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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
04 January 2018 (04.01.2018)

WIPO | PCT

(10) International Publication Number
WO 2018/000299 A1

(51) International Patent Classification:
H04N 5/232 (2006.01)

(21) International Application Number:
PCT/CN2016/087841

(22) International Filing Date:
30 June 2016 (30.06.2016)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant: **ORANGE** [FR/FR]; 78, rue Olivier de Serres, 75015 Paris (FR).

(72) Inventors; and

(71) Applicants *(for US only)*: **YE, Nan** [CN/CN]; Orange Labs International Centers Beijing, 23F, Tower A, Beijing Global Trade Center, 36 North, Third Ring Road East Dongcheng District, Beijing 100013 (CN). **HAN, Liang** [CN/CN]; Orange Labs International Centers Beijing, 23F, Tower A, Beijing Global Trade Center, 36 North, Third Ring Road East Dongcheng District, Beijing 100013 (CN). **WANG, Xin** [CN/CN]; Orange Labs International Centers Beijing, 23F, Tower A, Beijing Global Trade Center, 36 North, Third Ring Road East Dongcheng District, Beijing 100013 (CN).

(74) Agent: **WAN HUI DA INTELLECTUAL PROPERTY AGENCY**; Yiyuan Office Building, Friendship Hotel, No. 1 Zhongguancun Street South, Haidian District, Beijing 100873 (CN).

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

(54) Title: METHOD FOR ASSISTING ACQUISITION OF PICTURE BY DEVICE

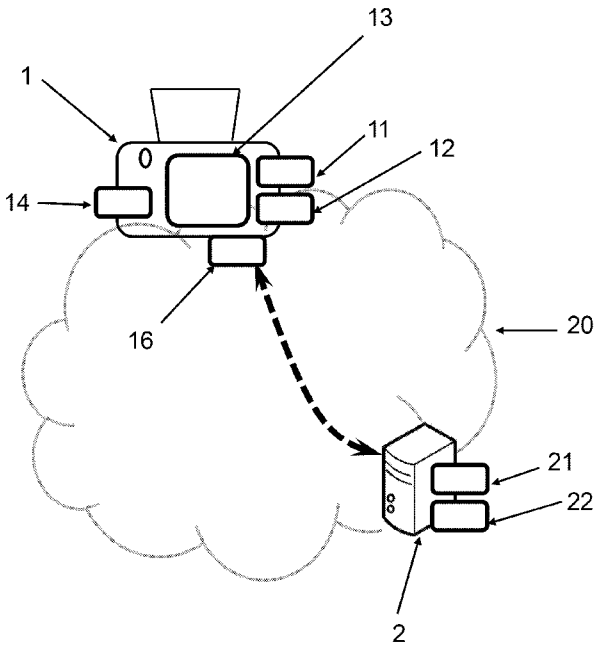


FIG. 1

(57) Abstract: A method for assisting the acquisition of a picture by a device (1) comprising a processing unit (11), a display (13) and a camera (14), the device (1) being configured to output on said display (13) a preview of a scene visible from the camera (14), the method comprising performing by the processing unit (11) steps of: (a) obtaining reference data associated to a target picture depicting at least one reference object, said reference data comprising at least location data and an outline of said reference object; (b) when a location of the device (1) matches said location data associated with the target picture, providing the outline as an overlay to said preview outputted on said display (13) so as to allow reproducing said target picture.

WO 2018/000299 A1

[Continued on next page]

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

METHOD FOR ASSISTING ACQUISITION OF PICTURE BY DEVICE

FIELD OF THE INVENTION

The field of this invention is that of photography.

More particularly, the invention relates to a method for assisting the acquisition of a picture by an electronic device.

BACKGROUND OF THE INVENTION

When travelling, some “key pictures” of famous places are nearly unavoidable for tourists.

For example, everybody visiting Paris shall have a picture of the Eiffel Tower, everybody visiting Tuscany shall have a picture of the Tower of Pisa, etc.

Some people like pictures taken by others at such famous places so much that they absolutely want to reproduce these great pictures.

To this end, have been proposed assistants for helping reproducing a target picture. In particular, such assistants help in better locating the camera as in the target picture. However the result is often not convincing, as a good placement alone does not suffice for repeating a photograph.

Document US 2010266269 discloses an imaging equipment storing a plurality of pieces of photographic settings information suitable (and actually performed) for photography at various locations.

It allows automatically applying photographic setting of a previous picture at a given location for improving overall quality of new pictures, but does not help in reproducing the previous pictures. Such solution is furthermore very heavy to implement.

There is consequently a need for a method allowing to easily and ergonomically to acquire a picture reproducing a target picture, even for novice users.

SUMMARY OF THE INVENTION

For these purposes, the present invention provides a method for assisting the acquisition of a picture by a device comprising a processing unit, a display and a camera, the device being configured to output on said display a preview of a scene visible from the camera, the method comprising performing by the processing unit steps of:

(a) obtaining reference data associated to a target picture depicting at least one reference object, said reference data comprising at least location data and an outline of said reference object;

(b) when a location of the device matches said location data associated with the target picture, providing the outline as an overlay to said preview outputted on said display so as to allow reproducing said target picture.

The use of points of interest in the target pictures as outlined reference objects allows easy and intuitive positioning of a digital camera so as to reproduce a target picture without photography skills.

Preferred but non limiting features of the present invention are as follow:

- the device further comprises a locating unit providing location data associated to the device, step (b) comprising comparing location data associated to the device and location data associated with the target picture;
- step (b) comprises outputting a signal indicating when location data associated to the device match location data associated with the target picture;
- the method further comprises a step (c) of acquiring a picture when the outline provided as an overlay to said preview outputted on said display matches an outline of a depiction of the reference object in said preview;
- step (c) comprises outputting a signal indicating when the outline provided as an overlay to said preview outputted on said display matches an outline of a depiction of the reference object in said preview;
- the method further comprises a previous step (a0) of selecting at an equipment the target picture, and processing the target picture by a processing unit of the equipment so as to determine said reference data;

- processing the target picture by a processing unit of the equipment comprises identifying said at least one reference object in the target picture, and extracting the outline of each identified reference object;
- the equipment is connected to a database of famous reference objects, identifying said at least one reference object in the target picture comprising searching the target picture for famous reference objects of said database;
- the device acts as the equipment;
- the device is a smartphone;
- the device and the equipment are distinct, step (a) comprising transmitting said reference data from the equipment to the device;
- the device and the equipment are connected through a network.

In a second aspect, the invention provides an electronic device comprising a processing unit, a display and a camera, the processing unit being configured to implement:

- outputting on said display a preview of a scene visible from the camera;
- obtaining reference data associated to a target picture depicting at least one reference object, said reference data comprising at least location data and an outline of said reference object;
- when a location of the device matches said location data associated with the target picture, providing the outline as an overlay to said preview outputted on said display so as to allow reproducing said target picture.

According to a third and a fourth aspects, the invention provides a computer program product, comprising code instructions for executing a method according to the first aspect for assisting the acquisition of a picture by a device; and a computer-readable medium, on which is stored a computer program product comprising code instructions for executing a method according to the first aspect for assisting the acquisition of a picture by a device.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of this invention will be apparent in the following detailed description of an illustrative embodiment thereof, which is to be read in connection with the accompanying drawings wherein:

- figure 1 illustrates an example of architecture in which the method according to the invention is performed;
- figure 2a represents an example of target image and figure 2b represents the associated outline extracted.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Architecture

The present invention relates to a method for assisting the acquisition of a picture by a device 1, as represented by **figure 1**. More precisely, the present method aims at easily enabling a user to reproduce a target picture, i.e. acquiring a picture of the same scene, i.e. from the same point and with a same orientation, but with a different foreground if wished (for example with other people).

As it will be explained, the target picture shall depict at least one reference object, i.e. a visible point of interest such as a famous monument (for example the Eiffel Tower, the Tower of Pisa), a natural curiosity (for example the Mount Fuji, Uluru), etc. It can be assumed that any photograph that was taken at a famous place and that people wants to reproduce depicts at least one reference object. **Figure 2a** represents an example of target picture with the Eiffel Tower within the background.

The method is performed at a device 1 comprising at least a processing unit 11 (typically a processor), a display 13 (typically a screen, possibly touch sensitive) and a camera 14, i.e. optical means for acquiring a picture of scene in front of the device 1. The device 1 is being configured to output on said display 13 a preview of a scene visible from the camera 14. To this end, the camera 14 is advantageously on a front face of the device 1, wherein the display 13 is on a rear face of the device. It is to be noted that the device 1 may comprise a secondary camera on the rear

face (which is for example the case for smartphones, see below) or have the display 13 articulated, so as to allow taking selfies.

By preview it is meant a low quality depiction (which is not further kept) of a picture that would have been acquired at this moment if the user had triggered the camera 14. Such preview allows the users to visualize the picture they are about to take so as to change their position or the settings if they are not satisfied.

The device 1 preferably further comprises a memory 12, possibly removable (i.e. a memory card for example of SD type), for storing the acquired pictures, a location unit 14 for providing location data representative of the position of the device 1 (using for example GPS, network triangulation, etc.), and/or a communication unit 16 for connecting (in particular wirelessly) the device 1 to a network 20 (for example WiFi, Bluetooth, and preferably a mobile network, in particular a GSM/UMTS/LTE network, see below). It is to be noted that alternatively to being stored in a memory 12, an acquired picture may be sent to the network 20.

The device 1 may be any digital camera or even a more complex device such as a smartphone, a tablet computer, etc.

Another equipment 2 may be connected to the device 1, either continuously (though a cable, through the network 20, etc.) or intermittently (for example by swapping memory cards) so as to allow transfer of pictures and/or data. The equipment 2 is for example a personal computer with its own processing unit 21 and its memory 22 (for example a hard drive).

In a preferred embodiment, the device 1 also acts as the equipment 2, i.e. the device 1 and the equipment 2 are a single entity having both roles. In such a case, the processing unit 11 and the processing unit 21 are confused, and the memory 21 and the memory 22 are confused.

Reference data of a target image

The present method starts with a step (a) of obtaining by the processing unit 11 of the device 1 reference data associated to a target picture depicting at least one reference object, said reference data comprising at least location data and an outline of said reference object.

By outline, it is meant a contour of the reference object on the target picture. For example, **figure 2b** represents the outline of the Eiffel Tower as visible in the target picture of figure 2a.

A database of target pictures and associated reference data might be available, but advantageously the method comprises a previous step (a0) of selecting at the equipment 2 the target picture, and processing the target picture by the processing unit 21 of the equipment 2 so as to determine said reference data. It allows using any picture that the user likes as a target picture.

In other words, the user selects the target picture (it can be either stored on the memory 22 of the equipment 2, or accessible through the network 20, for example if the target picture is published on a social network and encountered by the user) and requests (for example through a dedicated application or a plugin of a browser) to process it.

The location is generally available as a metadata of the picture (devices like smartphones comprise a locating unit and they automatically embed location data such a coordinates or an address of the current place when acquiring a pictures), or might be indicated by the user having taken this target picture.

Processing the target picture further comprises identifying said at least one reference object in the target picture, and extracting the outline of each identified reference object.

To this end, the equipment 2 may be connected to a database of “famous” reference objects (it can be either stored on the memory 22, or online and accessible through the network 20) such as moments, as already explained. Each famous reference object is associated in the database to at least one thumbnail depicting it (preferably a plurality according to several points of view). Therefore, identifying said at least one reference object in the target picture comprises searching the target picture for famous reference objects of said database (algorithms comparing two images are well known), and a reference object may be considered as identified when matching a thumbnail (a similarity score may be calculated).

Alternatively, the user can manually select the reference object in the target picture by clicking it. Thus, reference objects other than the famous ones may be

used (the selected reference object might be further transmitting so as to enrich the database of famous reference objects).

When the reference object(s) is(are) identified, known algorithms may be used for extracting the outline. For example, edge detection algorithms identify points in the image at which the image brightness has discontinuities (i.e. changes sharply).

If the device 1 also acts as the equipment 2, at the end of step (a0) the processing unit 11 has already at disposal the reference data of the target image. Alternatively, if they are distinct entities, step (a) comprises transmitting said reference data from the equipment 2 to the device 1.

Outline overlaying

In a following step (b), when a location of the device 1 matches said location data associated with the target picture, the outline (more preferably the outlines of all the reference objects of the target picture) is provided as an overlay to said preview outputted on said display 13 so as to allow reproducing said target picture.

In other words, the user has the outline of each reference object of the target picture appearing on the display 13. All he has to do is to have the reference objects as visible in the preview on said display 13 fit into the outlines added to the preview, and then to trigger the camera 14.

The matching between the location of the device 1 and said location data associated with the target picture is either manually submitted by the user, or automatically ascertained.

In the first case, in which the device is not required to present a locating unit 15, the user is simply provided the location data through the display 13, he goes to the place defined by the location data, and when he assumes having reaching it, he requests the device 1 to provide the outline as an overlay to said preview outputted on said display 13.

In the second case, wherein the device 1 further comprises the locating unit 15 providing location data associated to the device 1, step (b) advantageously

comprises comparing location data associated to the device 1 and location data associated with the target picture.

More precisely, the user is also provided with the location data through the display 13, he goes to the place defined by the location data while the location unit 15 periodically acquire location data associated to the device 1, and when the processing unit 11 determines that the location data match (i.e. when the distance between the position corresponding to the location data associated to the device 1 and the location data associated to the target picture is below a given threshold), it provides the outline as an overlay to said preview outputted on said display 13.

Advantageously, when the right position is reached, step (b) comprises outputting a signal indicating that location data associated to the device 1 match location data associated with the target picture. Such signal may be an audio signal (a bip) or a visual signal on the display 13 (for example blinking), so that the user stops moving and starts fitting the reference objects into the outlines.

Alternately, in particular if the device 1 is provided with a database of potential target pictures, the user may be automatically suggested to reproduce one of the potential target images if he is close to the reference location associated to this target image (in such an embodiment, the user does not have to select a target image, and is not provided with location data through the display 13).

Acquisition of the picture

The method advantageously further comprises a step (c) of acquiring a picture (thus reproducing the target picture) when the outline provided as an overlay to said preview outputted on said display 13 matches the outline of a depiction of the reference object in said preview.

Said acquisition may be performed either manually when the user estimates having the right orientation (or simply when he likes the scene), or automatically by the processing unit 11 (when it detects that the outline provided as an overlay to said preview outputted on said display 13 matches an outline of a depiction of the reference object in said preview) so as to get the closest picture to the target picture.

In the first case, which lets the user free, step (c) advantageously comprises outputting a signal indicating when the outline provided as an overlay to said

preview outputted on said display 13 matches an outline of a depiction of the reference object in said preview. Such signal may also be an audio signal (a bip) or a visual signal on the display 13 (for example change in the color of the outline), so that the user knows that he can triggers the camera 14.

Device and computer program

In a second aspect, the present invention concerns an electronic device 1 comprising a processing unit 11, a display 13 and a camera 14, adapted for carrying out the method for assisting the acquisition of a picture as previously described.

The device 1 may also comprise a memory 12, a locating unit 15, and/or a communication unit 16.

Said processing unit 11 is configured to implement:

- outputting on said display 13 a preview of a scene visible from the camera 14;
- obtaining reference data associated to a target picture depicting at least one reference object, said reference data comprising at least location data and an outline of said reference object;
- when a location of the device 1 matches said location data associated with the target picture, providing the outline as an overlay to said preview outputted on said display 13 so as to allow reproducing said target picture.

The device 1 may further act as an equipment 2 for selecting at an the target picture, and processing the target picture so as to determine said reference data, or may be connected to such an equipment 2.

The invention further proposes a computer program product, comprising code instructions for executing (in particular with a processing unit 11 of the device 1) a method according to the method for assisting the acquisition of a picture by a device 1; and a computer-readable medium (in particular a memory 12 of the device 1), on which is stored a computer program product comprising code instructions for executing said method.

CLAIMS

1. A method for assisting the acquisition of a picture by a device (1) comprising a processing unit (11), a display (13) and a camera (14), the device (1) being configured to output on said display (13) a preview of a scene visible from the camera (14), the method comprising performing by the processing unit (11) steps of:

(a) obtaining reference data associated to a target picture depicting at least one reference object, said reference data comprising at least location data and an outline of said reference object;

(b) when a location of the device (1) matches said location data associated with the target picture, providing the outline as an overlay to said preview outputted on said display (13) so as to allow reproducing said target picture.

2. A method according to claim 1, wherein the device (1) further comprises a locating unit (15) providing location data associated to the device (1), step (b) comprising comparing location data associated to the device (1) and location data associated with the target picture.

3. A method according to claim 2, wherein step (b) comprises outputting a signal indicating when location data associated to the device (1) match location data associated with the target picture.

4. A method according to any one of claims 1 to 3, further comprising a step (c) of acquiring a picture when the outline provided as an overlay to said preview outputted on said display (13) matches an outline of a depiction of the reference object in said preview.

5. A method according to claim 4, wherein step (c) comprises outputting a signal indicating when the outline provided as an overlay to said preview outputted on said display (13) matches an outline of a depiction of the reference object in said preview.

6. A method according to any one of claims 1 to 5, further comprising a previous step (a0) of selecting at an equipment (2) the target picture, and processing the target picture by a processing unit (21) of the equipment (2) so as to determine said reference data.

7. A method according to claim 6, wherein processing the target picture by a processing unit (21) of the equipment (2) comprises identifying said at least one reference object in the target picture, and extracting the outline of each identified reference object.

8. A method according to claims 7, wherein the equipment (2) is connected to a database of famous reference objects, identifying said at least one reference object in the target picture comprising searching the target picture for famous reference objects of said database.

9. A method according to any one of claims 6 to 8, wherein the device (1) acts as the equipment (2).

10. A method according to claim 9, wherein the device (1, 2) is a smartphone.

11. A method according to any one of claims 6 to 8, wherein the device (1) and the equipment (2) are distinct, step (a) comprising transmitting said reference data from the equipment (2) to the device (1).

12. A method according to claim 11, wherein the device (1) and the equipment (2) are connected through a network (20).

13. An electronic device (1) comprising a processing unit (11), a display (13) and a camera (14), the processing unit (11) being configured to implement:

- outputting on said display (13) a preview of a scene visible from the camera (14);

- obtaining reference data associated to a target picture depicting at least one reference object, said reference data comprising at least location data and an outline of said reference object;
- when a location of the device (1) matches said location data associated with the target picture, providing the outline as an overlay to said preview outputted on said display (13) so as to allow reproducing said target picture.

14. A computer program product, comprising code instructions for executing a method according to any one of claims 1 to 12 for assisting the acquisition of a picture by a device (1).

15. A computer-readable medium, on which is stored a computer program product comprising code instructions for executing a method according to any one of claims 1 to 12 for assisting the acquisition of a picture by a device (1).

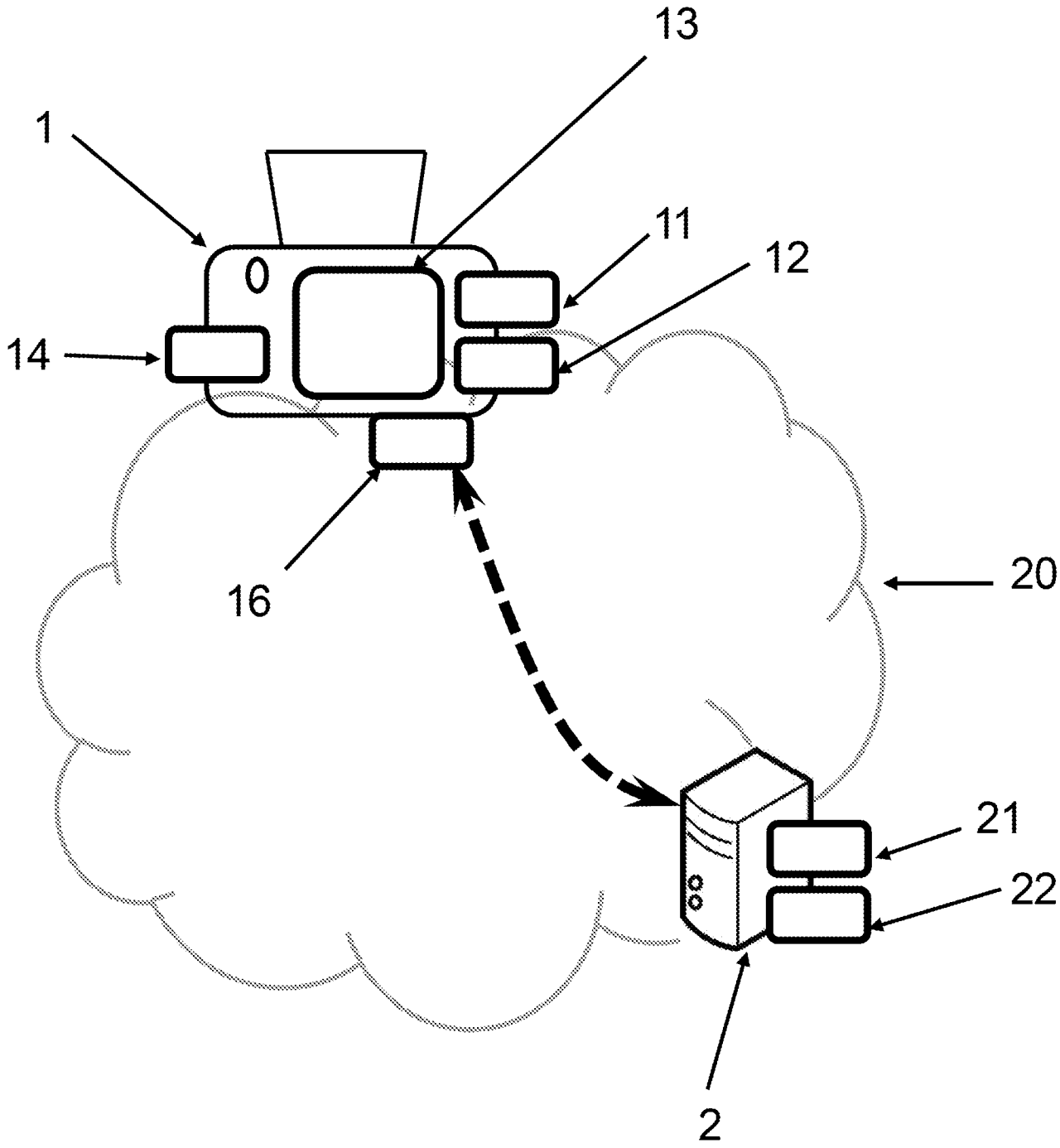


FIG. 1

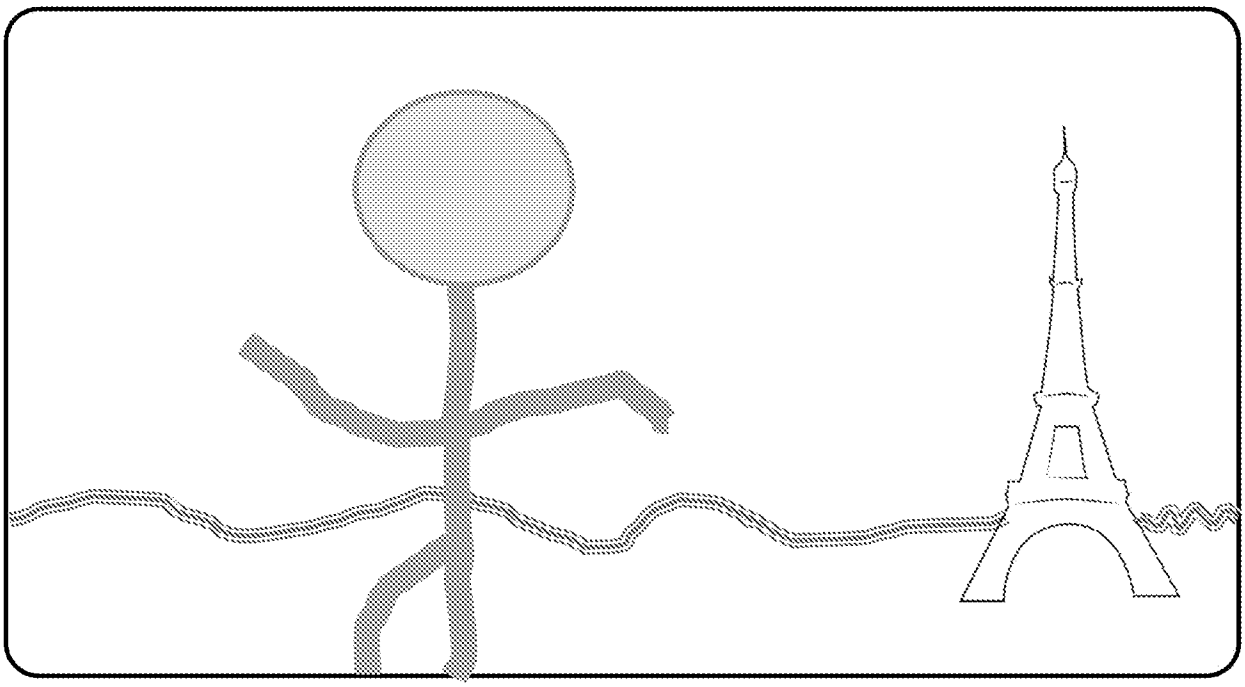


FIG. 2a

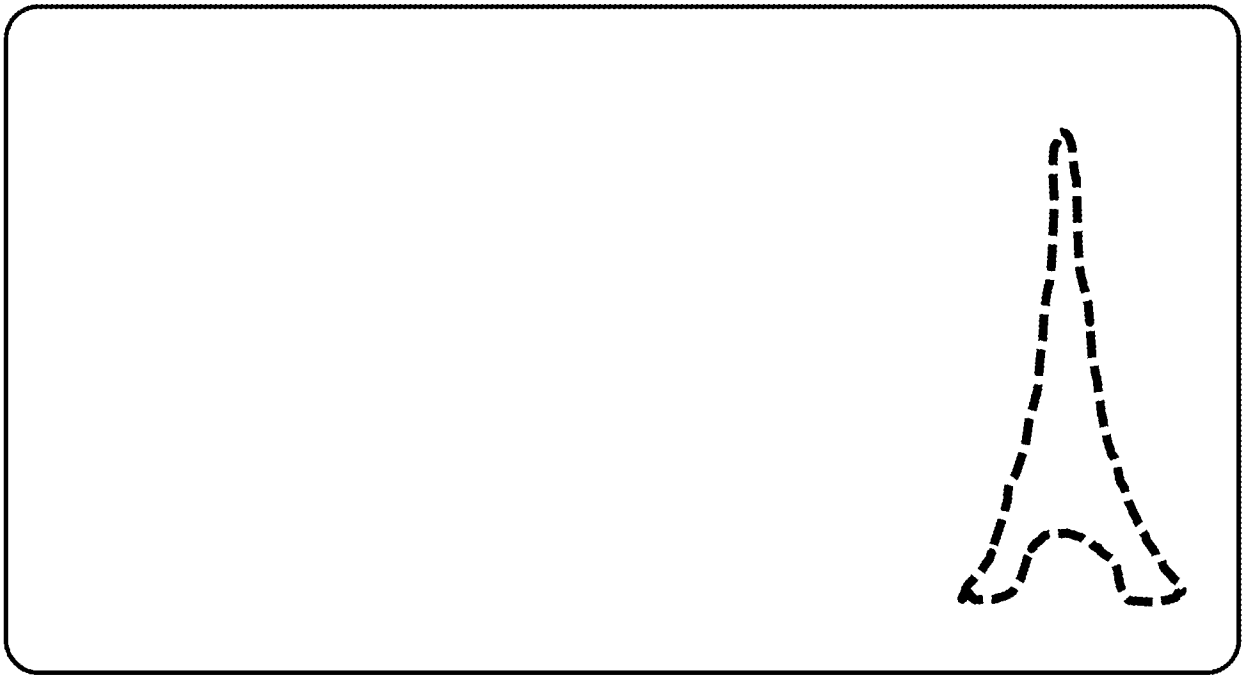


FIG. 2b

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2016/087841

A. CLASSIFICATION OF SUBJECT MATTER

H04N 5/232(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04N

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

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

CNPAT,DWPI,EPODOC,CNKI: picture, view, outline, module, overlay, location, position, scene

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 103297697 A (BEIJING XIAOMI TECHNOLOGY CO., LTD.) 11 September 2013 (2013-09-11) description, paragraphs[0003], [0070]-[0119], figure 3	1-15
A	CN 104135609 A (BEIJING XIAOMI TECHNOLOGY CO., LTD.) 05 November 2014 (2014-11-05) the whole document	1-15
A	CN 104298965 A (NORTHEASTERN UNIVERSITY) 21 January 2015 (2015-01-21) the whole document	1-15
A	CN 105139337 A (BEIJING KINGSOFT CO., LTD.) 09 December 2015 (2015-12-09) the whole document	1-15

☐ 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
22 February 2017	**01 April 2017**
Name and mailing address of the ISA/CN **STATE INTELLECTUAL PROPERTY OFFICE OF THE P.R.CHINA** **6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer **HU,Lili** Telephone No. **(86-10)52745004**

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2016/087841

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 103297697 A	11 September 2013	None	
CN 104135609 A	05 November 2014	None	
CN 104298965 A	21 January 2015	None	
CN 105139337 A	09 December 2015	None	