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(54) **INFORMATION PROCESSING APPARATUS, TRANSMISSION METHOD, AND STORAGE MEDIUM**

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(57) **ABSTRACT**

An information processing apparatus includes a first acquisition unit, a recognition unit, a specification unit, and a transmission unit. The first acquisition unit acquires an image. The recognition unit recognizes an object included in the image. The specification unit causes a user to specify data to be transmitted to the object recognized by the recognition unit. The transmission unit transmits the specified data to an apparatus identified by destination information corresponding to the object, according to the specification by the specification unit.

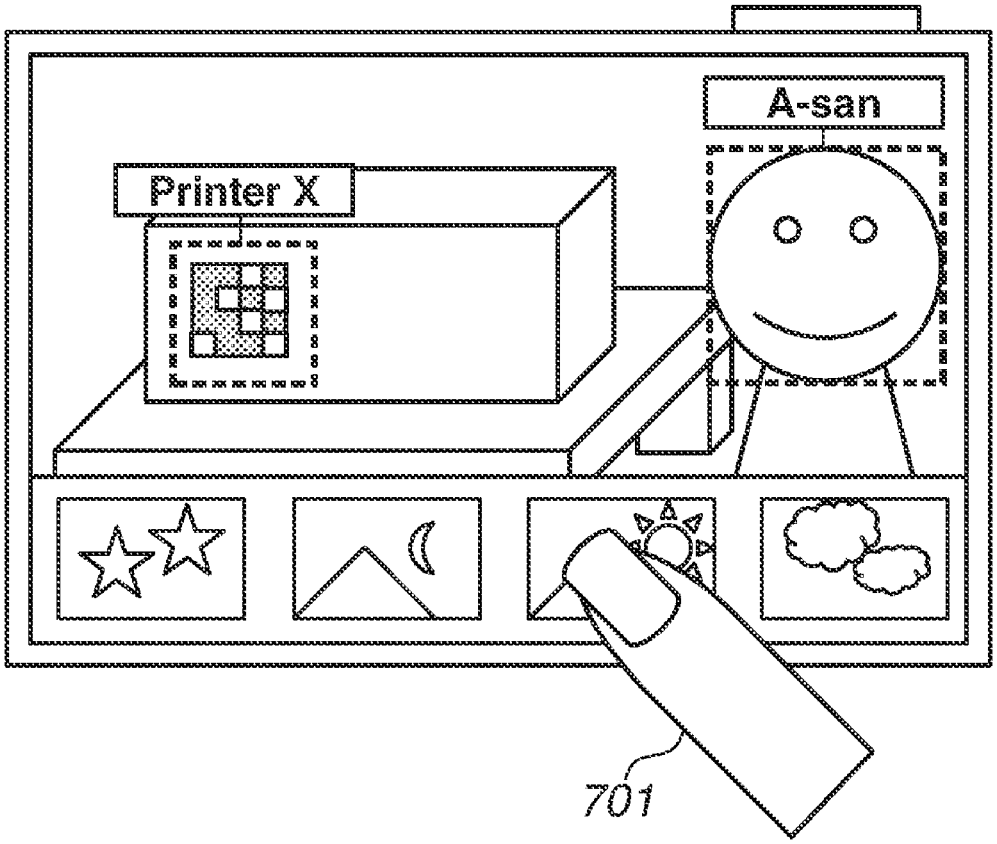


FIG.1

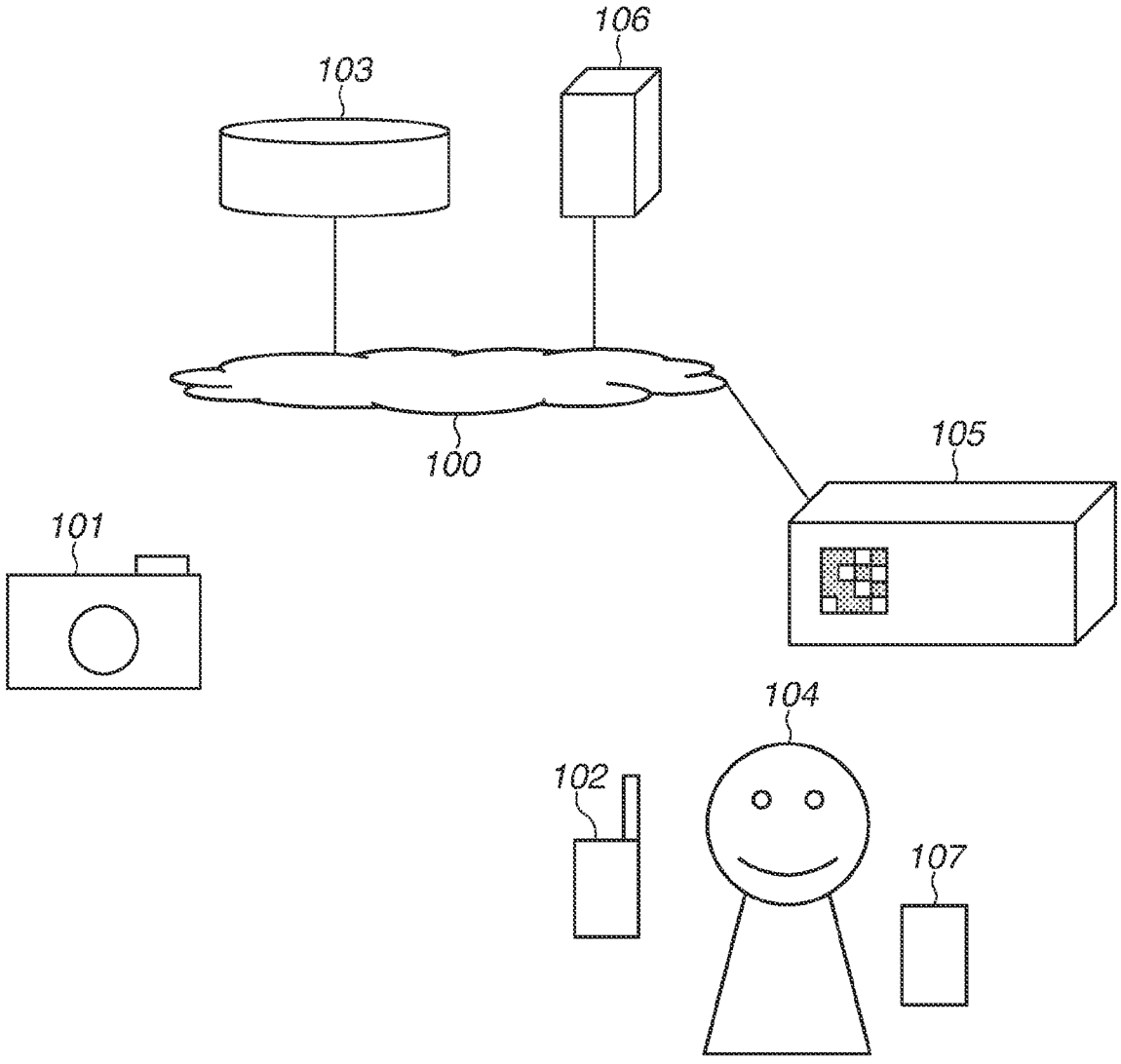


FIG.2

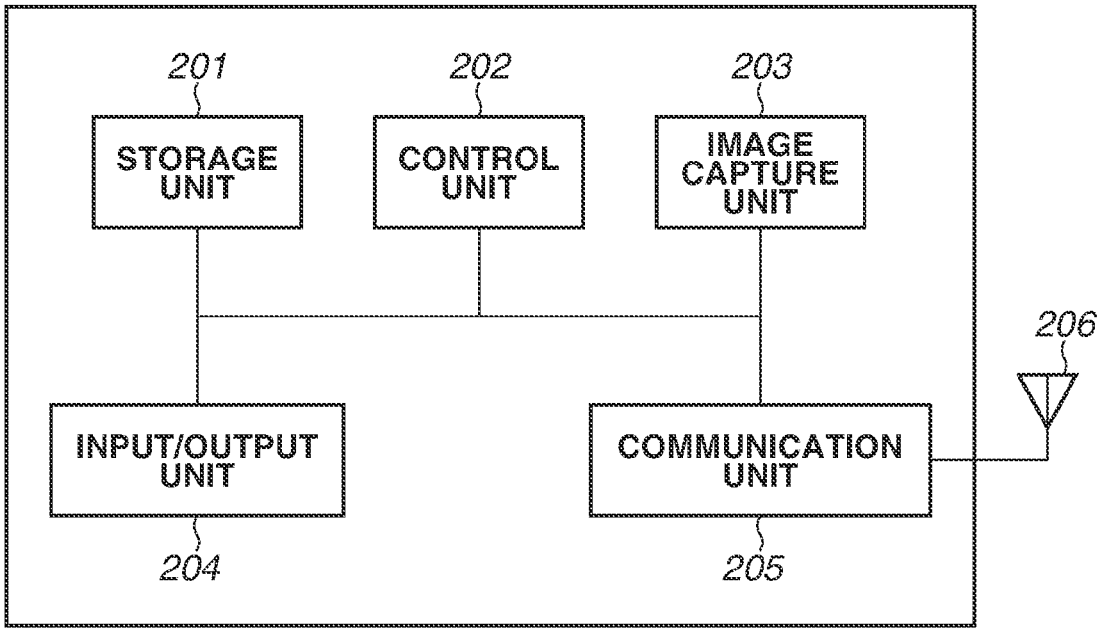

201
202
203
STORAGE UNIT
CONTROL UNIT
IMAGE CAPTURE UNIT
206
INPUT/OUTPUT UNIT
COMMUNICATION UNIT
204
205

FIG.3

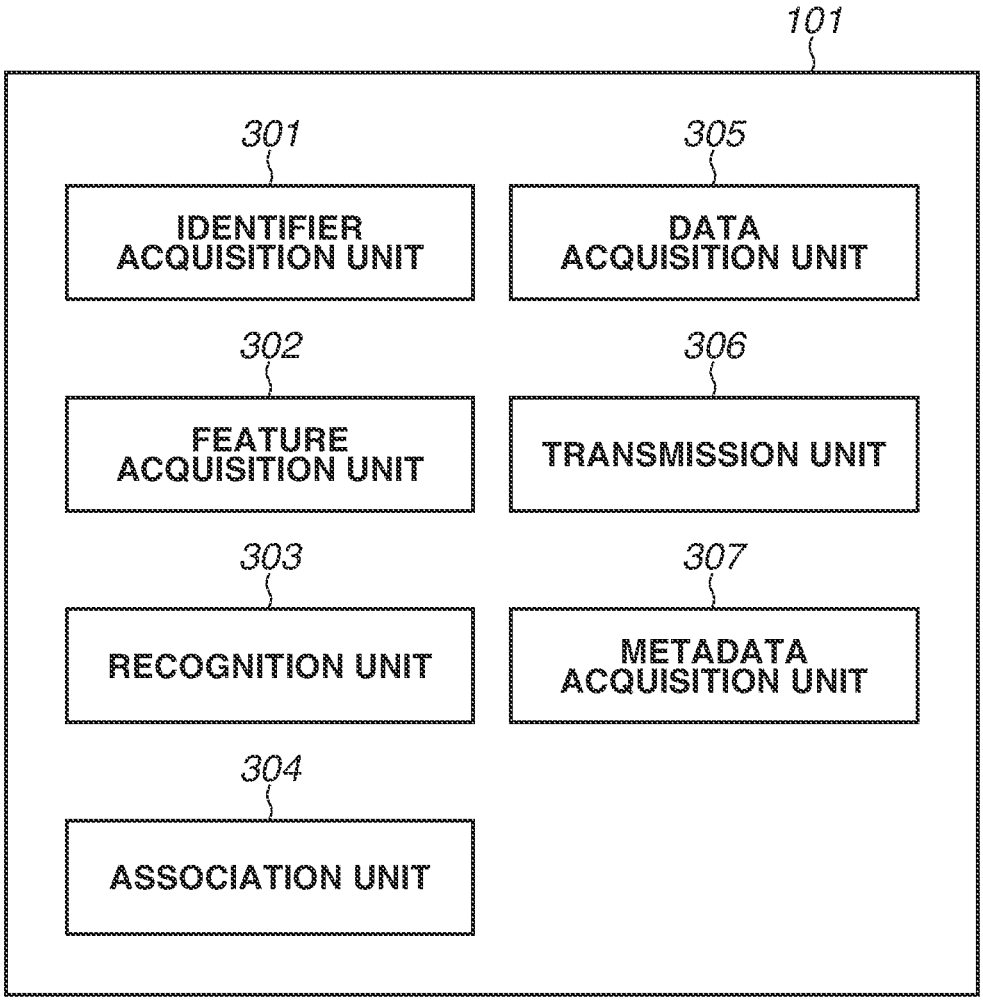

101
301
IDENTIFIER ACQUISITION UNIT
305
DATA ACQUISITION UNIT
302
FEATURE ACQUISITION UNIT
306
TRANSMISSION UNIT
303
RECOGNITION UNIT
307
METADATA ACQUISITION UNIT
304
ASSOCIATION UNIT

FIG.4

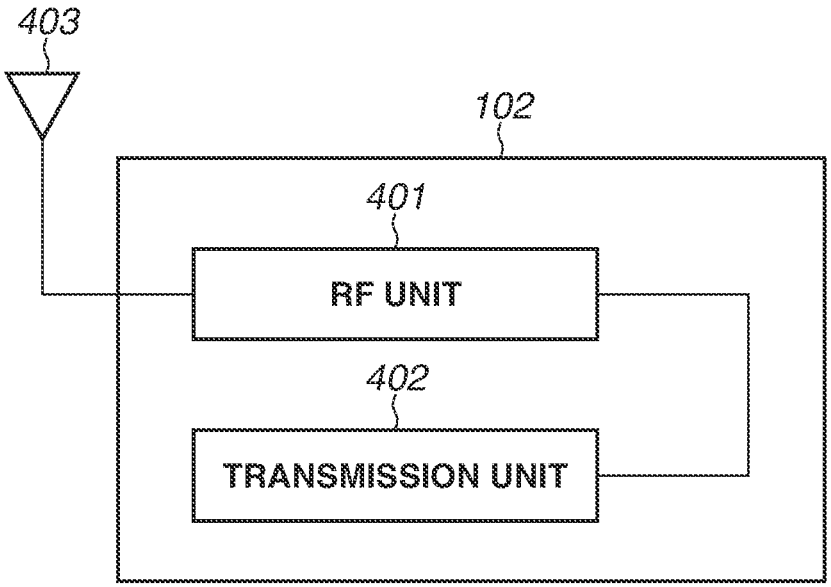


FIG.5

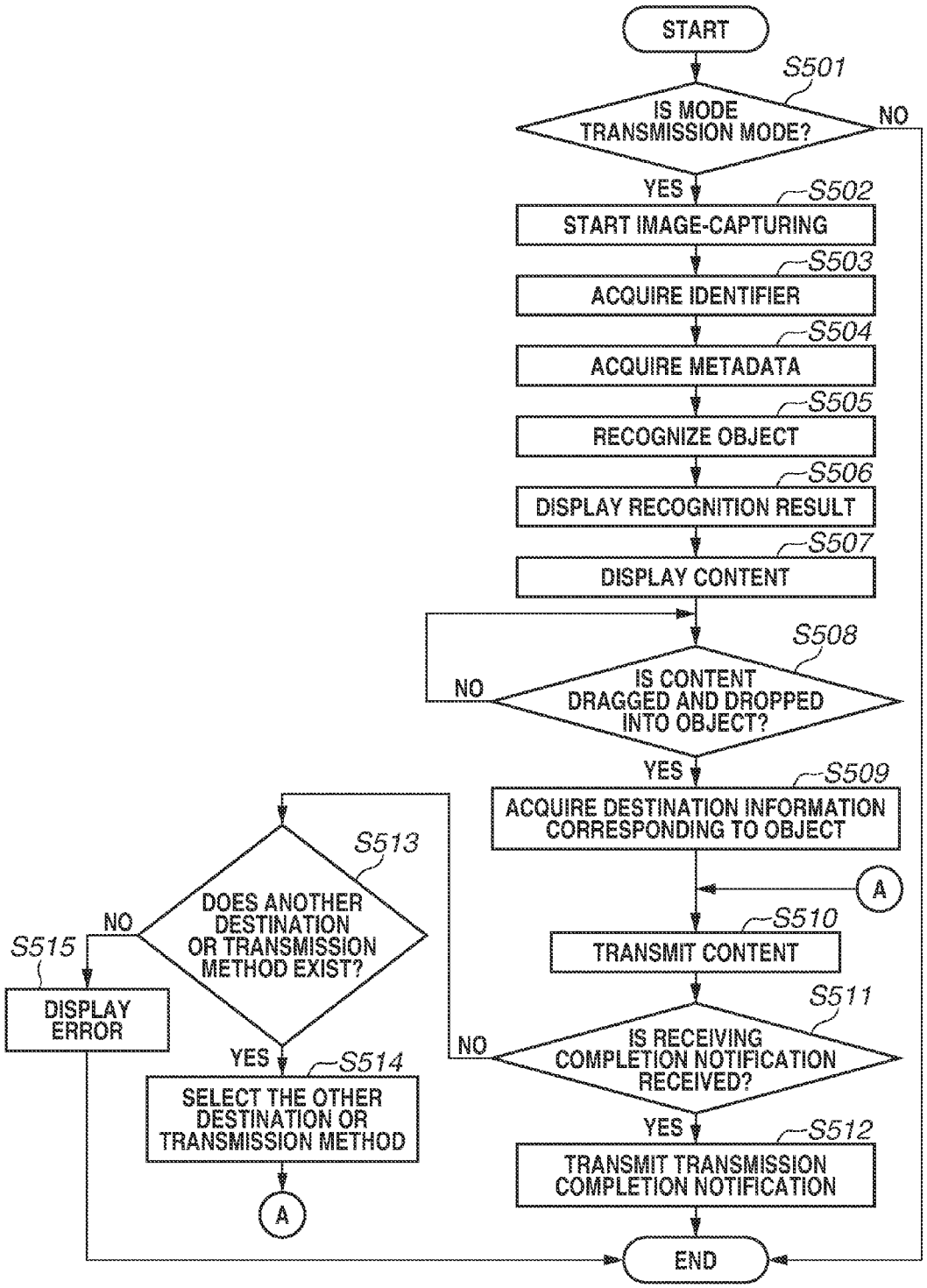

START
S501
IS MODE TRANSMISSION MODE?
NO
YES
S502
START IMAGE-CAPTURING
S503
ACQUIRE IDENTIFIER
S504
ACQUIRE METADATA
S505
RECOGNIZE OBJECT
S506
DISPLAY RECOGNITION RESULT
S507
DISPLAY CONTENT
S508
IS CONTENT DRAGGED AND DROPPED INTO OBJECT?
NO
YES
S509
ACQUIRE DESTINATION INFORMATION CORRESPONDING TO OBJECT
A
S510
TRANSMIT CONTENT
S511
IS RECEIVING COMPLETION NOTIFICATION RECEIVED?
NO
YES
S512
TRANSMIT TRANSMISSION COMPLETION NOTIFICATION
END
S513
DOES ANOTHER DESTINATION OR TRANSMISSION METHOD EXIST?
NO
S515
DISPLAY ERROR
YES
S514
SELECT THE OTHER DESTINATION OR TRANSMISSION METHOD
A

FIG.6A

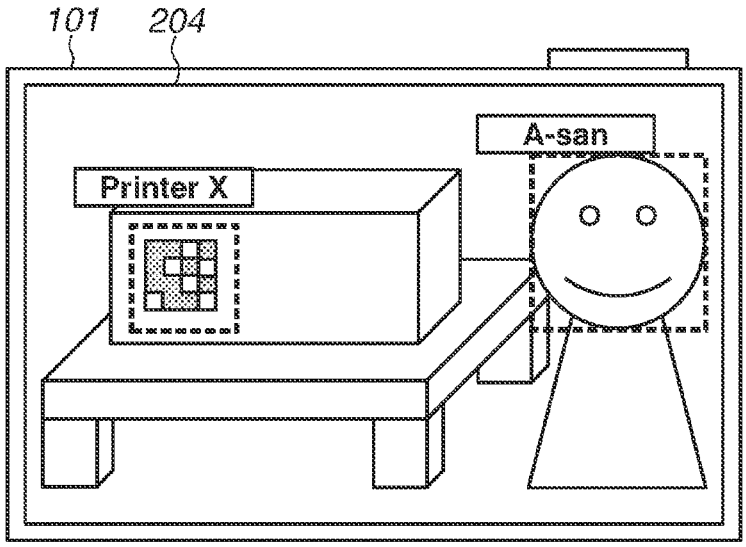


FIG.6B

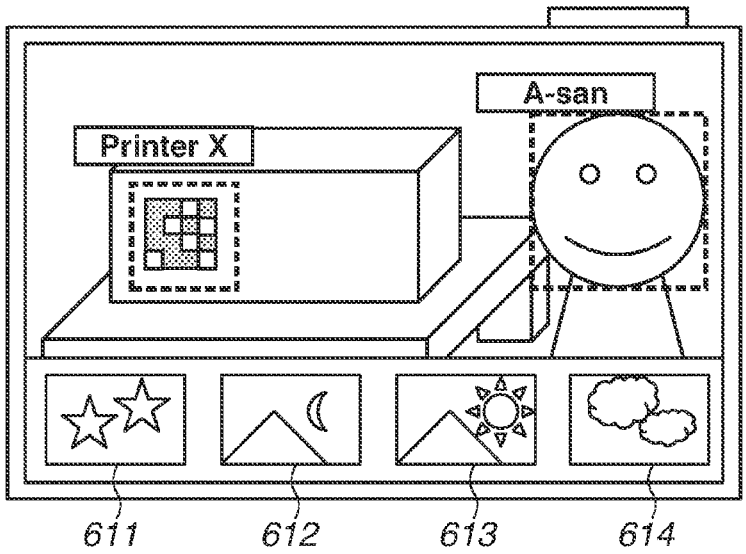


FIG.6C

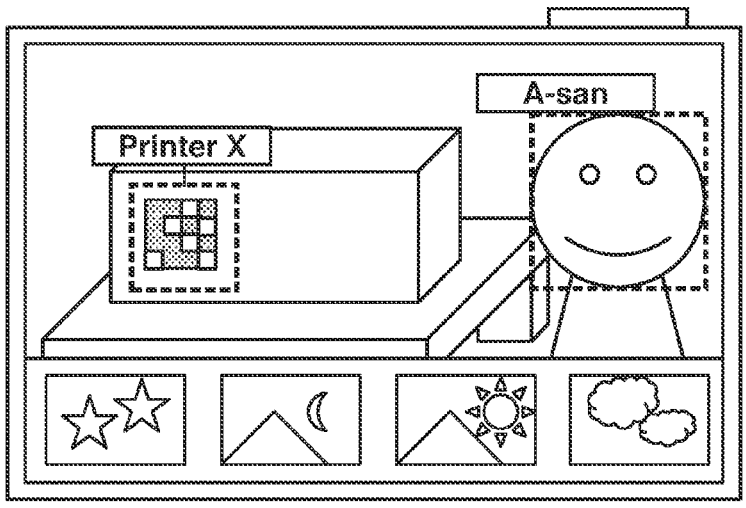


FIG.7A

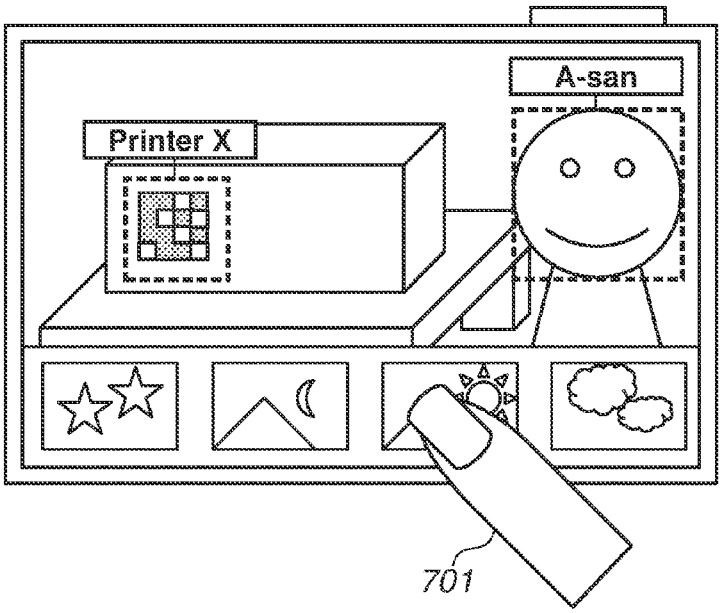


FIG.7B

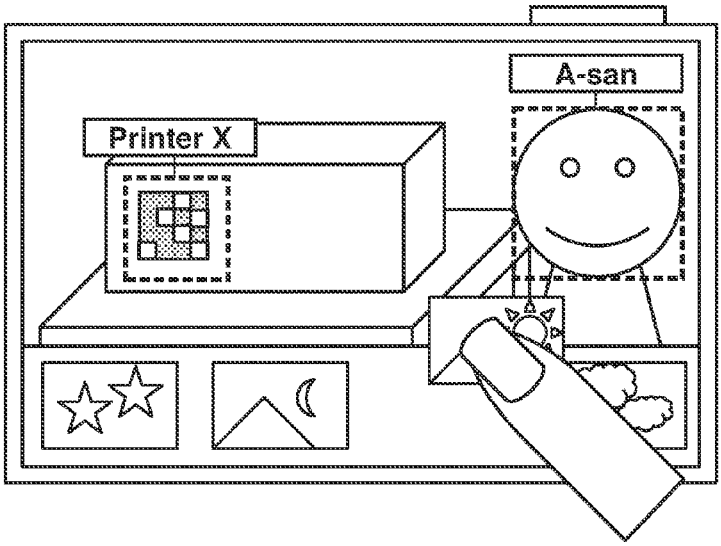


FIG.7C

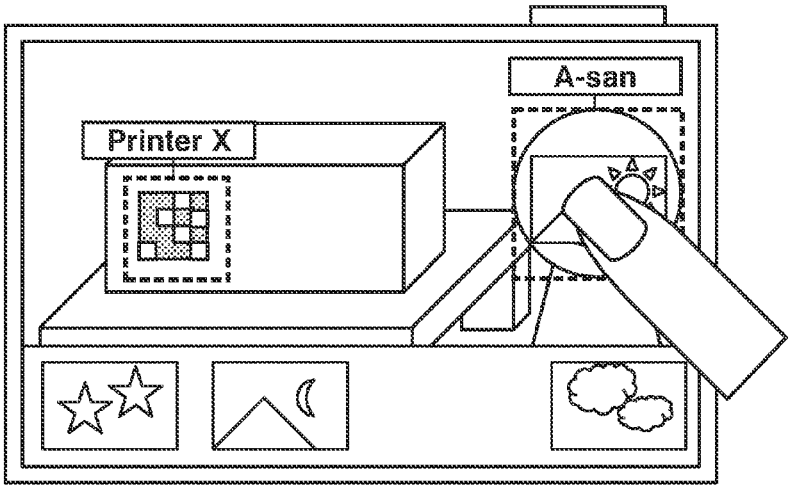


FIG.8

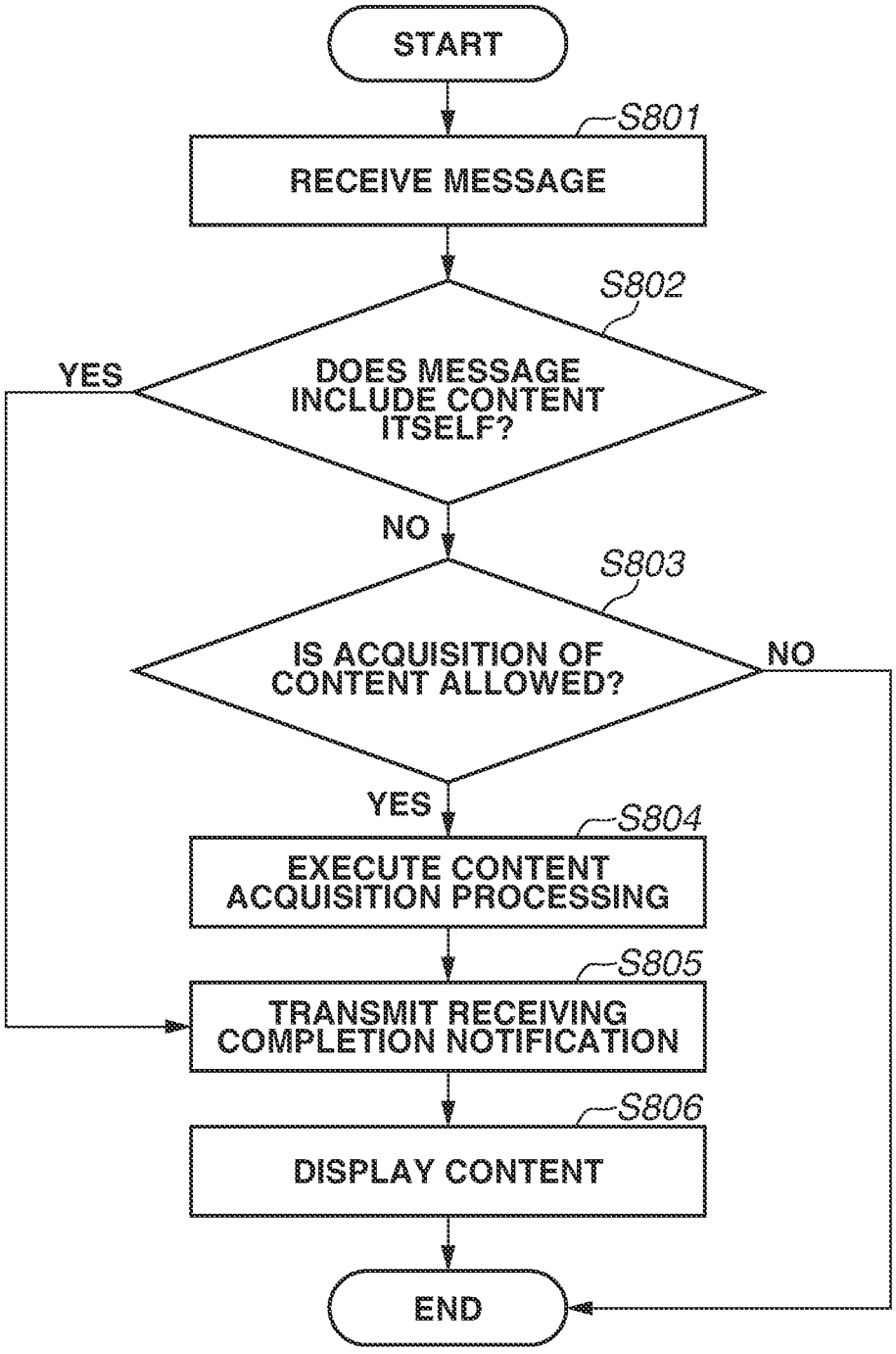
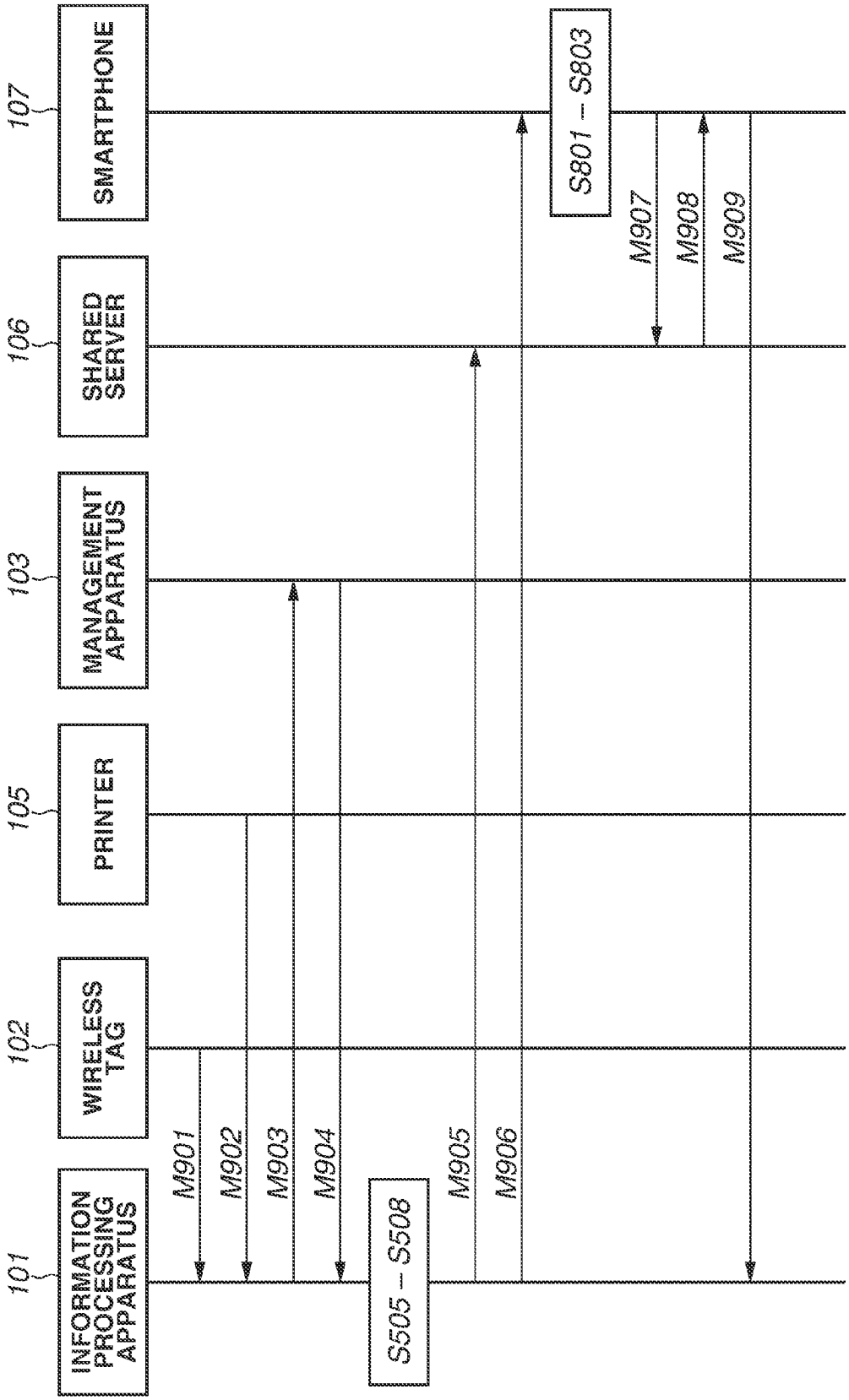

START
S801
RECEIVE MESSAGE
S802
DOES MESSAGE INCLUDE CONTENT ITSELF?
YES
NO
S803
IS ACQUISITION OF CONTENT ALLOWED?
NO
YES
S804
EXECUTE CONTENT ACQUISITION PROCESSING
S805
TRANSMIT RECEIVING COMPLETION NOTIFICATION
S806
DISPLAY CONTENT
END

FIG.9


101
INFORMATION PROCESSING APPARATUS
102
WIRELESS TAG
105
PRINTER
103
MANAGEMENT APPARATUS
106
SHARED SERVER
107
SMARTPHONE
S801 – S803
M901
M902
M903
M904
S505 – S508
M905
M906
M907
M908
M909

INFORMATION PROCESSING APPARATUS, TRANSMISSION METHOD, AND STORAGE MEDIUM

BACKGROUND OF THE INVENTION

[0001] Field of the Invention

[0002] The present invention relates to an information processing apparatus that transmits data.

[0003] Description of the Related Art

[0004] When data is to be transmitted to an addressee, the data is transmitted by specifying an e-mail address (Japanese Patent Application Laid-Open No. 2000-032036). Further, there is a technique for transmitting data to a server on a network by dragging and dropping a data icon into a folder icon managed by the server.

[0005] It is assumed that data is to be transmitted to an addressee existing in a visible area. In this case, if the data to be delivered is a tangible object such as a sheet of paper, for example, the data can be directly delivered to the addressee. On the contrary, when digital data such as an e-mail is to be delivered, a mail address of the addressee has to be looked up and specified from an address book of an e-mail application. Thus, this operation is complicated in comparison to the operation in the case where the tangible object is delivered directly.

SUMMARY OF THE INVENTION

[0006] The present invention is directed to a technique of enabling a user to easily select an addressee of data.

[0007] According to an aspect of the present invention, an information processing apparatus includes a first acquisition unit configured to acquire an image, a recognition unit configured to recognize an object included in the image, a specification unit configured to cause a user to specify data to be transmitted to the object recognized by the recognition unit, and a transmission unit configured to transmit the specified data to an apparatus identified by destination information corresponding to the object, according to the specification by the specification unit.

[0008] Further features of the present invention will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. **1** is a diagram illustrating a configuration of a system.

[0010] FIG. **2** is a block diagram illustrating a hardware configuration of an information processing apparatus.

[0011] FIG. **3** is a block diagram illustrating a module configuration of the information processing apparatus.

[0012] FIG. **4** is a block diagram illustrating a hardware configuration of a wireless tag.

[0013] FIG. **5** is a flowchart illustrating processing realized by the information processing apparatus.

[0014] FIGS. **6**A, **6**B, and **6**C are diagrams illustrating examples of display screens.

[0015] FIGS. **7**A, **7**B, and **7**C are diagrams illustrating a drag-and-drop operation.

[0016] FIG. **8** is a flowchart illustrating processing realized by a smartphone.

[0017] FIG. **9** is a sequence chart of the system.

DESCRIPTION OF THE EMBODIMENTS

[0018] Various exemplary embodiments, features, and aspects of the invention will be described in detail below with reference to the drawings.

[0019] FIG. **1** is a diagram illustrating a configuration of a data transmission system according to an exemplary embodiment of the present invention.

[0020] A network **100** is the Internet. However, the network **100** is not limited to the Internet, but may be a wide area network (WAN), a local area network (LAN), a personal area network (PAN), or may be a combination of these networks.

[0021] An information processing apparatus **101** captures and recognizes objects such as an imaging target **104** and a printer **105**. Further, the information processing apparatus **101** transmits content data (hereinafter, referred to as "content") to apparatuses identified by addresses respectively corresponding thereto. Hereinafter, the content will be described by taking image data as an example. However, the content is not limited to the above, and the content may be document data, image data, moving image data, audio data, message data, program data, or command data, or may be a combination of these data.

[0022] In addition, the information processing apparatus **101** executes wireless communication compliant with the Institute of Electrical and Electronics Engineers (IEEE) 802.11 series with a wireless tag **102**. However, the configuration is not limited to the above, and the present exemplary embodiment is applicable to information processing apparatuses compliant with other wireless communication methods such as Bluetooth (registered trademark), an ultra-wideband (UWB), ZigBee, and multiband OFDM alliance (MBOA). Furthermore, the present exemplary embodiment is also applicable to an information processing apparatus compliant with a wired communication method of a wired LAN. Further, the UWB includes a wireless universal serial bus (USB), the wireless **1394**, and the wimedia network (WiNET).

[0023] The wireless tag **102** transmits identifier information of the wireless tag **102**. Herein, a media access control (MAC) address of the wireless tag **102** is used as the identifier. However, the identifier is not limited to the above, and an internet protocol (IP) address or a universally unique identifier (UUID) of the wireless tag **102** may be used as the identifier.

[0024] Herein, the wireless tag **102** periodically informs identification information at a certain interval by including the identifier information as one information element of a beacon specified in the IEEE 802.11 series. However, the transmission method is not limited to the above, and the wireless tag **102** may transmit the identification information by including the identification information in a response (e.g., a probe response signal as a search response) with respect to a request (e.g., probe request signal as a search request) from the information processing apparatus **101**.

[0025] The imaging target **104** and the printer **105** are target objects recognized by the information processing apparatus **101**. The imaging target **104** owns the wireless tag **102** and a smartphone **107**. The wireless tag **102** may be built into the smartphone **107**.

[0026] Further, a two-dimensional code (e.g., quick response (QR) code (registered trademark)) including the identifier information of the printer **105** is attached to the printer **105**. In addition, instead of the two-dimensional

code, a one-dimensional barcode or a built-in wireless tag (not illustrated) may be used. In a case where a wireless tag is to be built in, the wireless tag has a configuration similar to that of the wireless tag **102** and transmits the identifier information of the printer **105**.

[0027] A management apparatus **103** manages image feature information of the imaging target **104** and the printer **105**. Further, the management apparatus **103** manages destination apparatuses of content respectively corresponding to the imaging target **104** and the printer **105**. Herein, a destination apparatus corresponding to the imaging target **104** is the smartphone **107**, whereas a destination apparatus corresponding to the printer **105** is the printer **105** itself. More specifically, the management apparatus **103** manages destination information of the destination apparatus. Hereinafter, the destination information will be described by taking a mail address or a uniform resource locator (URL) as an example. However, the destination information is not limited to the above, and the destination information may be an IP address, a MAC address, or a phone number (i.e., short message service (SMS) address).

[0028] Further, in response to a request from the information processing apparatus **101**, the management apparatus **103** transmits metadata that stores image feature information and destination information to the information processing apparatus **101**. A shared server **106** manages a content by receiving the content from the information processing apparatus **101**. Then, the shared server **106** releases the content to the information processing apparatus **101** and an external apparatus.

[0029] FIG. **2** is a block diagram illustrating a hardware configuration of the information processing apparatus **101**.

[0030] A storage unit **201** is configured of a read only memory (ROM) and a random access memory (RAM), and stores various kinds of information such as a program for executing various operations described below and a communication parameter for wireless communication. Further the storage unit **201** stores the contents. In addition to the memories such as the ROM and the RAM, storage media such as a flexible disk, a hard disk, an optical disk, a magneto-optical disk, a compact disk read-only memory (CD-ROM), a compact disk recordable (CD-R), a magnetic tape, a non-volatile memory card, and a digital versatile disk (DVD) may be used as the storage unit **201**.

[0031] A control unit **202** is configured of a central processing unit (CPU) or a micro processing unit (MPU), and controls the entirety of the information processing apparatus **101** by executing the program stored in the storage unit **201**. Further, the entirety of the information processing apparatus **101** may be controlled by cooperatively operating with an operating system (OS) executed by the control unit **202**.

[0032] Further, the control unit **202** controls the image capture unit **203** to execute predetermined processing such as capturing, printing, or projecting an image. The image capture unit **203** adjusts a view angle by using an optical zoom function or a digital zoom function to execute imaging processing (image-capturing).

[0033] An input/output unit **204** is configured of a touch panel so as to receive various operation inputs from a user and display various kinds of information on a display screen of the touch panel. Further, an input using a mouse or an input using a gesture performed in space may be received in addition to the input using the touch panel. Furthermore, the output may include an audio output via a speaker or a vibrational output in addition to the output displayed on the screen of the touch panel.

[0034] The input/output unit **204** arranges and displays an image and a content captured by the image capture unit **203**. Further, the input/output unit **204** causes a user to specify a displayed object such as the imaging target **104** or the printer **105** and a content via the touch panel. Further, the input/output unit **204** detects an operation so-called "drag-and-drop" (hereinafter, referred to as "D-and-D"), in which the content is moved to the object while being held in a selected state and released at the object. With this detection, the input/output unit **204** determines that the content and the object are specified by the user. Hereinafter, this operation is expressed as "D-and-D the content into the object".

[0035] Further, the input/output unit **204** may determine that the content and the object are specified by detecting an operation in which the displayed content and the object are concurrently pointed with two fingers instead of detecting the D-and-D operation. Further, the input/output unit **204** may determine that the content and the object are specified by detecting a pinching operation with respect to the displayed content and the object. Furthermore, the input/output unit **204** may determine that the content and the object are specified by detecting a flick operation in which a user quickly flicks a screen by sliding a finger from the content to the object.

[0036] A communication unit **205** executes control of wireless communication compliant with the IEEE 802.11 series or control of IP communication. Further, the communication unit **205** controls an antenna **206** to transmit and receive a wireless signal of the wireless communication.

[0037] FIG. **3** is a block diagram illustrating software functional blocks which the control unit **202** of the information processing apparatus **101** realizes by reading a program stored in the storage unit **201**. In addition, at least a part of the software functional blocks illustrated in FIG. **3** may be realized by hardware. For example, in a case where a software functional block is to be realized by the hardware, with the use of a predetermined compiler, a dedicated circuit is automatically generated on a field programmable gate array (FPGA) through a program for realizing the functional block. Then, this circuit may be used as a hardware module having a function of the software module. Further, as with the case of the FPGA, a gate array circuit may be formed and realized as the hardware.

[0038] An identifier acquisition unit **301** acquires identifier information of the wireless tag **102** and identifier information of the printer **105** through wireless communication. However, the identifier information may be acquired through image recognition of a two-dimensional barcode or an embedded image instead of being acquired through the wireless communication.

[0039] A feature acquisition unit **302** acquires image feature information of the imaging target **104** corresponding to the identifier of the wireless tag **102** or the identifier of the printer **105** from the management apparatus **103**. In addition, the storage unit **201** may store the identifier and the image feature information in association with each other, so that the feature acquisition unit **302** may acquire the image feature information corresponding to the identifier from the storage unit **201**.

[0040] A recognition unit **303** recognizes an object included in the image captured by the image capture unit

203. The recognition unit **303** recognizes a person's face, a two-dimensional barcode, and a printer. Further, when a recognized object is a person's face, the recognition unit **303** executes individual identification. In other words, the recognition unit **303** identifies who the detected face is.

[0041] When the user "D-and-D" the content into the object via the input/output unit **204**, an association unit **304** associates the content with the object. A data acquisition unit **305** acquires the content stored in the storage unit **201**. In addition, the data acquisition unit **305** may acquire the content from the shared server **106**. A transmission unit **306** transmits the content to the shared server **106**.

[0042] A metadata acquisition unit **307** acquires metadata that stores image feature information and destination information of the imaging target **104** and the printer **105** from the management apparatus **103**. In addition, the metadata acquisition unit **307** may directly acquire respective metadata from the wireless tag **102** and the printer **105**.

[0043] FIG. **4** is a block diagram illustrating a hardware configuration of the wireless tag **102**. A radiofrequency (RF) unit **401** executes wireless communication compliant with the IEEE 802.11 series via an antenna **403**. A transmission unit **402** controls the RF unit **401** to periodically transmit the identifier information of the wireless tag **102**.

[0044] FIG. **5** is a flowchart illustrating a processing flow which the control unit **202** realizes by reading and executing the program stored in the storage unit **201** when the information processing apparatus **101** transmits the content.

[0045] Further, a sequence chart of a data transmission system is illustrated in FIG. **9**. Hereinafter, the processing will be described with reference to FIGS. **5** and **9**.

[0046] First, in step S**501**, the information processing apparatus **101** determines whether the mode is a transmission mode for transmitting the content. For example, an imaging mode for capturing an image via the image capture unit **203** and a reproducing mode for browsing the content are provided as other modes different from the transmission mode.

[0047] In the present exemplary embodiment, the user can select a mode via the input/output unit **204**. However, the configuration is not limited to the above, and the information processing apparatus **101** may enter the transmission mode when the wireless tag **102** is detected in its vicinity. Further, the information processing apparatus **101** may prompt the user to set a mode to the transmission mode when the wireless tag **102** is detected in its vicinity.

[0048] As a result of determination in step S**501**, if the mode is a mode different from the transmission mode (NO in step S**501**), the information processing apparatus **101** ends the processing illustrated in FIG. **5**.

[0049] On the other hand, if the mode is the transmission mode (YES in step S**501**), the processing proceeds to step S**502**. In step S**502**, the image capture unit **203** starts image-capturing. In concurrent with the image-capturing, in step S**503**, the identifier acquisition unit **301** acquires identifier information. Herein, in step M**901**, the identifier acquisition unit **301** acquires the identifier information of the wireless tag **102** from the wireless tag **102** via the communication unit **205**. Further, in step M**902**, the identifier acquisition unit **301** acquires the identifier information of the printer **105** from the two-dimensional barcode attached to the printer **105** via the image capture unit **203**. Alternatively, the identifier acquisition unit **301** may acquire the identification information from a wireless tag included in the printer **105**.

[0050] When the identifier information is acquired, in step S**504**, the metadata acquisition unit **307** acquires metadata corresponding to the identification information from the management apparatus **103**. Specifically, in step M**903**, the metadata acquisition unit **307** transmits a metadata request signal including the identifier information to the management apparatus **103**. When the management apparatus **103** receives the metadata request signal, in step M**904**, the management apparatus **103** transmits a response signal that includes the metadata corresponding to the identifier information included in the request signal. The metadata acquisition unit **307** acquires the metadata by receiving the response signal. The metadata acquired as the above is stored in the storage unit **201**.

[0051] After the metadata is acquired, in step S**505**, the recognition unit **303** recognizes the object included in the image captured by the image capture unit **203** through image analysis based on the image feature information included in the metadata. When the object is recognized, in step S**506**, the input/output unit **204** displays a recognition result by superimposing the recognition result on the captured image. Herein, the recognition result is displayed as illustrated in FIG. **6**A. In addition, the recognition result is displayed in real time in accordance with the image-capturing operation of the imaging unit **203**.

[0052] Further, in FIG. **6**A, a dotted frame that indicates a recognized object and a name or a nominal designation of the object are displayed as the recognition result. However, an address as a transmission destination of the content or a comment may be displayed instead of the name or the nominal designation. In this case, the name, the nominal designation, the address, or the comment is managed by the management apparatus **103** and included in the metadata.

[0053] Further, any one of the name or the nominal designation and the dotted frame that indicates the recognized object may be displayed thereon. With this configuration, the user can check the recognized object on a display screen.

[0054] Further, in step S**507**, the input/output unit **204** arranges and displays contents together with the image. Herein, thumbnails of at least a part of the contents (i.e., contents **611** to **614**) stored in the storage unit **201** are displayed as illustrated in FIG. **6**B. Further, in addition to or in place of the contents stored in the storage unit **201**, thumbnails of contents stored in the shared server **106** may be displayed.

[0055] Next, in step S**508**, the input/output unit **204** detects a D-and-D operation executed by the user. Herein, as illustrated in FIGS. **7**A to **7**C, the user "D-and-D" the content **613** into an object "A-san". In addition, FIGS. **7**A to **7**C sequentially illustrate respective states of the D-and-D operation. Then, the input/output unit **204** detects the D-and-D operation. Through the detection, the information processing apparatus **101** determines that the user has specified the object "A-san" and the content **613**.

[0056] Herein, the states illustrated in FIGS. **7**A to **7**C will be described in detail. In FIG. **7**A, the user touches the content **613** displayed on the touch panel serving as the input/output unit **204** with a finger. In FIG. **7**B, from the state illustrated in FIG. **7**A, the user moves the finger in a direction of the object "A-san" without separating the finger

from the touch panel ("drag"). When the user moves the finger without separating the finger from the touch panel, the content **613** displayed on the touch panel also moves along with the finger. In FIG. **7**C, the user moves the finger over the object "A-san" and separates the finger from the touch panel ("drop"). When the user separates the finger from the touch panel, the touch panel acquires coordinates of the image where the user has separated the finger. Then, the information processing apparatus **101** determines whether the acquired coordinates exist within the dotted frame that indicates the recognized object. If the coordinates exist within the dotted frame that indicates the recognized object, the information processing apparatus **101** determines that the user has separated the finger at the object corresponding to the dotted frame, and determines that the content is dragged and dropped into the object (YES in step S**508**). As described above, the information processing apparatus **101** detects that the user "D-and-D" the content **613** into the object "A-san", and determines this detection as a user's instruction for transmitting the content **613** to the apparatus associated with the object "A-san".

[0057] Further, instead of detecting the D-and-D operation, the information processing apparatus **101** may detect a touching operation in which two places on the touch panel such as the object "A-san" as the imaging object **104** and the content **613** are touched simultaneously, so as to determine the touching operation as the user's instruction for transmitting the content **613** to the apparatus associated with the object "A-san". Furthermore, when the user executes a pinching operation by touching two places on the touch panel such as the object "A-san" as the imaging object **104** and the content **613** with fingers while moving the fingers close to each other, the information processing apparatus **101** may determine the pinching operation as the user's instruction for transmitting the content **613** to the apparatus associated with the object "A-san". In addition, the D-and-D operation using a mouse may be detected instead of the D-and-D operation using a finger.

[0058] Description will be given by returning to FIG. **5**. When the D-and-D operation is detected (YES in step S**508**), the processing proceeds to step S**509**. In step S**509**, the metadata acquisition unit **307** acquires destination information corresponding to the object specified by the user. Specifically, in step S**504**, the metadata acquisition unit **307** acquires destination information included in the metadata stored in the storage unit **201**. Herein, as the destination information, the metadata acquisition unit **307** acquires address information of the shared server **106** used by the smartphone **107** owned by the imaging target **104**.

[0059] However, the configuration is not limited to the above, and metadata including the image feature information, which does not include the destination information, may be acquired in step S**504**, and metadata including the destination information may be acquired from the management apparatus **103** in step S**509**. With this configuration, a volume of communication with the management apparatus **103** can be reduced because only necessary information is acquired from the management apparatus **103**.

[0060] Then, in step S**510**, the transmission unit **306** transmits the specified content to the apparatus identified by the destination information. Herein, in step M**905**, the transmission unit **306** transmits the content **613** to the shared server **106**. Further, in step M**906**, the information processing apparatus **101** separately sends an e-mail or an SMS to notify the smartphone **107** of the information indicating that the content **613** has been transmitted to the shared server **106** and the information necessary for acquiring the content **613** from the shared server **106**. The information necessary for acquiring the content **613** from the shared server **106** may be log-in information or authentication information. Then, the smartphone **107** acquires the content **613** from the shared server **106**. Details thereof will be described below.

[0061] Further, a transmission method is not limited to the above, and if the apparatus identified by the destination information is the smartphone **107** itself, the information processing apparatus **101** may transmit the content **613** thereto by directly communicating with the smartphone **107** through wireless communication using the Wi-Fi Direct.

[0062] In addition, if the destination information is a mail address while the apparatus identified by the destination information is a mail server (not illustrated), the information processing apparatus **101** may transmit the content **613** to the mail server.

[0063] Further, if a plurality of destinations is included as the destination information, the transmission destination may be determined based on the size of the content to be transmitted. Specifically, description will be given to the case where a mail address and information about the shared server **106** are included in the metadata as the destination information. In this case, if a size of the content to be transmitted is greater than a content size attachable to a mail (e.g., 3 megabytes), the information processing apparatus **101** determines that the content is transmitted to the shared server **106**, and if the content size is the attachable size, the information processing apparatus **101** determines that the content is transmitted to the mail server. As described above, the content can be transmitted to the appropriate transmission destination.

[0064] Further, mailing software for transmitting the specified content to the apparatus identified by the destination information may be activated. In this case, when the mailing software is activated, the apparatus information is set as a destination whereas the specified content is set as an attached data. With this configuration, the content can be easily transmitted via an e-mail.

[0065] Thereafter, in step S**511**, the transmission unit **306** waits for a receiving completion notification of the content, which is transmitted from the apparatus as a transmission destination of the content in step M**909**. If the receiving completion notification is received within a predetermined time (YES in step S**511**), the processing proceeds to step S**512**. In step S**512**, the input/output unit **204** notifies the user that transmission of the content has been completed and ends the processing illustrated in FIG. **5**.

[0066] On the other hand, if the information processing apparatus **101** does not receive the receiving completion notification within a predetermined time or receives an error notification (NO in step S**511**), the processing proceeds to step S**513**. In step S**513**, the information processing apparatus **101** determines whether another destination information or transmission method exists.

[0067] More specifically, the information processing apparatus **101** determines that the other destination information exists in a case where the metadata includes a plurality of pieces of destination information while there is a destination to which transmission of the content has not yet been tried. Further, in addition to the method for transmitting the content to the mail server, in a case where a method for

transmitting the content through direct wireless communication or a method for transmitting the content to the shared server **106** is provided as a method for transmitting the content, the information processing apparatus **101** determines that the other transmission method exists. The user can previously register the above transmission methods, or information about a plurality of transmission methods can be previously included in the metadata. Furthermore, communication compliant with different communication methods can be executed according to the transmission methods.

[0068] In a case where the other destination information or transmission method exists (YES in step S**513**), the processing proceeds to step S**514**. In step S**514**, the information processing apparatus **101** selects the other destination or transmission method. Then, in step S**510**, the content is transmitted again through the other selected destination or transmission method.

[0069] On the other hand, in a case where the other destination information or transmission method does not exist (NO in step S**513**), the processing proceeds to step S**515**. In step S**515**, the input/output unit **204** notifies the user of an error indicating that transmission of the content has failed. In addition, the information processing apparatus **101** also determines that the other destination information or transmission method does not exist if transmission of the content has failed even though the information processing apparatus **101** has thoroughly tried a plurality of pieces of destination information and transmission methods. Further, in addition to displaying an error on the screen, the error may be notified through a sound, blinking of a light-emitting diode (LED), or vibrations.

[0070] With reference the flowchart in FIG. **8**, description will be given to the processing which a control unit realizes by reading and executing a program stored in a storage unit (not illustrated) included in the smartphone **107** when the smartphone **107** receives the content.

[0071] In step S**801**, the smartphone **107** receives a message relating to the content which is transmitted from the information processing apparatus **101** in step M**906**. For example, the message relating to the content may be a notification of mail reception, a notification of upload of the content in the shared server **106**, or a message including the content itself.

[0072] After receiving the message, in step S**802**, the smartphone **107** determines whether the message includes the content itself. If the message includes the content itself (YES in step S**802**), the processing proceeds to step S**805**. In step S**805**, the smartphone **107** transmits a receiving completion notification of the content to the information processing apparatus **101** serving as a transmission source of the message. Then, in step S**806**, the smartphone **107** displays the content and ends the processing illustrated in FIG. **8**.

[0073] On the other hand, if the message does not include the content itself (NO in step S**802**), the processing proceeds to step S**803**. In step S**803**, the smartphone **107** inquires of the imaging target **104** as a user whether acquisition of the content is permitted. As a result, if the user selects not to acquire the content (NO in step S**803**), the processing illustrated in FIG. **8** is ended.

[0074] On the other hand, if the user selects to acquire the content (YES in step S**803**), the processing proceeds to step S**804**. In step S**804**, the smartphone **107** executes acquisition processing of the content. Specifically, in steps M**907** and M**908**, the smartphone **107** acquires the content by receiving an e-mail and accessing the shared server **106**. In addition, the smartphone **107** may omit the inquiry in step S**803** and execute acquisition processing of the content.

[0075] After acquiring the content, in steps S**805** and M**909**, the smartphone **107** transmits the receiving completion notification of the content to the image processing apparatus **101** serving as a transmission source of the message. Then, in step S**806**, the smartphone **107** displays the content and ends the processing illustrated in FIG. **8**.

[0076] As described above, in the present exemplary embodiment, the information processing apparatus **101** recognizes the object from the captured image in real time. Then, when the user drags and drops the data saved within the information processing apparatus **101** into the recognized object, the information processing apparatus **101** transmits the dropped data to the apparatus associated with the recognized object.

[0077] With this configuration, it is possible to transmit data to an object or a user existing in an area that can be captured by the imaging unit **203** of the information processing apparatus **101** through an intuitive operation. In other words, because the data is transmitted to the apparatus corresponding to the object recognized from the image, an addressee of the data can be selected easily, and thus the convenience of the user is improved.

[0078] In the above-described exemplary embodiment, a configuration in which the content **613** is transmitted to and displayed by the smartphone **107** has been described as an example. However, for example, if the content **613** is transmitted to the printer **105**, the content **613** is printed by the printer **105**.

[0079] Further, the data to be transmitted is not limited to the content, and predetermined command data may be included therein. For example, if a shutter command is treated as transmission data and dragged and dropped into the imaging target **104**, an image-capturing operation may be executed by the smartphone **107** owned by the imaging target **104**. Further, for example, if an alarm-sounding command is treated as transmission data and dragged and dropped into the imaging target **104**, an alarm may be activated by the smartphone **107** owned by the imaging target **104**.

[0080] In the above-described exemplary embodiment, the metadata has been acquired from the management apparatus **103**. However, the exemplary embodiment is not limited to the above, and the metadata may be acquired from the wireless tag **102** or the two-dimensional barcode.

[0081] In the above-described exemplary embodiment, the information processing apparatus **101** has executed object recognition based on the image feature information. However, the exemplary embodiment is not limited to the above, and the captured image data and the image feature information may be transmitted to another server on the network similar to the management apparatus **103**, and the object recognition may be executed by the other server. In this case, the server that executes object recognition feeds back the information about a recognized object and a position to the information processing apparatus **101**. With this configuration, even if the information processing apparatus **101** has low processing capacity, it is possible to acquire a similar effect.

[0082] In the above-described exemplary embodiment, the information processing apparatus **101** has executed object

recognition based on the image feature information. However, the exemplary embodiment is not limited to the above, and recognition employing a generic object recognition method may be executed on the image. Further, in the above-described exemplary embodiment, the metadata has been acquired from the management apparatus **103**. However, the exemplary embodiment is not limited to the above, and the metadata may be previously stored in the storage unit **201**.

[0083] Further, in the above-described exemplary embodiment, the management apparatus **103** has transmitted the metadata. At this time, if the management apparatus **103** does not have metadata corresponding to the identifier information, the management apparatus **103** transmits an error notification. Then, when the information processing apparatus **101** receives the error notification, the information processing apparatus **101** notifies the user of the error and ends the processing illustrated in FIG. **5**.

[0084] Further, when the metadata is to be acquired in step S**504**, the information processing apparatus **101** may transmit the identification information of the information processing apparatus **101** or user account information to the management apparatus **103** to cause the management apparatus **103** to execute the recognition. For example, based on the identification information of the information processing apparatus **101**, the management apparatus **103** may execute control so as to provide only the metadata of the printer **105** without providing the metadata of the imaging target **104**. With this configuration, an addressee to which the metadata is to be provided can be restricted, and thus the security thereof can be improved.

[0085] Further, the management apparatus **103** and the shared server **106** according to the above-described exemplary embodiment may be configured of a cloud system configured of a plurality of apparatuses. Further, the management apparatus **103** and the shared server **106** may be configured of a single apparatus.

[0086] In the above-described exemplary embodiment, the object included in the image captured by the information processing apparatus **101** has been recognized. Instead of the above, the information processing apparatus **101** may acquire an image captured by another imaging apparatus (not illustrated) and recognize an object included in the acquired image.

[0087] In the above-described exemplary embodiment, the user has specified the object included in the image. However, the exemplary embodiment is not limited to the above, and a user's operation for specifying the object may be omitted if only one object is recognized in the image captured by the information processing apparatus **101**. With this configuration, the user can transmit the content to the object by simply capturing the object as a transmission target of the content.

[0088] Further, in a predetermined operation mode, even if a plurality of objects is recognized in the image captured by the information processing apparatus **101**, the user's operation for specifying the object may be omitted while the content is transmitted to a plurality of recognized objects. Details thereof will be omitted because the configuration is similar to the above-described configuration.

[0089] The present invention can be realized through processing in which a program for realizing one or more functions according to the above-described exemplary embodiments is supplied to a system or an apparatus via a network or a storage medium, and one or more processors in the system or the apparatus reads and executes the program. Further, the present invention can be also realized by a circuit (e.g., application specific integrated circuit (ASIC)) that realizes one or more functions.

[0090] Further, the present invention includes some effects from among one or a plurality of effects described above.

[0091] According to the present invention, it is possible to easily select an addressee of data.

Other Embodiments

[0092] Embodiment(s) of the present invention can also be realized by a computer of a system or apparatus that reads out and executes computer executable instructions (e.g., one or more programs) recorded on a storage medium (which may also be referred to more fully as a 'non-transitory computer-readable storage medium') to perform the functions of one or more of the above-described embodiment(s) and/or that includes one or more circuits (e.g., application specific integrated circuit (ASIC)) for performing the functions of one or more of the above-described embodiment(s), and by a method performed by the computer of the system or apparatus by, for example, reading out and executing the computer executable instructions from the storage medium to perform the functions of one or more of the above-described embodiment(s) and/or controlling the one or more circuits to perform the functions of one or more of the above-described embodiment(s). The computer may comprise one or more processors (e.g., central processing unit (CPU), micro processing unit (MPU)) and may include a network of separate computers or separate processors to read out and execute the computer executable instructions. The computer executable instructions may be provided to the computer, for example, from a network or the storage medium. The storage medium may include, for example, one or more of a hard disk, a random-access memory (RAM), a read only memory (ROM), a storage of distributed computing systems, an optical disk (such as a compact disc (CD), digital versatile disc (DVD), or Blu-ray Disc (BD)™), a flash memory device, a memory card, and the like.

[0093] While the present invention has been described with reference to exemplary embodiments, it is to be understood that the invention is not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

[0094] This application claims the benefit of Japanese Patent Application No. 2015-144407, filed Jul. 21, 2015, which is hereby incorporated by reference herein in its entirety.

What is claimed is:

1. An information processing apparatus comprising:

a first acquisition unit configured to acquire an image;

a recognition unit configured to recognize an object included in the image;

a specification unit configured to cause a user to specify data to be transmitted to the object recognized by the recognition unit; and

a transmission unit configured to transmit the specified data to an apparatus identified by destination information corresponding to the object, according to the specification by the specification unit.

2. The information processing apparatus according to claim 1,

wherein the specification unit causes a user to specify the object recognized by the recognition unit and the data to be transmitted, and

wherein the transmission unit transmits the specified data to the apparatus identified by the destination information corresponding to the object specified by the specification unit, according to the specification by the specification unit.

3. The information processing apparatus according to claim 1, wherein the specification unit causes a user to specify the object included in the image and the data to be transmitted by causing the user to drag the data to be transmitted into the object included in the image.

4. The information processing apparatus according to claim 1, wherein the specification unit causes a user to specify the object included in the image and the data to be transmitted by causing the user to specify the data to be transmitted and the object included in the image with a finger.

5. The information processing apparatus according to claim 1, further comprising a display unit configured to display a recognition result of the recognition by the recognition unit.

6. The information processing apparatus according to claim 5, wherein the display unit superimposes and displays the image and the recognition result.

7. The information processing apparatus according to claim 5, wherein the display unit arranges and displays the image and the data to be transmitted by the transmission unit.

8. The information processing apparatus according to claim 1, further comprising an image capture unit configured to execute image-capturing,

wherein the first acquisition unit acquires the image via the image-capturing executed by the image capture unit.

9. The information processing apparatus according to claim 1, further comprising a second acquisition unit configured to acquire the destination information corresponding to the specified object from another apparatus.

10. The information processing apparatus according to claim 9, further comprising a third acquisition unit configured to acquire identification information used for recognizing the object,

wherein the second acquisition unit acquires the destination information according to the identification information from the other apparatus.

11. The information processing apparatus according to claim 10, further comprising a fourth acquisition unit configured to acquire image feature information corresponding to the identification information,

wherein the recognition unit recognizes the object based on the image feature information.

12. The information processing apparatus according to claim 1, wherein, in a case where the transmission unit fails to transmit data through a first transmission method, the transmission unit transmits the data through a second transmission method different from the first transmission method.

13. The information processing apparatus according to claim 1,

wherein the recognition unit recognizes a plurality of objects included in the image, and

wherein the specification unit causes a user to specify one of the plurality of recognized objects.

14. The information processing apparatus according to claim 1, wherein the data is any one of image data, command data, and document data.

15. A transmission method for an information processing apparatus, the transmission method comprising:

acquiring an image;

recognizing an object included in the image;

causing a user to specify data to be transmitted to the recognized object; and

transmitting the specified data to an apparatus identified by destination information corresponding to the object, according to the specification.

16. A non-transitory computer-readable storage medium storing a program to cause a computer to execute a transmission method for an information processing apparatus, the transmission method comprising:

acquiring an image;

recognizing an object included in the image;

causing a user to specify data to be transmitted to the recognized object; and

transmitting the specified data to an apparatus identified by destination information corresponding to the object, according to the specification.

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