some embodiments, simulated stacks or piles of images may also act as collection-selection controls.

[Para 47] In decision block 435, subroutine 400 determines whether a selection indication has been received, e.g., via a user acting on one of the collection-selection controls provided in block 430. If subroutine 400 determines that the selection indication has been received, then subroutine 400 proceeds to block 440, discussed below. Otherwise, if subroutine 400 determines that a selection indication has not been received, then subroutine 400 proceeds to ending block 499.

[Para 48] In block 440, subroutine 400 focuses display on digital images associated with an image collection corresponding to the selection indication determined to be received in decision block 435. See, e.g., filtered and focused digital images 910A-C of Figure 9, discussed below.

[Para 49] Subroutine 400 ends in ending block 499, returning to the caller.

[Para 50] Figure 5 illustrates a subroutine 500 for capturing a new digital image, such as may be performed by a client device 200 in accordance with one embodiment. In block 505, subroutine 500 captures a new digital image, typically via a camera or other digital-image sensor (e.g. digital-image sensor 215).

[Para 51] In some embodiments, in block 510, subroutine 500 determines current location metadata to be associated with the new digital image captured in block 505. For example, in one embodiment, subroutine 500 may determine geo-location coordinates using a positioning sensor (e.g., geo-location sensor 205).

[Para 52] In some embodiments, in block 515, subroutine 500 determines current-event metadata that may be associated with the new digital image captured in block 505. For example, in one embodiment, subroutine 500 may access calendar data (e.g., calendar data 260) that is associated with client device 200 and that is potentially associated with the new digital image. In some embodiments, subroutine 500 may filter the accessed calendar data to identify calendar items that may be associated with the current date and/or time, and/or the current location metadata determined in block 510.

[Para 53] In block 520, subroutine 500 sends to a remote image-processing server (e.g. image-processing server 105) the new digital image captured in block 505 and any metadata determined in block 510 and/or block 515. In some embodiments, the remote image-processing server may process the new digital image and/or the metadata received therewith in order to associate various additional metadata with the new digital image. For example, in one embodiment, the remote image-processing server may identify persons, events, locations, social relationships, and/or other like entities as being associated with the new digital image.

[Para 54] In block 525, subroutine 500 receives from the remote image-processing server additional metadata (e.g., person, event, time, social, or other like metadata) that the remote image-processing server may have associated with the new digital image. In some embodiments, subroutine 500 may store (at least transiently) the additional metadata to facilitate presenting the new digital image to the user according to methods similar to those described herein.

[Para 55] In decision block 530, subroutine 500 determines whether the user wishes to capture additional new digital images. If so, then subroutine 500 loops back to block 505 to capture an additional new digital image. Otherwise, subroutine 500 proceeds to ending block 599.

[Para 56] Subroutine 500 ends in ending block 599, returning to the caller.

[Para 57] Figure 6 illustrates a multiplicity of digital images displayed on a client device 200, in accordance with one embodiment. Digital image display 610 displays a multiplicity of digital images.

[Para 58] Filtering controls 605A-C can be acted on by a user to select a filtered subset of the multiplicity of digital images, filtered along a metadata dimension of location (605A), time (605B), or people (605C).

[Para 59] Figure 7 illustrates a filtered subset of a multiplicity of digital images displayed on a client device 200, in accordance with one embodiment. Filtered digital image display 710 displays the filtered subset of the multiplicity of digital images. In the illustrated embodiment, the user has selected a location metadata dimension ('Seattle') using filtering control 605A. Of the twelve digital images displayed in Figure 6, a subset of nine digital images that are associated with Seattle has been selected, and the display focused on the filtered subset of digital images.

[Para 60] Pivoting controls 705A-C can be acted on by a user to group the filtered subset of the multiplicity of digital images into two or more image collections according to a metadata pivot dimension.

[Para 61] Figure 8 illustrates a plurality of grouped image collections displayed on a client device 200, in accordance with one embodiment. Image collections 805A-C illustrate three collections of digital images, each grouped together according to a date metadata dimension. More specifically, image collection 805A includes digital images that are associated with the location 'Seattle' and that were taken on or are otherwise associated with the date September 5, 2012; image collection 805B includes digital images that are associated with the location 'Seattle' and that were taken on or are otherwise associated with the date September 17, 2012; and image collection 805C includes digital images that are associated with the location 'Seattle' and that were taken on or are otherwise associated with the date October 4, 2012.

[Para 62] In the illustrated embodiment, image collections 805A-C depict simulated stacks or piles of images. In some embodiments, the depictions may also be user-actionable selection controls allowing a user to select among the image collections.

[Para 63] Figure 9 illustrates a plurality of digital images, displayed on a client device 200, that are associated with an indicated location and date, in accordance with one embodiment. Figure 9 includes three filtered and focused digital images 910A-C, each associated with a date metadata dimension (here, September 5, 2012) and a location metadata dimension (here, Seattle).

[Para 64] In the illustrated embodiment, Figure 9 also includes user-actionable focused grouping controls 915A-B, which may be used to further group the filtered and focused digital images 910A-C according to a third metadata dimension (here, person or event).

[Para 65] Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that alternate and/or equivalent implementations may be substituted for the specific embodiments shown and described without departing from the scope of the present disclosure. This application is intended to cover any adaptations or variations of the embodiments discussed herein.

CLAIMS

Claim 1. A computer-implemented method for filtering and grouping a multiplicity of digital images, the method comprising:

obtaining, by the computer, metadata associated with the multiplicity of digital images;

displaying, by the computer, the multiplicity of digital images, and providing a user-actionable filtering control associated with a first dimension of said metadata;

in response to a filter indication received via said filtering control, the computer:

selecting a filtered subset of the multiplicity of digital images according to said first dimension of said metadata;

focusing display on said filtered subset of the multiplicity of digital images; and

providing a plurality of user-actionable pivoting controls; and

in response to a pivot indication received via a selected pivoting control of said plurality of pivoting controls, the computer:

determining a second dimension of said metadata corresponding to said selected pivoting control;

grouping said filtered subset of the multiplicity of digital images into a plurality of image collections according to said second dimension of said metadata; and

displaying said plurality of image collections.

Claim 2. The method of Claim 1, further comprising:

providing a plurality of user-actionable collection-selection controls corresponding respectively to said plurality of image collections;

receiving a collection-selection indication via a selected collection-selection control of said plurality of collection-selection controls, said collection-selection indication corresponding to a selected image collection; and

focusing display on digital images associated with said selected image collection.

Claim 3. The method of Claim 1, wherein said metadata comprises, for each digital image of the multiplicity of digital images, a set of dimensional metadata comprising at least two dimensions selected from a group consisting of:

location metadata indicating a geographic location associated with each digital image;

event metadata indicating an event associated with each digital image;

person metadata indicating a person associated with each digital image;

time metadata indicating a date and/or time associated with each digital image; and

social metadata indicating a social relationship associated with each digital image.

Claim 4. The method of Claim 3, wherein:

said filtered subset of the multiplicity of digital images is selected according to a first one of said at least two dimensions; and

said plurality of image collections are grouped according to a second one of said at least two dimensions.

Claim 5. The method of Claim 3, further comprising:

capturing a new digital image and contemporaneously determining current-location metadata associated with the computer;

providing said new digital image and said current-location metadata to a remote image-processing server; and

receiving from said remote image-processing server event or person metadata associated with said new digital image.

Claim 6. The method of Claim 5, further comprising:

accessing calendar data that is associated with the computer and that is potentially associated with said new digital image; and

providing said calendar data to said remote image-processing server.

Claim 7. The method of Claim 1, wherein displaying said plurality of image collections comprises animating each digital image of said filtered subset of the multiplicity of digital images into a selected one of a plurality of simulated stacks of digital images, said plurality of simulated stacks corresponding respectively to said plurality of image collections.

Claim 8. A computing apparatus comprising a processor and a memory having stored therein instructions that when executed by the processor, configure the apparatus to perform a method for filtering and grouping a multiplicity of digital images, the method comprising:

obtaining metadata associated with the multiplicity of digital images;

displaying the multiplicity of digital images, and providing a user-actionable filtering control associated with a first dimension of said metadata;

in response to a filter indication received via said filtering control:

selecting a filtered subset of the multiplicity of digital images according to said first dimension of said metadata;

focusing display on said filtered subset of the multiplicity of digital images; and

providing a plurality of user-actionable pivoting controls; and

in response to a pivot indication received via a selected pivoting control of said plurality of pivoting controls:

determining a second dimension of said metadata corresponding to said selected pivoting control;

grouping said filtered subset of the multiplicity of digital images into a plurality of image collections according to said second dimension of said metadata; and

displaying said plurality of image collections.

Claim 9. The apparatus of Claim 8, the method further comprising:

providing a plurality of user-actionable collection-selection controls corresponding respectively to said plurality of image collections;

receiving a collection-selection indication via a selected collection-selection control of said plurality of collection-selection controls, said collection-selection indication corresponding to a selected image collection; and

focusing display on digital images associated with said selected image collection.

Claim 10. The apparatus of Claim 8, wherein said metadata comprises, for each digital image of the multiplicity of digital images, a set of dimensional metadata comprising at least two dimensions selected from a group consisting of:

location metadata indicating a geographic location associated with each digital image;

event metadata indicating an event associated with each digital image;

person metadata indicating a person associated with each digital image;

time metadata indicating a date and/or time associated with each digital image; and

social metadata indicating a social relationship associated with each digital image.

Claim 11. The apparatus of Claim 10, wherein:

said filtered subset of the multiplicity of digital images is selected according to a first one of said at least two dimensions; and

said plurality of image collections are grouped according to a second one of said at least two dimensions.

Claim 12. The apparatus of Claim 10, the method further comprising:

capturing a new digital image and contemporaneously determining current-location metadata associated with the computer;

providing said new digital image and said current-location metadata to a remote image-processing server; and

receiving from said remote image-processing server event or person metadata associated with said new digital image.

Claim 13. The apparatus of Claim 12, the method further comprising:

accessing calendar data that is associated with the computer and that is potentially associated with said new digital image; and

providing said calendar data to said remote image-processing server.

Claim 14. The apparatus of Claim 8, wherein displaying said plurality of image collections comprises animating each digital image of said filtered subset of the multiplicity of digital images into a selected one of a plurality of simulated stacks of digital images, said plurality of simulated stacks corresponding respectively to said plurality of image collections.

Claim 15. A non-transient computer-readable storage medium having stored therein instructions that when executed by a processor, configure the processor to perform a method for filtering and grouping a multiplicity of digital images, the method comprising:

obtaining metadata associated with the multiplicity of digital images;

displaying the multiplicity of digital images, and providing a user-actionable filtering control associated with a first dimension of said metadata;

in response to a filter indication received via said filtering control:

selecting a filtered subset of the multiplicity of digital images according to said first dimension of said metadata;

focusing display on said filtered subset of the multiplicity of digital images; and

providing a plurality of user-actionable pivoting controls; and

in response to a pivot indication received via a selected pivoting control of said plurality of pivoting controls:

determining a second dimension of said metadata corresponding to said selected pivoting control;

grouping said filtered subset of the multiplicity of digital images into a plurality of image collections according to said second dimension of said metadata; and

displaying said plurality of image collections.

Claim 16. The storage medium of Claim 15, the method further comprising:

providing a plurality of user-actionable collection-selection controls corresponding respectively to said plurality of image collections;

receiving a collection-selection indication via a selected collection-selection control of said plurality of collection-selection controls, said collection-selection indication corresponding to a selected image collection; and

focusing display on digital images associated with said selected image collection.

Claim 17. The storage medium of Claim 15, wherein said metadata comprises, for each digital image of the multiplicity of digital images, a set of dimensional metadata comprising at least two dimensions selected from a group consisting of:

location metadata indicating a geographic location associated with each digital image;

event metadata indicating an event associated with each digital image;

person metadata indicating a person associated with each digital image;

time metadata indicating a date and/or time associated with each digital image; and

social metadata indicating a social relationship associated with each digital image.

Claim 18. The storage medium of Claim 17, wherein:

said filtered subset of the multiplicity of digital images is selected according to a first one of said at least two dimensions; and

said plurality of image collections are grouped according to a second one of said at least two dimensions.

Claim 19. The storage medium of Claim 17, the method further comprising:

capturing a new digital image and contemporaneously determining current-location metadata associated with the computer;

providing said new digital image and said current-location metadata to a remote image-processing server; and

receiving from said remote image-processing server event or person metadata associated with said new digital image.

Claim 20. The storage medium of Claim 19, the method further comprising:

accessing calendar data that is associated with the computer and that is potentially associated with said new digital image; and

providing said calendar data to said remote image-processing server.

Claim 21. The storage medium of Claim 15, wherein displaying said plurality of image collections comprises animating each digital image of said filtered subset of the multiplicity of digital images into a selected one of a plurality of simulated stacks of digital images, said

plurality of simulated stacks corresponding respectively to said plurality of image collections.

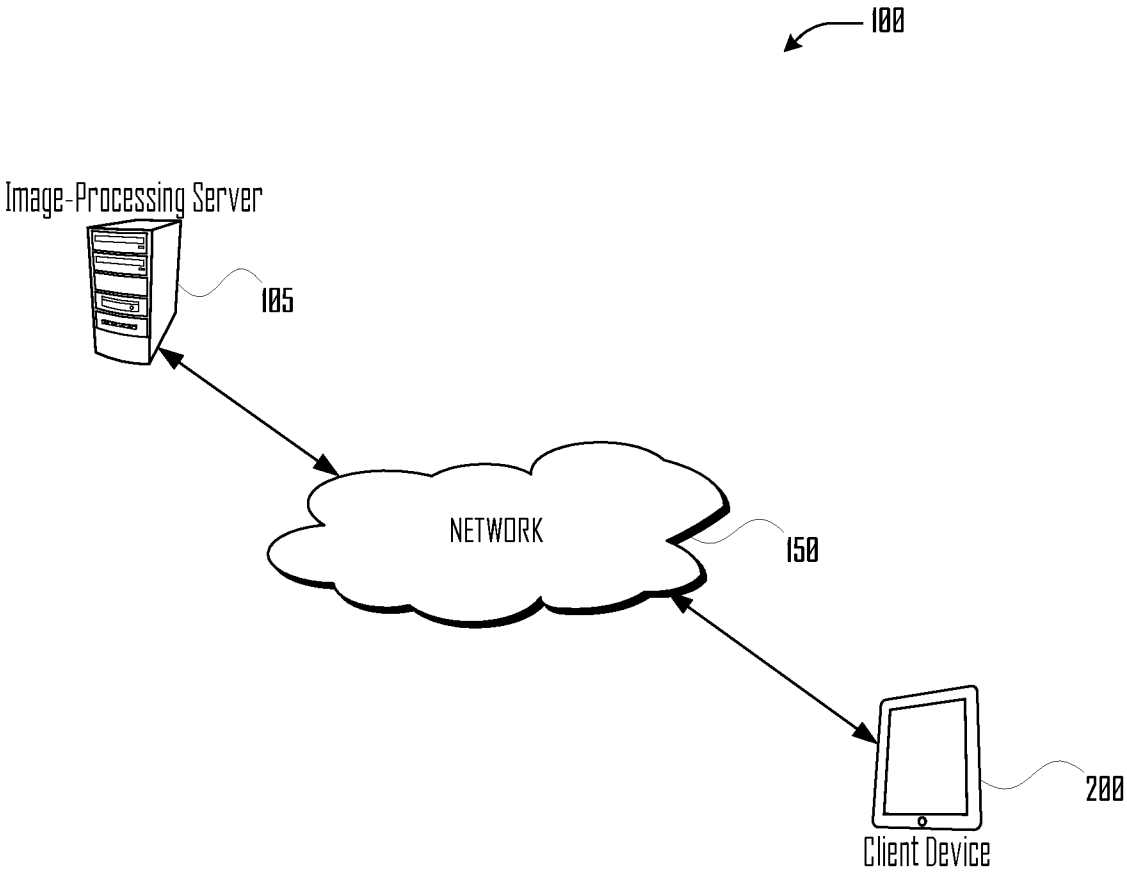

100
Image-Processing Server
105
NETWORK
150
200
Client Device

Fig.1

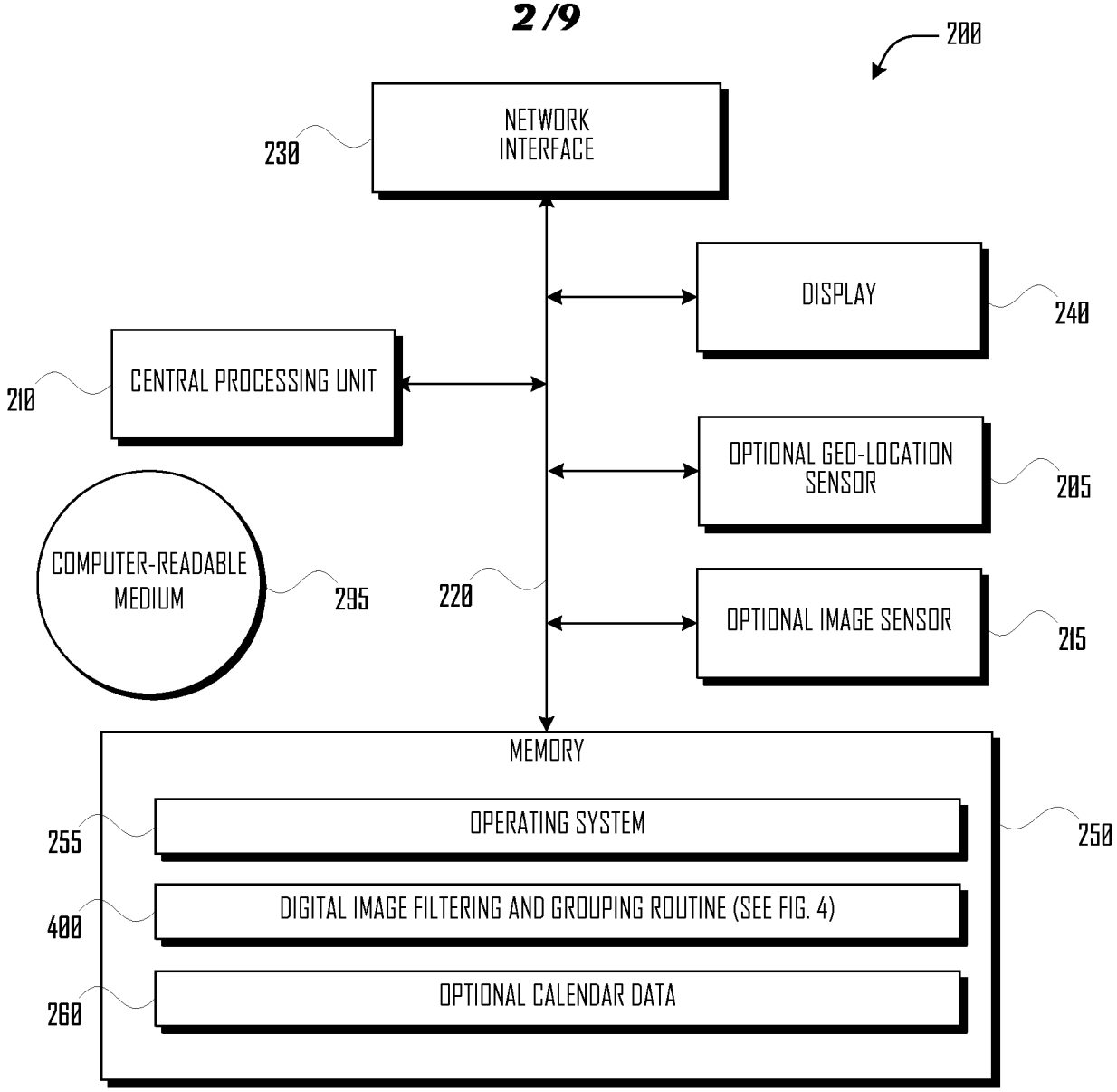

200
NETWORK INTERFACE
230
DISPLAY
240
CENTRAL PROCESSING UNIT
210
OPTIONAL GEO-LOCATION SENSOR
205
COMPUTER-READABLE MEDIUM
295
220
OPTIONAL IMAGE SENSOR
215
MEMORY
OPERATING SYSTEM
255
250
DIGITAL IMAGE FILTERING AND GROUPING ROUTINE (SEE FIG. 4)
400
OPTIONAL CALENDAR DATA
260

Fig.2

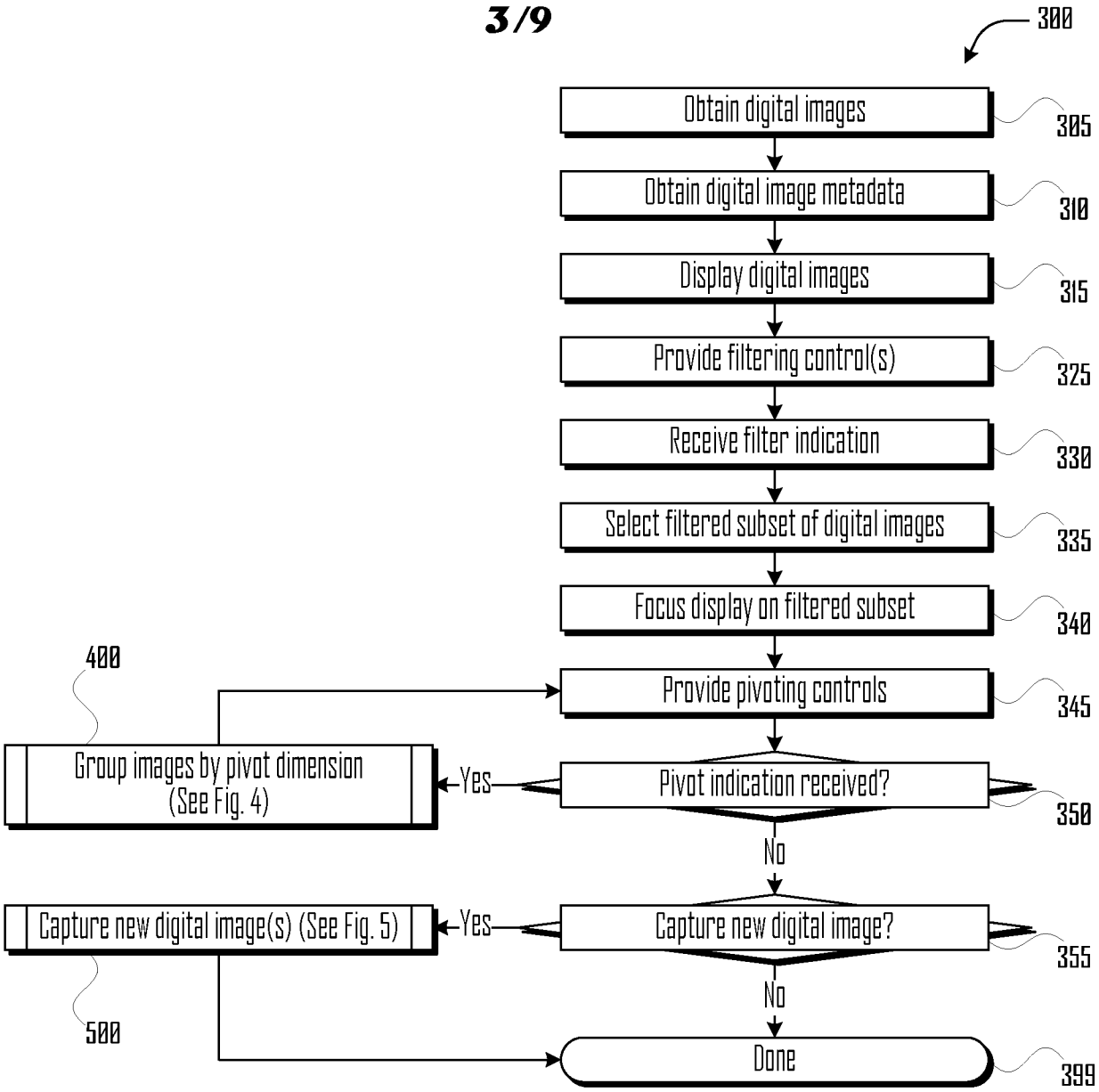

300
Obtain digital images
305
Obtain digital image metadata
310
Display digital images
315
Provide filtering control(s)
325
Receive filter indication
330
Select filtered subset of digital images
335
Focus display on filtered subset
340
400
Provide pivoting controls
345
Group images by pivot dimension
(See Fig. 4)
Yes
Pivot indication received?
350
No
Capture new digital image(s) (See Fig. 5)
Yes
Capture new digital image?
355
No
500
Done
399

Fig.3

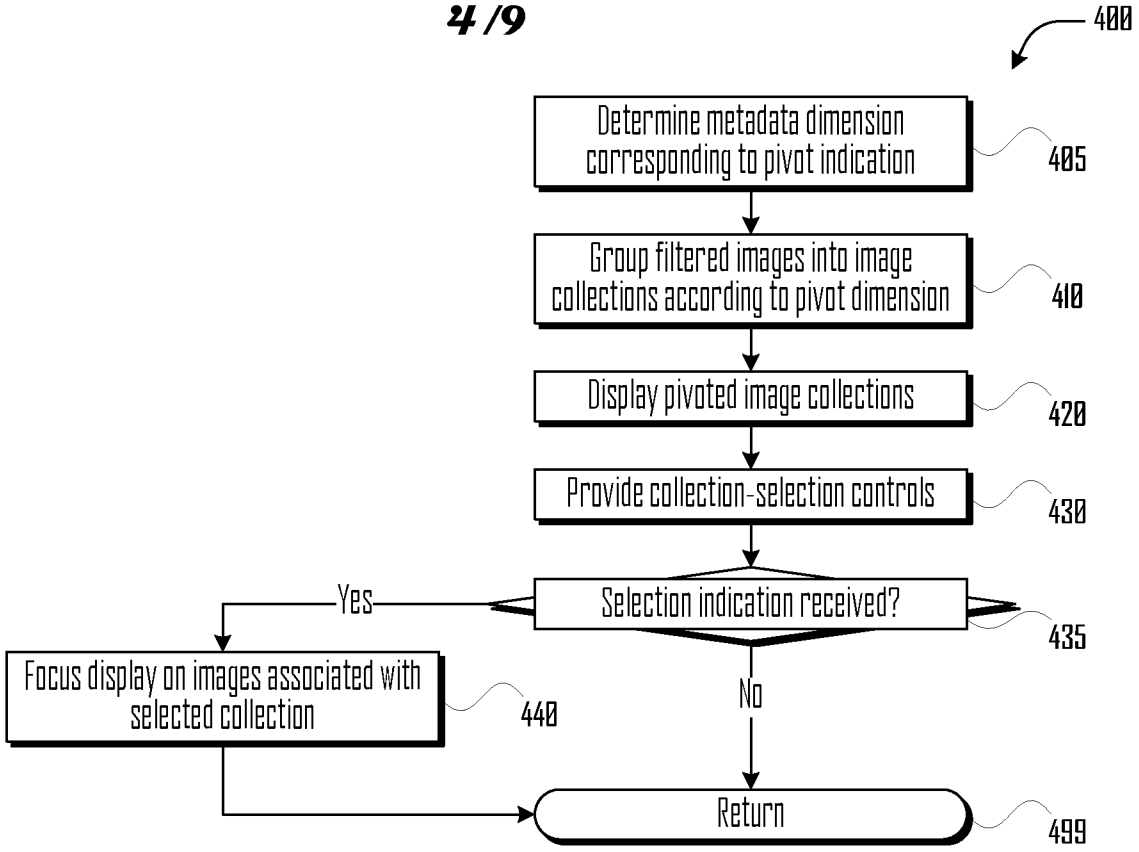

400
Determine metadata dimension corresponding to pivot indication
405
Group filtered images into image collections according to pivot dimension
410
Display pivoted image collections
420
Provide collection-selection controls
430
Selection indication received?
435
Yes
No
Focus display on images associated with selected collection
440
Return
499

Fig.4

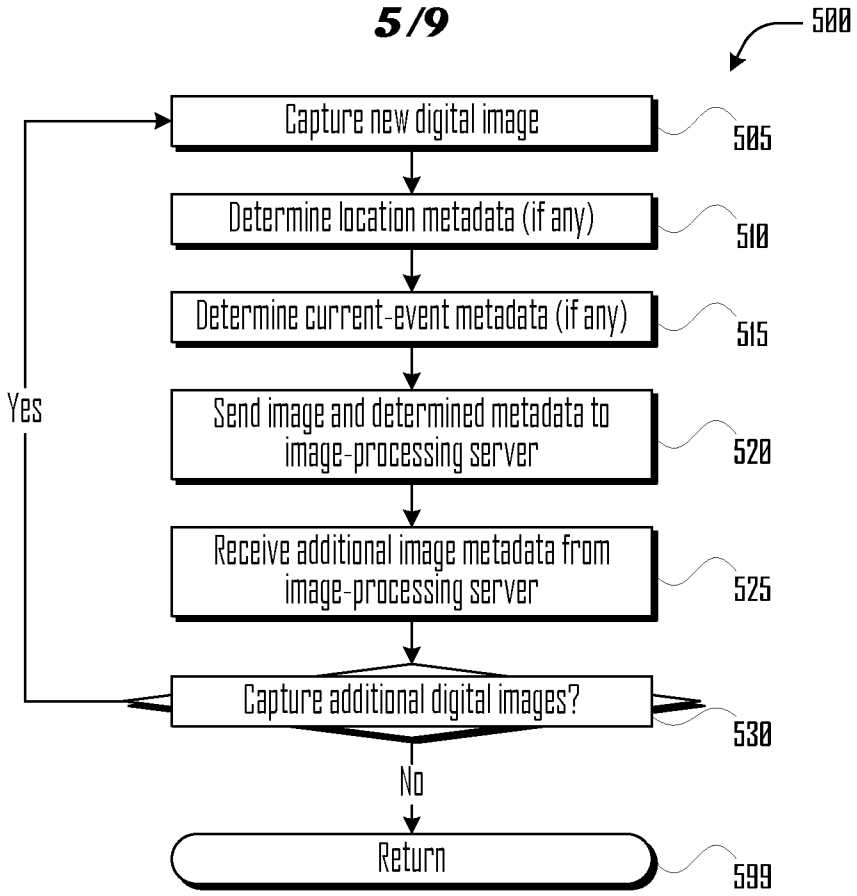

500
Capture new digital image
505
Determine location metadata (if any)
510
Determine current-event metadata (if any)
515
Send image and determined metadata to image-processing server
520
Receive additional image metadata from image-processing server
525
Capture additional digital images?
530
Yes
No
Return
599

Fig.5

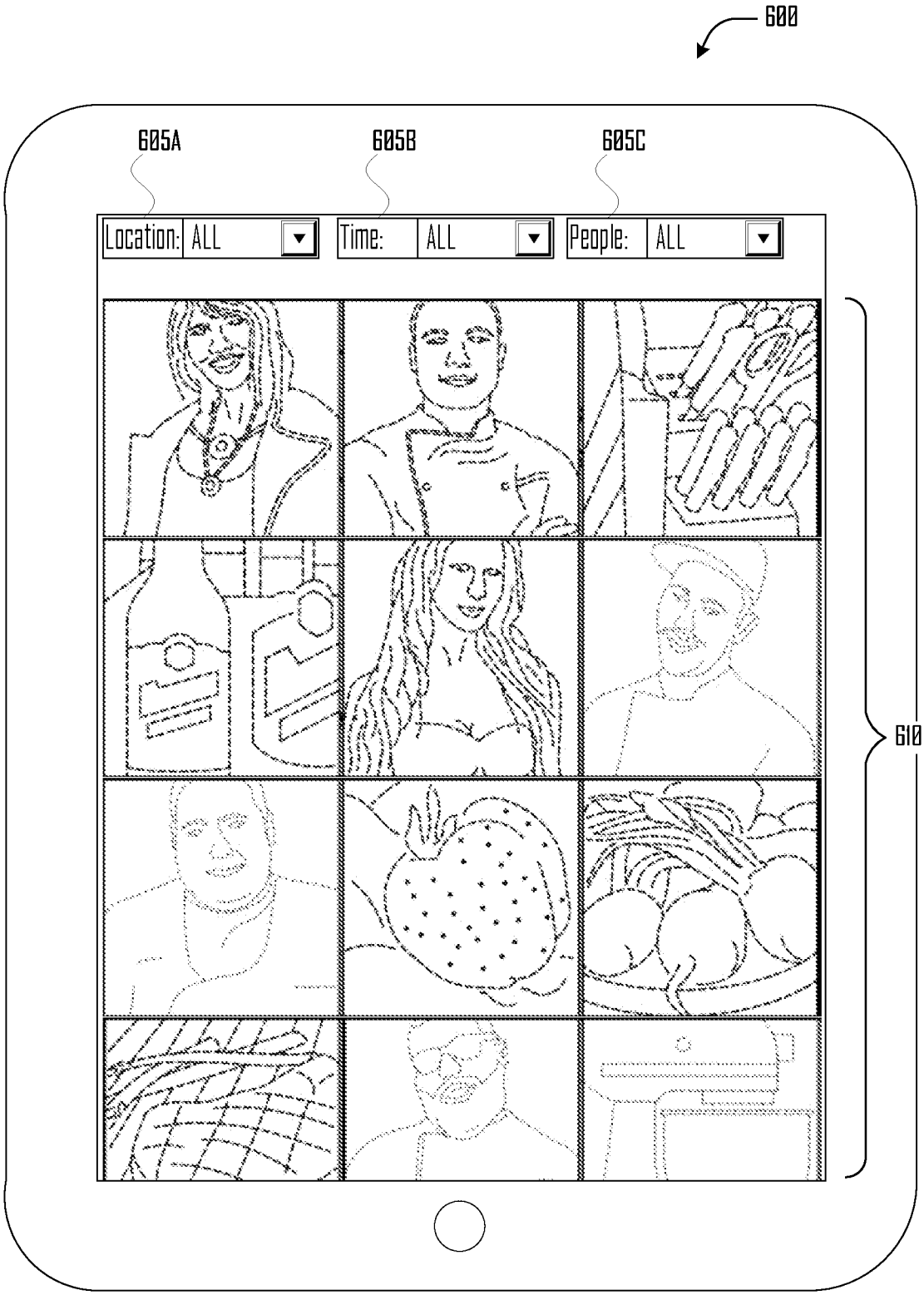


Fig.6

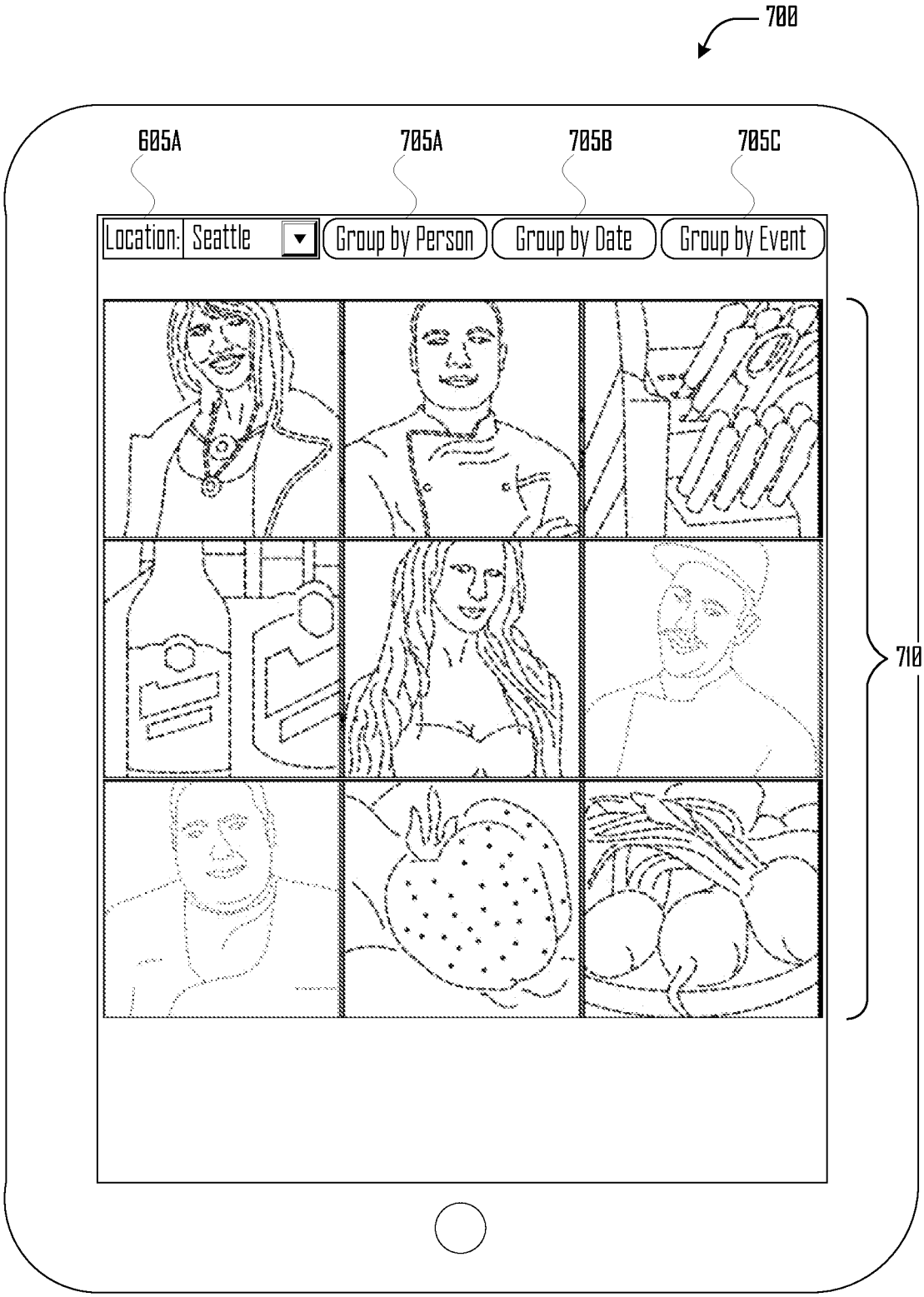

700
605A
705A
705B
705C
Location:
Seattle
Group by Person
Group by Date
Group by Event
710

Fig.7

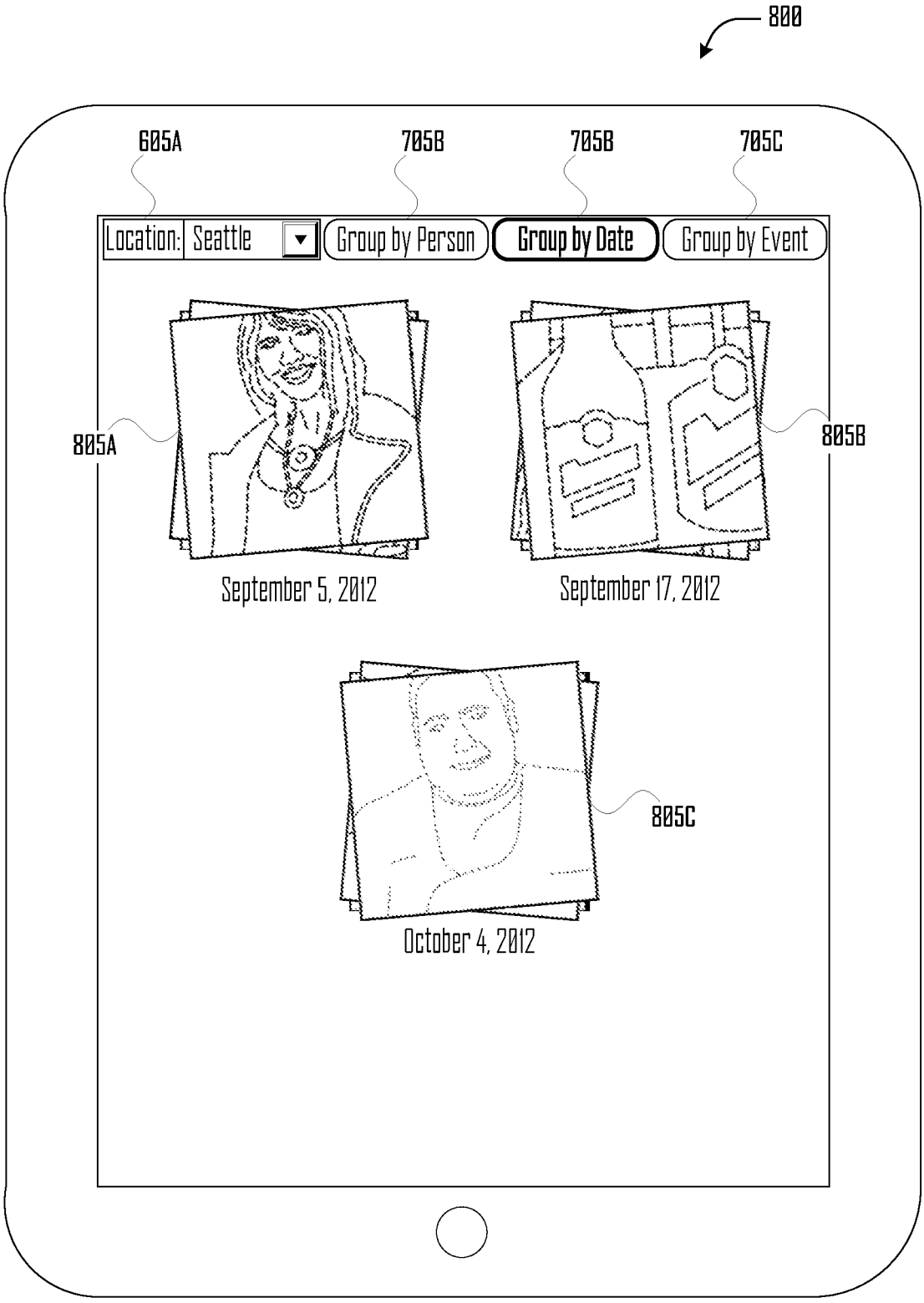

800
605A
705B
705B
705C
Location:
Seattle
Group by Person
Group by Date
Group by Event
805A
805B
September 5, 2012
September 17, 2012
805C
October 4, 2012

Fig.8

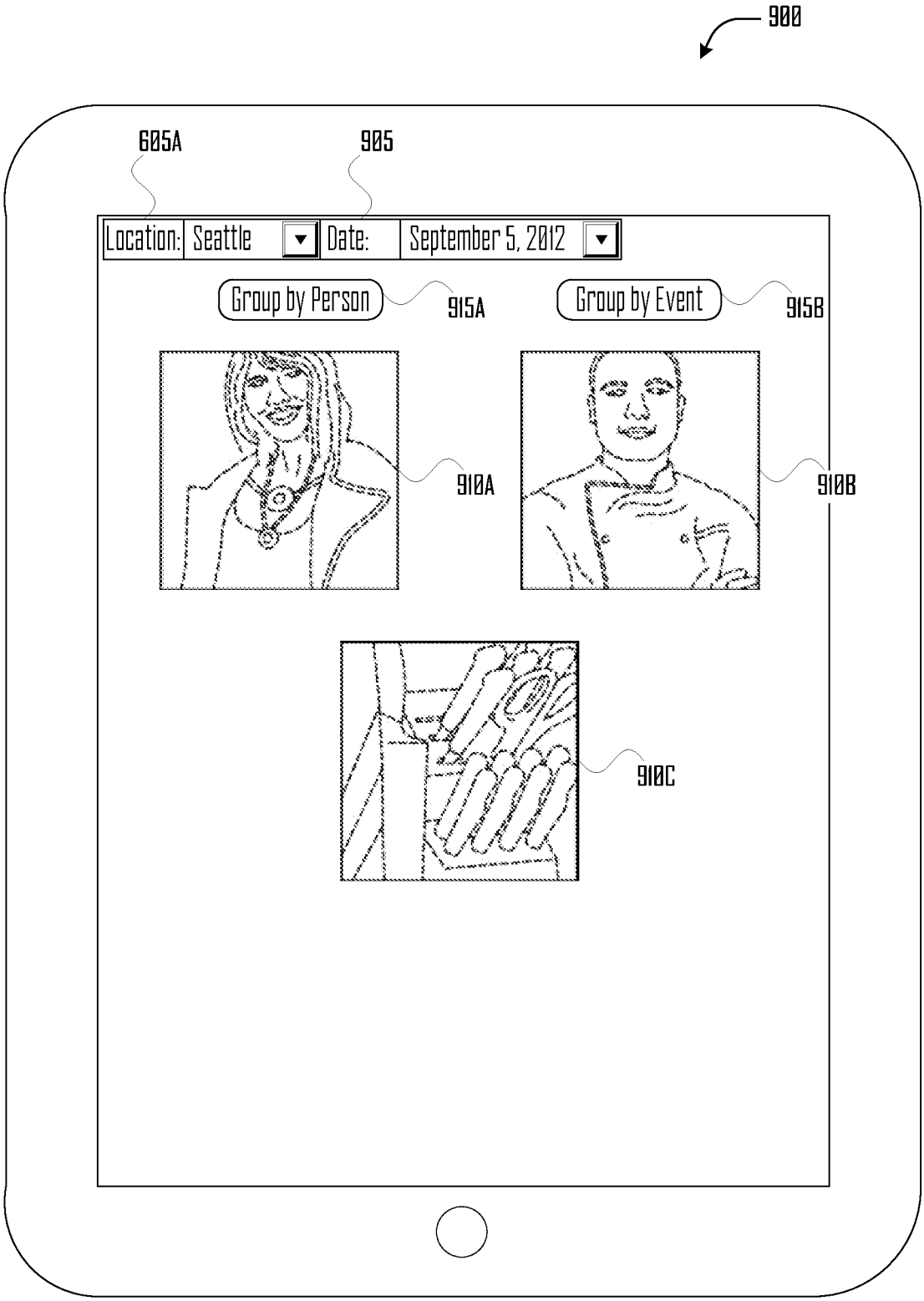

900
605A
905
Location:
Seattle
Date:
September 5, 2012
Group by Person
915A
Group by Event
915B
910A
910B
910C

Fig.9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/064697

A. CLASSIFICATION OF SUBJECT MATTER

G06F 3/048(2006.01)i, G06F 3/01(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06F 3/048; G06K 9/54; G06T 17/00; G06F 17/30; G06K 9/62; G06Q 50/00; G06K 9/60; G06F 17/40; H04B 1/40; G06F 3/01

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: image, metadata, user-actionable, filtering, and grouping

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 7840892 B2 (SEPPO PYHALAMMI et al.) 23 November 2010 See abstract, column 6, line 43 - column 8, line 32, claims 1, 26, 30-36 and figures 1, 4-15B.	1-21
Y	US 7970240 B1 (EDWARD K. CHAO et al.) 28 June 2011 See abstract, claims 1-10, 14-15, 20-28, 39 and figures 2-8, 20.	1-21
A	US 2012-0114257 A1 (PETER THOMAS FRY et al.) 10 May 2012 See abstract, claims 1, 3-14 and figures 1-2.	1-21
A	KR 10-2012-0028491 A (SAMSUNG ELECTRONICS CO., LTD.) 23 March 2012 See abstract, claims 1, 11-23 and figures 2a-7.	1-21
A	KR 10-2012-0087312 A (JUNG WON KIM) 07 August 2012 See abstract, claims 1-10 and figures 1-3.	1-21

☐ 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	Date of mailing of the international search report
27 January 2014 (27.01.2014)	**28 January 2014 (28.01.2014)**

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daej eon Metropolitan City, 302-701, Republic of Korea
Facsimile No. +82-42-472-7140

Authorized officer
CHOI, Sang Won
Telephone No. +82-42-481-8291

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2013/064697

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 7840892 B2	23/11/2010	EP 1513080 A2	09/03/2005
		EP 1513080 A3	05/04/2006
		US 2005-0050043 Al	03/03/2005
US 7970240 Bl	28/06/2011	None	
US 2012-0114257 Al	10/05/2012	CN 102150163 A	10/08/2011
		EP 2335167 Al	22/06/2011
		GB 0818089 DO	05/11/2008
		JP 2012-504806 A	23/02/2012
		US 2012-0020576 Al	26/01/2012
		wo 2010-037591 Al	08/04/2010
KR 10-2012-0028491 A	23/03/2012	EP 2432209 Al	21/03/2012
		US 2012-0062766 Al	15/03/2012
KR 10-2012-0087312 A	07/08/2012	None	