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(71) Applicant: HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P. [US/US]; 10300 Energy Drive, Spring, Texas 77389 (US).

(72) Inventors: CHOI, Changseok; 33 SungChon-Gil SeoChon-Gu, 06765 6th floor, Building C, S-Printing, Seoul 06765 (KR). YU, Hyunchul; 33 SungChon-Gil SeoChon-Gu, 06765 6th floor, Building C, S-Printing, Seoul 06765 (KR). PARK, Sehui; 33 SungChon-Gil SeoChon-Gu, 06765 6th floor, Building C, S-Printing, Seoul 06765 (KR).

(74) Agent: KO, Steve Sokbong et al.; HP Inc., 3390 E. Harmony Rd., Mail Stop 35, Fort Collins, Colorado 80528 (US).

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(54) Title: IMAGE FORMING OPERATION BASED ON BIOMETRIC INFORMATION

(57) Abstract: A method for an electronic apparatus includes recognizing biometric information corresponding to a user through a sensor associated with the electronic apparatus, determining whether setting information is set to perform an image forming operation related to image forming according to recognition of the first biometric information, when it is determined that the setting information is not set, setting the setting information to map, based on an input of the user, the biometric information to the image forming operation the certain image forming operation mapped to the first biometric information.

TITLE

IMAGE FORMING OPERATION BASED ON BIOMETRIC INFORMATION

BACKGROUND

[0001] When authentication information of a user is received in an image forming apparatus, the image forming apparatus may perform user authentication and perform a login to a user account. The authentication information may include an identification (ID) of the user and a password for the ID. Also, the authentication information may include biometric information of the user. The user may input a certain image forming operation command through an execution screen logged in to the user's account. The image forming apparatus may perform an image forming operation according to the certain image forming operation command.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] The disclosure may be readily understood with reference to the following detailed description and the accompanying drawings, in which reference numerals refer to structural elements.

[0003] FIG. 1 is a conceptual diagram illustrating an operation of performing a certain image forming operation mapped to biometric information when biometric information of a user is recognized in an image forming apparatus or an electronic apparatus, according to an example;

[0004] FIG. 2 is a flowchart illustrating an operation method of an image forming apparatus, according to an example;

[0005] FIG. 3 is a diagram illustrating a sensor for recognizing biometric information of a user in an image forming apparatus, according to an example;

[0006] FIG. 4 is a diagram illustrating a process of mapping and registering fingerprint information of a user to a certain image forming operation in an image forming apparatus, according to an example;

[0007] FIG. 5 is a diagram illustrating a process of guiding the execution of an image forming operation mapped to biometric information of a user when a login to an account of the user is performed according to biometric information of the user in an image forming apparatus, according to an example;

[0008] FIG. 6 is a diagram illustrating a process of mapping and registering setting information of a certain copy operation to biometric information of a user when a certain copy operation is performed according to setting information set by the user in an image forming apparatus, according to an example;

[0009] FIG. 7 is a diagram illustrating a process of executing a unique function or a custom function of a function button provided in an image forming apparatus, according to a touch input recognized by a sensor in the image forming apparatus, according to an example;

[0010] FIG. 8 is a diagram illustrating a process of mapping and registering setting information of a certain workflow to biometric information of a user when a certain workflow is performed according to setting information set by the user in an image forming apparatus, according to an example;

[0011] FIG. 9 is a diagram illustrating a process of determining an image forming operation to be performed by a user according to the way or mode in which biometric information of the user is recognized by a sensor in an image forming apparatus, according to an example;

[0012] FIG. 10 is a diagram illustrating a process of performing a copy operation or a paste operation on certain information by using biometric information of a user in an input window displayed on an image forming apparatus, according to an example;

[0013] FIG. 11 is a diagram illustrating a process of setting the setting information for performing a communication connection between an image forming apparatus and an electronic apparatus by using biometric information of a user in the image forming apparatus, according to an example;

[0014] FIG. 12 is a diagram illustrating a process in which an image forming apparatus is communicatively connected to an electronic apparatus mapped to biometric information of a user when biometric information of the user is recognized in the image forming apparatus, according to an example; and

[0015] FIG. 13 is a block diagram illustrating a configuration of an image forming apparatus according to an example.

DETAILED DESCRIPTION

[0016] The term "image forming apparatus" may refer to any type of apparatus capable of performing an image forming operation, such as a printer, a scanner, a fax machine, a multi-function printer (MFP), or a display apparatus.

[0017] An "image forming operation" may be an operation related to at least one of a print operation, a scan operation, and a fax operation. Also, the image forming operation may include an operation to be performed for a print operation, a scan operation, or a fax operation.

[0018] "Biometric information" may refer to information including the lifetime-invariant and unique biometric characteristics of each user. For example, the biometric information may be information about at least one of the fingerprint, face shape, iris retina, vein, and deoxyribonucleic acid (DNA) of each user. The biometric information may also be referred to as bio information.

[0019] Hereinafter, examples of the disclosure will be described in detail with reference to the accompanying drawings so that those of ordinary skill in the art may easily implement the examples. However, the disclosure may be implemented in various different forms and should not be construed as being limited to the examples described herein.

[0020] FIG. 1 is a conceptual diagram illustrating an operation of performing a certain image forming operation mapped to biometric information when biometric information of a user is recognized in an image forming apparatus or an electronic apparatus, according to an example.

[0021] The user may map and store the biometric information of the user to a certain image forming operation. When the biometric information of the user is recognized by an image forming apparatus 10 or electronic apparatuses 20-1 and 20-2, the image forming apparatus 10 or the electronic apparatuses 20-1 and 20-2 may perform a certain image forming operation mapped to the biometric information of the user. The image forming apparatus 10 or the

electronic apparatuses 20-1 and 202A may be mounted with a sensor capable of recognizing the biometric information of the user. For example, the sensor may include fingerprint recognition sensors 111, 121, or 131 capable of recognizing fingerprint information of the user, an iris recognition sensor, a face recognition sensor, and/or a vein recognition sensor.

[0022] The image forming apparatus 10 or the electronic apparatuses 20-1 and 20-2 may identify the biometric information of the user and the certain image forming operation mapped to the biometric information of the user from information of the user stored in a server 30. Also, the image forming apparatus 10 or the electronic apparatuses 20-1 and 20-2 may transmit the biometric information of the user and certain image forming operation information mapped to the biometric information of the user to the server 30 and request the server 30 to register the same as the information of the user.

[0023] As illustrated in FIG. 1, a first user may map an operation of transmitting/receiving a scanned document file to fingerprint information 104 of the thumb, map an operation of performing a communication connection between an image forming apparatus and an electronic apparatus to fingerprint information 102 of the index finger, map an operation of printing a certain document file to fingerprint information 103 of the middle finger, map an operation of performing a certain workflow to fingerprint information 106 of the ring finger, and map an operation of copying/pasting certain information to fingerprint information 105 of the little finger.

[0024] The image forming apparatus 10 may acquire first fingerprint information of the first user through the fingerprint recognition sensor 111 in the image forming apparatus 10. The image forming apparatus 10 may perform a login to an account of the first user based on the first fingerprint information. When a certain image forming operation is mapped to the first fingerprint information, the image forming apparatus 10 may perform the certain image forming operation based on the first fingerprint information. Based on the information of the user stored in the server, the image forming apparatus 10 may perform user authentication using the fingerprint information and identify a certain image forming operation mapped to the fingerprint information.

[0025] For example, when the fingerprint information 104 of the thumb of the first user is recognized by the fingerprint recognition sensor 111 of the image forming apparatus 10, the image forming apparatus 10 may perform an operation 114 of transmitting a scanned document file, which is mapped to the fingerprint information 104 of the thumb of the first user.

[0026] For example, when the fingerprint information 102 of the index finger of the first user is recognized by the fingerprint recognition sensor of the image forming apparatus 10, the image forming apparatus 10 may perform an operation 112 of performing a communication connection between the image forming apparatus 10 and the first electronic apparatus 20-1, which is mapped to the fingerprint information 102 of the index finger of the first user.

[0027] For example, when the fingerprint information 103 of the middle finger of the first user is recognized by the fingerprint recognition sensor 111 of the image forming apparatus 10, the image forming apparatus 10 may perform an operation 113 of printing a certain document file, which is mapped to the fingerprint information 103 of the middle finger of the first user.

[0028] For example, when the fingerprint information 106 of the ring finger of the first user is recognized by the fingerprint recognition sensor 111 of the image forming apparatus 10, the image forming apparatus 10 may perform an operation 116 of performing a certain workflow, which is mapped to the fingerprint information 106 of the ring finger of the first user.

[0029] For example, when the fingerprint information 105 of the little finger of the first user is recognized by the fingerprint recognition sensor 111 of the image forming apparatus 10, the image forming apparatus 10 may perform an operation 115 of pasting certain information, which is mapped to the fingerprint information 105 of the little finger of the first user.

[0030] Also, when each fingerprint information of the first user is recognized by the fingerprint recognition sensor 121 of the first electronic apparatus 20-1, the first electronic apparatus 20-1 may perform a certain image forming operation mapped to each fingerprint information. The certain image forming operation being an operation related to image forming may include an operation 122 of performing a communication connection between the image forming apparatus

10 and the first electronic apparatus 20-1, an operation 123 of requesting the image forming apparatus 10 to print a certain document file, an operation 124 of requesting the image forming apparatus 10 to scan a certain document file, and an operation 125 of copying certain information.

[0031] FIG. 2 is a flowchart illustrating an operation method of an image forming apparatus, according to an example.

[0032] Referring to FIG. 2, in operation 210, the image forming apparatus 10 may recognize the first biometric information of the first user through the sensor in the image forming apparatus 10.

[0033] For example, the image forming apparatus 10 may be mounted with at least one of a fingerprint recognition sensor, an iris recognition sensor, a face recognition sensor, and a vein recognition sensor.

[0034] For example, the sensor may be included in at least one button for receiving a certain command in the image forming apparatus 10. Also, the sensor may be included in at least a partial region of a touchscreen of a user interface device of the image forming apparatus 10.

[0035] For example, the sensor in the image forming apparatus 10 may include a fingerprint recognition sensor. The user interface device of the image forming apparatus 10 may display at least one user interface for receiving an input of an execution command of a certain image forming operation. The certain image forming operation may including print, scan, copy, fax transmission/reception, start, next, connect, and login. In this case, the sensor may be arranged in a region where at least one user interface is displayed. Also, the sensor may be arranged in a region where a certain input window provided in the user interface device of the image forming apparatus 10 is displayed.

[0036] In operation 220, the image forming apparatus 10 may determine whether there is first setting information set to perform a certain image forming operation according to the recognition of the first biometric information.

[0037] The image forming apparatus 10 may perform a login to the account of the first user based on the first biometric information. The image forming apparatus 10 may determine whether there is first setting information set to perform an image forming operation customized to the first user, based on the

way in which the first user presses the sensor or the position at which the first user presses the sensor.

[0038] Meanwhile, the image forming apparatus 10 may determine whether the first biometric information is mapped and stored to a certain image forming operation, through the server managing the image forming apparatus 10. Particularly, the image forming apparatus 10 may transmit the first biometric information recognized from the sensor to the server. The image forming apparatus 10 may receive information about the image forming operation mapped to the first biometric information from the server.

[0039] In operation 230, when the first setting information is determined to be not set, based on an input of the first user, the image forming apparatus 10 may map the first biometric information to a certain image forming operation and set the first setting information.

[0040] For example, when a first workflow is performed in the image forming apparatus 10, the image forming apparatus 10 may map the first workflow to the first biometric information of the first user. The image forming apparatus 10 may receive condition information of the sensor for performance of the first workflow and custom information of the first user about the first workflow. Based on the condition information and the custom information, the image forming apparatus 10 may set the first setting information for performing the first workflow when the first biometric information is recognized.

[0041] For example, the image forming apparatus 10 may display a fingerprint registration screen for recognizing and registering the fingerprint information of the user to the touchscreen of the user interface device of the image forming apparatus 10. The image forming apparatus 10 may acquire the fingerprint information of the first user through the fingerprint registration screen. The image forming apparatus 10 may set an image forming operation mapped to each fingerprint of the first user.

[0042] Also, the image forming apparatus 10 may set condition information for performing an image forming operation mapped to a first fingerprint, based on the way in which the first user presses the sensor or the position at which the first user presses the sensor. Here, the way in which the first user presses the

sensor may be determined based on at least one of the time or time period of pressing the sensor and the pressure applied to the sensor.

[0043] For example, the image forming apparatus 10 may receive a setting input for mapping, to the first biometric information, at least one of copying first information input to an input window displayed on the user interface device of the image forming apparatus 10 and pasting second information to be input to the input window. Based on the recognized biometric information of the first user, the image forming apparatus 10 may perform an operation of copying the first information to the input window or an operation of pasting the second information.

[0044] For example, the image forming apparatus 10 may receive a setting input for mapping, to the first biometric information, connection information used to communicatively connect the image forming apparatus 10 to the first electronic apparatus. Based on the setting input, the image forming apparatus 10 may set setting information for causing the image forming apparatus 10 to perform a process of communicatively connecting to the first electronic apparatus when the first biometric information is recognized.

[0045] As a particular example, when the image forming apparatus 10 is mounted with a fingerprint recognition sensor, the image forming apparatus 10 may acquire the fingerprint information of the fingers of the user and store an image forming operation mapped to each fingerprint information as shown in Table 1. Also, the image forming apparatus 10 may transmit, to the server, fingerprint information of the user and information of an image forming operation mapped to the fingerprint information. The server may register the fingerprint information of the user and the information of the image forming operation mapped to the fingerprint information, for each user as shown in Table 1.

[0046] Table 1

FINGERPRINT INFORMATION OF FIRST USER	USER AUTHENTICATION	IMAGE FORMING OPERATION MATCHED TO FINGERPRINT INFORMATION	ADDITIONAL INFORMATION
FIRST FINGERPRINT INFORMATION	ID AND PASSWORD OF FIRST USER	SCAN OPERATION	POSITION AT WHICH SCANNED DOCUMENT FILE IS STORED
SECOND	ID AND	COMMUNICATION	IP ADDRESS OF

FINGERPRINT INFORMATION	PASSWORD OF FIRST USER	CONNECTION BETWEEN IMAGE FORMING APPARATUS 10 AND ELECTRONIC APPARATUS	IMAGE FORMING APPARATUS 10, IP ADDRESS OF ELECTRONIC APPARATUS
THIRD FINGERPRINT INFORMATION	ID AND PASSWORD OF FIRST USER	PRINT OPERATION	SETTING INFORMATION OF DOCUMENT TO BE PRINTED
FOURTH FINGERPRINT INFORMATION	ID AND PASSWORD OF FIRST USER	WORKFLOW (TRANSMIT AFTER SCAN)	ELECTRONIC ADDRESS TO WHICH SCANNED DOCUMENT FILE WILL BE TRANSMITTED
FIFTH FINGERPRINT INFORMATION	ID AND PASSWORD OF FIRST USER	COPY AND PASTE CERTAIN INFORMATION	TEXT

[0047] In operation 240, when the first setting information is determined to be set, the image forming apparatus 10 may perform a certain image forming operation mapped to the first biometric information.

[0048] For example, when data related to a certain image forming operation mapped to the first biometric information is stored in the image forming apparatus 10, the image forming apparatus 10 may perform the certain image forming operation without having to request the server for the data related to the certain image forming operation.

[0049] On the other hand, when data related to a certain image forming operation mapped to the first biometric information is not stored in the image forming apparatus 10, the image forming apparatus 10 may receive the data related to the certain image forming operation from the server. The image forming apparatus 10 may perform the certain image forming operation based on the data related to the certain image forming operation.

[0050] FIG. 3 is a diagram illustrating a sensor for recognizing biometric information of the user in an image forming apparatus, according to an example.

[0051] The image forming apparatus 10 may include a sensor for recognizing the biometric information of the user. For example, when the biometric information is fingerprint information, the image forming apparatus 10 may be mounted with a sensor capable of recognizing the fingerprint of the user.

[0052] Referring to an image 310 of FIG. 3, a fingerprint recognition sensor may be mounted in a partial region 312 on a touchscreen 311 of the user interface

device of the image forming apparatus 10. When the user puts a finger, the fingerprint information of which is registered, on the partial region 312, the fingerprint recognition sensor may acquire the fingerprint information of the user. In the image 310 of FIG. 3, the fingerprint recognition sensor may be arranged in the partial region 312 of the touchscreen 311; however, it may be arranged in another region of the touchscreen 311 or may be arranged in an entire region of the touchscreen 311.

[0053] Referring to an image 320 of FIG. 3, the user interface device of the image forming apparatus 10 may display a button 321 for providing a copy function on the touchscreen. In this case, a fingerprint recognition sensor may be arranged in a region where the button 321 is located. Also, a fingerprint recognition sensor may be arranged in a region near the region where the button 321 is located.

[0054] Referring to an image 330 of FIG. 3, the image forming apparatus 10 may include a plurality of buttons for receiving a certain command on the outside of the image forming apparatus 10. In this case, a fingerprint recognition sensor may be arranged in a shortcut button 331 for executing a certain operation, such as a copy button or a scan button. For example, when a fingerprint recognition sensor is arranged in a scan button, the image forming apparatus 10 may recognize the fingerprint information of the user through the scan button. Based on the recognized fingerprint information, the image forming apparatus 10 may identify the user and perform a scan operation on a certain document. That is, the image forming apparatus 10 may perform user authentication through the fingerprint information of the user and perform an image forming operation mapped to the fingerprint information at one time.

[0055] FIG. 4 is a diagram illustrating a process of mapping and registering fingerprint information of the user to a certain image forming operation in an image forming apparatus, according to an example.

[0056] Referring to an image 410 of FIG. 4, the image forming apparatus 10 may display a fingerprint registration screen for recognizing and registering the fingerprint information of the user to the touchscreen of the user interface device of the image forming apparatus 10. The image forming apparatus 10 may

display a palm-shaped region for the user to put on the touchscreen in order to recognize the fingerprint information of the user. For example, a fingerprint recognition sensor may be arranged in the palm-shaped region displayed on the touchscreen.

[0057] For example, the first user may put the spread palms of both hands on the palm-shaped region displayed on the touchscreen. When the fingerprint of the first user is recognized by the fingerprint recognition sensor, the image forming apparatus 10 may display a message for informing that the fingerprint recognition is completed. The first user may set an image forming operation mapped to the fingerprint of each finger.

[0058] As illustrated in the image 410 of FIG. 4, the image forming apparatus 10 may receive an input for mapping the fingerprint of the first finger of the first user to an operation 411 of receiving/transmitting a scanned file, an input for mapping the fingerprint of the second finger to an operation 412 of performing a communication connection between the image forming apparatus 10 and a certain electronic apparatus, an input for mapping the fingerprint of the third finger to an operation 413 of receiving/transmitting a printed file, an input for mapping the fingerprint of the fourth finger to an operation 414 of transmitting a scanned file to me, and an input for mapping the fingerprint of the fifth finger to an operation 415 of copying/pasting a certain character string. The image forming apparatus 10 may set an image forming operation mapped to the fingerprint of each finger and register the set information.

[0059] Referring to an image 420 of FIG. 4, the image forming apparatus 10 may receive an input for selecting a certain finger. The image forming apparatus 10 may display an input window for receiving detailed setting information of an image forming operation mapped to the certain finger. The image forming apparatus 10 may register the setting information of the image forming operation mapped to the certain finger, based on the information input to the input window.

[0060] For example, the image forming apparatus 10 may receive an input for selecting the second finger. The image forming apparatus 10 may display an input window 421 for receiving detailed setting information of the operation 412

of performing a communication connection between the image forming apparatus 10 and the certain electronic apparatus. As a particular example, the image forming apparatus 10 may receive Internet Protocol (IP) address information about the image forming apparatus 10 and IP address information about a laptop computer.

[0061] FIG. 5 is a diagram illustrating a process of guiding the execution of an image forming operation mapped to the biometric information of the user when the login to the account of the user is performed according to the biometric information of the user in an image forming apparatus, according to an example.

[0062] Referring to an image 510 of FIG. 5, the image forming apparatus 10 may recognize the first biometric information of the first user through the sensor and perform a login to the account of the first user. The image forming apparatus 10 may determine whether there is first setting information set to perform a certain image forming operation according to the recognition of the first biometric information.

[0063] For example, the first fingerprint information of the first user may be mapped and stored to an operation of printing a certain file. Setting information about the first fingerprint information of the first user may be information set to perform an operation of printing a certain file when the first fingerprint information is recognized. Referring to an image 520 of FIG. 5, when the login to the account of the first user is performed through the authentication of the first fingerprint information of the first user in the image forming apparatus 10, the image forming apparatus 10 may display a message 521 for guiding a print operation on a certain file.

[0064] As another example, the first fingerprint information of the first user may be mapped and stored to an operation of scanning a certain file and transmitting the same to the first user. The setting information about the first fingerprint information of the first user may be information set to perform an operation of scanning a certain file and transmitting the same to the first user when the first fingerprint information is recognized. Referring to an image 530 of FIG. 5, when the login to the account of the first user is performed through the authentication of the first fingerprint information of the first user in the image forming apparatus

10, the image forming apparatus 10 may display a message 531 for guiding an operation of scanning a certain file and transmitting the same to the first user. Particularly, the message 531 may also include a message for requesting selection of a file to be scanned.

[0065] As another example, the first fingerprint information of the first user may be mapped and stored to an operation of performing a communication connection between the image forming apparatus 10 and a certain electronic apparatus. The setting information about the first fingerprint information of the first user may be information set to perform an operation of performing a communication connection between the image forming apparatus 10 and the certain electronic apparatus when the first fingerprint information is recognized. Referring to an image 540 of FIG. 5, when the login to the account of the first user is performed through the authentication of the first fingerprint information of the first user in the image forming apparatus 10, the image forming apparatus 10 may display a message 541 for guiding an operation of performing a communication connection between the image forming apparatus 10 and the certain electronic apparatus.

[0066] FIG. 6 is a diagram illustrating a process of mapping and registering the setting information of a certain copy operation to the biometric information of the user when the certain copy operation is performed according to the setting information set by the user in an image forming apparatus, according to an example.

[0067] Referring to an image 610 of FIG. 6, a first copy operation on a certain document may be performed in the image forming apparatus 10. When the first copy operation is completed, the image forming apparatus 10 may display a message for informing that the first copy operation is completed. In this case, the image forming apparatus 10 may display setting information 611 set in the first copy operation. The image forming apparatus 10 may display a message for proposing to map and register the fingerprint information to the first copy operation. For example, a message for proposing to map and register the first copy operation to the fingerprint information may be automatically displayed when the first copy operation is completed, or may be displayed when the first

user presses a fingerprint recognition sensor for more than a certain time. The first user may put his/her finger on a fingerprint recognition sensor 612. The fingerprint recognition sensor 612 may recognize the fingerprint information of the finger of the first user.

[0068] Referring to an image 620 of FIG. 6, the image forming apparatus 10 may display an execution screen for mapping and registering the fingerprint information of the first user to the first copy operation. For example, based on an input of the first user, the image forming apparatus 10 may map the fingerprint information of the index finger of the right hand to the first copy operation.

[0069] An icon 621 corresponding to the setting information 611 set in the first copy operation may be displayed on the execution screen displayed on the image forming apparatus 10. When the image forming apparatus 10 receives an input for selecting the icon 621, the image forming apparatus 10 may display detailed information 622 of the setting information 611 set in the first copy operation. For example, the detailed information may include information in which "10 copies of a mono type" is set. Also, the image forming apparatus 10 may provide an interface for modifying the detailed information 622. The first user may modify the detailed information 622 of the first copy operation while mapping the first copy operation to the fingerprint information of the index finger of the first user.

[0070] FIG. 7 is a diagram illustrating a process of executing a unique function or a custom function of a function button provided in an image forming apparatus according to a touch input recognized by a sensor in the image forming apparatus, according to an example.

[0071] The image forming apparatus 10 may set condition information for performing an image forming operation mapped to a certain fingerprint, based on the way in which the user presses the fingerprint recognition sensor or the position at which the user presses the fingerprint recognition sensor.

[0072] Here, the way in which the user presses the fingerprint recognition sensor may be determined based on at least one of the time while the user presses the

fingerprint recognition sensor and the pressure which the user applies to the fingerprint recognition sensor.

[0073] The image forming apparatus 10 may set setting information for "performing an image forming operation mapped to a certain fingerprint when first condition information is input through the fingerprint recognition sensor".

[0074] For example, the first condition information may be information about the condition under which the user presses the fingerprint recognition sensor according to the way preset in the fingerprint recognition sensor. As a particular example, the first condition information may be information about the condition under which the user presses the fingerprint recognition sensor for more than a certain time.

[0075] Referring to an image 710 of FIG. 7, the first user may touch a copy operation button including a fingerprint recognition sensor for a time not exceeding a certain time (for example, normal touch 711). In this case, the image forming apparatus 10 may make one copy of a certain file according to a unique function of the copy operation button. Here, the unique function of the copy operation button may be a function of performing a copy operation uniformly regardless of the fingerprint information of the user even when a certain user presses the copy operation button.

[0076] Referring to an image 720 of FIG. 7, the first user may touch a copy operation button including a fingerprint recognition sensor for a time exceeding a certain time (for example, long touch 721). In this case, the image forming apparatus 10 may make ten copies of a certain file according to a custom function of the copy operation button. Here, the custom function of the copy operation button may be a function of performing a copy operation mapped and customized to the fingerprint information of the first user.

[0077] As another example, when a fingerprint recognition sensor is mounted in a partial region of a button for receiving a certain command in the image forming apparatus 10, the first condition information may be information about the condition under which the user presses a partial region in the button where the fingerprint recognition sensor is located.

[0078] When the first user presses a region in the button where the fingerprint recognition sensor is not mounted, the image forming apparatus 10 may perform a unique function of the button. When the first user presses a region in the button where the fingerprint recognition sensor is mounted, the image forming apparatus 10 may perform a custom function of the button mapped to the fingerprint of the first user.

[0079] FIG. 8 is a diagram illustrating a process of mapping and registering the setting information of a certain workflow to the biometric information of the user when the certain workflow is performed according to the setting information set by the user in an image forming apparatus, according to an example.

[0080] Referring to an image 810 of FIG. 8, the image forming apparatus 10 may display a preparation screen for performing a first workflow of "scanning a certain document and transmitting a file of the scanned document to a preset email address". In this case, the image forming apparatus 10 may display setting information 811 set in the first workflow. The first user may identify the setting information 811 and press a scan button 812 displayed in the preparation screen. When the image forming apparatus 10 receives an input for pressing the scan button 812, it may perform the first workflow according to the setting information 811.

[0081] Referring to an image 820 of FIG. 8, the image forming apparatus 10 may display an execution screen for mapping and registering the fingerprint information of the first user to the first workflow. For example, based on an input of the first user, the image forming apparatus 10 may map the fingerprint information of the index finger of the left hand to the first workflow.

[0082] The image forming apparatus 10 may display detailed information 821 of the setting information 811 set in the first workflow. For example, the detailed information 821 may include information about a scan operation, an email address to which a scanned file is to be transmitted, whether to perform color scanning, resolution, and whether to perform duplex scanning. Also, the image forming apparatus 10 may provide an interface for modifying the detailed information 821.

[0083] FIG. 9 is a diagram illustrating a process of determining an image forming operation to be performed by the user according to the way in which the biometric information of the user is recognized by a sensor in an image forming apparatus, according to an example.

[0084] Referring to an image 910 of FIG. 9, the image forming apparatus 10 may display an icon of a certain service provided by the image forming apparatus 10, on the touchscreen of the user interface device. For example, the image forming apparatus 10 may display a copy icon, a scan icon, a print icon, and a fax icon. The image forming apparatus 10 may receive an input for selecting the copy icon. Then, the image forming apparatus 10 may display a copy execution button 911 on the touchscreen of the user interface device. A fingerprint recognition sensor may be arranged in a region of the copy execution button 911. Based on an input of the first user, the image forming apparatus 10 may set setting information for "performing a first custom copy operation mapped to the first fingerprint information of the first user when the fingerprint information of the first user is recognized by pressing the copy execution button 911 for 2 seconds". For example, the first custom copy operation may be a duplex copy or a copy of two pages per output page.

[0085] Referring to an image 920 of FIG. 9, the image forming apparatus 10 may display a copy execution button 921 on the touchscreen of the user interface device. For example, the region of the copy execution button 921 may be wider than the region of the copy execution button 911. A fingerprint recognition sensor may be located in an edge region in the region of the copy execution button 921. Based on an input of the first user, the image forming apparatus 10 may set setting information for "performing a second custom copy operation mapped to the first fingerprint information of the first user when the fingerprint information of the first user is recognized in the copy execution button 921 based on a swipe-touch". For example, the second custom copy operation may be a simplex copy, a color copy, or a copy of one page per output page. The swipe-touch may be a touch for swiping to a second region where the fingerprint recognition sensor is located, while maintaining touching and contacting a first region of the copy execution button 921.

[0086] FIG. 10 is a diagram illustrating a process of performing a copy operation or a paste operation on certain information by using the biometric information of the user in an input window displayed on an image forming apparatus, according to an example.

[0087] Referring to an image 1010 of FIG. 10, the image forming apparatus 10 may display an input window 1011 for inputting an electronic address to which a scanned electronic document file of a certain document will be transmitted. The first user may directly input a first electronic address to the input window. Also, the first user may perform an operation of pasting the first electronic address to the input window 1011 based on the fingerprint information of the first user.

[0088] For example, the image forming apparatus 10 may receive an input for pressing the input window 1011 for a certain time or more. When the input window 1011 is pressed for a certain time or more, the fingerprint information of the first user may be recognized from a fingerprint recognition sensor arranged in the input window 1011. The image forming apparatus 10 may display a message 1012 for selecting a copy operation or a paste operation mapped to the fingerprint information of the first user. For example, the copy operation mapped to the fingerprint information may be an operation of mapping a certain phrase input into the input window 1011 to the fingerprint information of the first user and storing the same in a memory. For example, the paste operation mapped to the fingerprint information may be an operation of reading a certain phrase mapped to the fingerprint information of the first user from the memory and inputting the same into the input window 1011.

[0089] The image forming apparatus 10 may receive an input for selecting the paste operation in the message 1012. The image forming apparatus 10 may read the first electronic address mapped to the fingerprint information of the first user from the memory of the image forming apparatus 10 and input the first electronic address into the input window 1011.

[0090] FIG. 11 is a diagram illustrating a process of setting the setting information for performing a communication connection between an image forming apparatus and an electronic apparatus by using the biometric information of the user in the image forming apparatus, according to an example.

[0091] Referring to an image 1110 of FIG. 11, the image forming apparatus 10 may display a message for guiding the user to put a finger on a fingerprint recognition sensor. When the first user puts a finger of the first user on the fingerprint recognition sensor, the fingerprint recognition sensor may acquire the fingerprint information of the first user.

[0092] The first user may register a first electronic apparatus as an electronic apparatus capable of being connected to the image forming apparatus 10. Particularly, the image forming apparatus 10 may receive an input for selecting the first electronic apparatus as an electronic apparatus capable of being connected to the image forming apparatus 10. The image forming apparatus 10 may map the first electronic apparatus to the fingerprint information of the first user. The image forming apparatus 10 may receive connection information used for communication connection between the image forming apparatus 10 and the first electronic apparatus. For example, the image forming apparatus 10 may acquire the connection information including the IP address of the first electronic apparatus and the name of the first electronic apparatus, based on an input of the first user.

[0093] Referring to an image 1120 of FIG. 11, the image forming apparatus 10 may map and store connection information 1122 used for communication connection between the image forming apparatus 10 and the first electronic apparatus to the fingerprint information of the first user. Particularly, a fingerprint recognition sensor 1121 may again acquire the fingerprint information of the first user and determine whether it matches the previously-acquired fingerprint information of the first user. When the two pieces of fingerprint information acquired by the fingerprint recognition sensor 1121 match each other, the image forming apparatus 10 may map and store the connection information 1122 used for communication connection between the image forming apparatus 10 and the first electronic apparatus to the fingerprint information of the first user. That is, the image forming apparatus 10 may set setting information for "causing the image forming apparatus 10 to perform a process of communicatively connecting to the first electronic apparatus when the first biometric information is recognized in the image forming apparatus 10".

[0094] FIG. 11 illustrates a process of setting the setting information for performing a communication connection between the image forming apparatus 10 and an electronic apparatus by using the biometric information of the user in the image forming apparatus 10, and the process may also be similarly applied to the electronic apparatus.

[0095] FIG. 12 is a diagram illustrating a process in which an image forming apparatus is communicatively-connected to an electronic apparatus mapped to the biometric information of the user when the biometric information of the user is recognized in the image forming apparatus, according to an example.

[0096] The first user may input an input for requesting a communication connection between the image forming apparatus 10 and the first electronic apparatus into the image forming apparatus 10 in order to connect to the first electronic apparatus.

[0097] Referring to an image 1210 of FIG. 12, the image forming apparatus 10 may display a message for guiding the user to put a finger on a fingerprint recognition sensor. When the first user puts a finger of the first user on the fingerprint recognition sensor, the fingerprint recognition sensor may acquire the fingerprint information of the first user.

[0098] Referring to an image 1220 of FIG. 12, the image forming apparatus 10 may display a message 1222 for inquiring whether to connect the first electronic apparatus mapped to the fingerprint information of the first user to the image forming apparatus 10. The image forming apparatus 10 may receive an input for selecting a confirmation (OK) in the message 1222. The image forming apparatus 10 may acquire the fingerprint information of the first user through a fingerprint recognition sensor 1121. When the fingerprint information of the first user matches the prestored fingerprint information, the image forming apparatus 10 may perform a communication connection between the image forming apparatus 10 and the first electronic apparatus.

[0099] FIG. 12 illustrates a process in which the image forming apparatus 10 is communicatively-connected to an electronic apparatus mapped to the biometric information of the user when the biometric information of the user is recognized

in the image forming apparatus 10, and the process may also be similarly applied to the electronic apparatus.

[00100] FIG. 13 is a block diagram illustrating a configuration of an image forming apparatus according to an example.

[00101] The image forming apparatus 10 illustrated in FIG. 13 may include a communication device 1310, a user interface device 1320, a sensor 1330, a memory 1340, and a processor 1350. The image forming apparatus 10 may be implemented by more components than the illustrated components, or may be implemented by less components than the illustrated components. The above components will be described below.

[00102] The communication device 1310 may communicate with an external apparatus. Particularly, the communication device 1310 may be connected to a network by wire or wireless to communicate with an external apparatus. Here, the external apparatus may include an electronic apparatus, a server, a smart phone, a tablet, a personal computer (PC), a home appliance, a medical apparatus, a camera, or a wearable device. The communication device 1310 may include a communication module that supports one of various wired/wireless communication methods. For example, the communication module may be in the form of a chipset, or may be a sticker/barcode including information necessary for communication (e.g., a sticker including a Near Field Communication (NFC) tag). Also, the communication module may include a short-range communication module or a wired communication module.

[00103] The communication device 1310 may support, for example, at least one of wireless Local Area Network (LAN), Wireless Fidelity (Wi-Fi), Wi-Fi Direct, Bluetooth, Universal Serial Bus (USB), wired LAN, and Near Field Communication (NFC).

[00104] The user interface device 1320 may include an input unit for receiving an input for controlling an operation of the image forming apparatus 10 from the user and an output unit for displaying information such as the result of the operation of the image forming apparatus 10 or the state of the image forming apparatus 10. For example, the user interface device 1320 may include an

operation panel for receiving a user input and/or a display panel for displaying a screen.

[00105] Particularly, for example, the input unit may include devices capable of receiving various types of user inputs, such as a keyboard, a physical button, a touchscreen, a camera, or a microphone. Also, for example, the output unit may include a display panel or a speaker. However, the disclosure is not limited thereto, and the user interface device 1320 may include any devices supporting various input/outputs.

[00106] The sensor 1330 may recognize the biometric information of the user. The sensor 1330 may include, for example, a fingerprint recognition sensor capable of recognizing the fingerprint information of the user, an iris recognition sensor, a face recognition sensor, and/or a vein recognition sensor.

[00107] Also, the sensor 1330 may be included in at least one button for receiving a certain command in the image forming apparatus 10. Also, the sensor 1330 may be included in at least a partial region of the touchscreen of the user interface device 1320 of the image forming apparatus 10.

[00108] The sensor 1330 may be a fingerprint recognition sensor. The user interface device 1320 may display at least one user interface for receiving an input of an execution command of a certain image forming operation. The certain image forming operation may including print, scan, copy, fax transmission/reception, start, next, connect, and login. In this case, the sensor 1330 may be arranged in a region where at least one user interface is displayed. Also, the sensor may be arranged in a region where a certain input window provided in the user interface device 1320 is displayed.

[00109] The memory 1340 may store programs, data, or files related to the image forming apparatus 10. The processor 1350 may execute a program stored in the memory 1340, read data or files stored in the memory 1340, or store a new file in the memory 1340. The memory 1340 may store program commands, data files, data structures, and the like alone or in combination. The memory 1340 may store instructions executable by the processor 1350.

[00110] The processor 1350 may control an overall operation of the image forming apparatus 10, and may include at least one processor such as a central

processing unit (CPU). The processor 1350 may control other components included in the electronic apparatus to perform an operation corresponding to a user input received through the user interface device 1320. The processor 1350 may include at least one specialized processor corresponding to each function, or may be a processor in the form of a single integral unit.

[00111] The processor 1350 may recognize the first biometric information of the first user through the sensor 1330. For example, the image forming apparatus 10 may recognize the first biometric information of the first user through at least one of a fingerprint recognition sensor, an iris recognition sensor, a face recognition sensor, and a vein recognition sensor.

[00112] The processor 1350 may determine whether there is first setting information set to perform a certain image forming operation according to the recognition of the first biometric information.

[00113] The processor 1350 may perform a login to the account of the first user based on the first biometric information. The processor 1350 may determine whether there is first setting information set to perform an image forming operation customized to the first user, based on the way in which the first user presses the sensor 1330 or the position at which the first user presses the sensor 1330.

[00114] Meanwhile, the processor 1350 may determine whether the first biometric information is mapped and stored to a certain image forming operation, through the server managing the image forming apparatus 10. Particularly, the processor 1350 may transmit the first biometric information recognized by the sensor 1330 to the server through the communication device 1310. The image forming apparatus 10 may receive information about the image forming operation mapped to the first biometric information from the server through the communication device 1310.

[00115] When the first setting information is determined to be not set, based on an input of the first user, the processor 1350 may map the first biometric information to a certain image forming operation and set the first setting information.

[00116] For example, when a first workflow is performed in the image forming apparatus 10, the processor 1350 may map the first workflow to the first biometric information of the first user. The processor 1350 may receive condition information of the sensor 1330 for performance of the first workflow and custom information of the first user about the first workflow. Based on the condition information and the custom information, the processor 1350 may set the first setting information for performing the first workflow when the first biometric information is recognized.

[00117] For example, the processor 1350 may display a fingerprint registration screen for recognizing and registering the fingerprint information of the user to the touchscreen of the user interface device 1320. The processor 1350 may acquire the fingerprint information of the first user through the fingerprint registration screen. The processor 1350 may set an image forming operation mapped to each fingerprint of the first user.

[00118] Also, the processor 1350 may set condition information for performing an image forming operation mapped to a first fingerprint, based on the way in which the first user presses the sensor 1330 or the position at which the first user presses the sensor 1330. Here, the way in which the first user presses the sensor 1330 may be determined based on at least one of the time of pressing the sensor 1330 and the pressure applied to the sensor 1330.

[00119] For example, the processor 1350 may receive a setting input for mapping, to the first biometric information, at least one of copying the first information input to the input window displayed on the user interface device 1320 of the image forming apparatus 10 and pasting the second information to be input to the input window. Based on the recognized biometric information of the first user, the processor 1350 may perform an operation of copying the first information to the input window or an operation of pasting the second information.

[00120] For example, the processor 1350 may receive, through the user interface device 1320, a setting input for mapping, to the first biometric information, connection information used to communicatively connect the image forming apparatus 10 to the first electronic apparatus. Based on the setting

input, the processor 1350 may set setting information for causing the image forming apparatus 10 to perform a process of communicatively connecting to the first electronic apparatus when the first biometric information is recognized.

[00121] As a particular example, when the image forming apparatus 10 is mounted with a fingerprint recognition sensor 1330, the fingerprint recognition sensor 1330 may acquire the fingerprint information of the fingers of the user and the processor 1350 may store an image forming operation mapped to each fingerprint information. Also, the processor 1350 may transmit, to the server through the communication device 1310, the fingerprint information of the user and information of the image forming operation mapped to the fingerprint information. The server may register the fingerprint information of the user and the information of the image forming operation mapped to the fingerprint information, for each user.

[00122] When the first setting information is determined to be set, the processor 1350 may perform a certain image forming operation mapped to the first biometric information.

[00123] For example, when data related to the certain image forming operation mapped to the first biometric information is stored in the image forming apparatus 10, the processor 1350 may perform the certain image forming operation without having to request the server for the data related to the certain image forming operation.

[00124] On the other hand, when data related to the certain image forming operation mapped to the first biometric information is not stored in the image forming apparatus 10, the processor 1350 may receive the data related to the certain image forming operation from the server through the communication device 1310. The processor 1350 may perform the certain image forming operation based on the data related to the certain image forming operation.

[00125] Meanwhile, the above operation method of the image forming apparatus 10, the electronic apparatus 20, and the server 30 may be implemented in the form of a computer-readable storage medium storing data or instructions executable by a computer or a processor. It may be written as a program executable in a computer and may be implemented in a general-purpose digital

computer that operates the program by using a computer-readable storage medium. The computer-readable storage medium may be Read-Only Memory (ROM), Random-Access Memory (RAM), flash memory, Compact Disk Read-Only Memory (CD-ROM), Compact Disk Recordable (CD-R), CD+R, Compact Disk Rewritable (CD-RW), CD+RW, Digital Versatile Disk Read-Only Memory (DVD-ROM), Digital Versatile Disk Recordable (DVD-R), DVD+R, Digital Versatile Disk Rewritable (DVD-RW), DVD+RW, Digital Versatile Disk Random-Access Memory (DVD-RAM), Blu-ray Disk Read-Only Memory (BD-ROM), Blu-ray Disk Recordable (BD-R), Blu-ray Disk Recordable Low to High (BD-R LTH), Blu-ray Disk Recordable Erasable (BD-RE), magnetic tapes, floppy disks, magneto-optical data storages, optical data storages, hard disks, Solid-State Disk (SSD), or any device that may store machine-readable instructions, related data, data files, and data structures and may provide machine-readable instructions, related data, data files, and data structures to a processor or computer to enable the processor or computer to execute instructions.

[00126] While the disclosure has been described with reference to the drawings and particular examples, those of ordinary skill in the art may make various changes and modifications therein without departing from the spirit and scope of the disclosure. For example, the described techniques may be performed in a different order than the described method, and/or the described components such as systems, structures, devices, and circuits may be united or combined in a different form than the described method or may be replaced or substituted by other components or equivalents thereof.

[00127] Therefore, the scope of the disclosure should not be limited to the described examples and should be defined by the following claims and equivalents thereof.

WHAT IS CLAIMED IS:

1. An operation method for an electronic apparatus, the method comprising:

recognizing biometric information corresponding to a user through a sensor associated with the electronic apparatus;

determining whether setting information is set to perform an image forming operation related to image forming according to the recognizing of the biometric information;

when determined that the setting information is not set, setting the setting information to map, based on an input of the user, the biometric information to the image forming operation to perform the image forming operation mapped to the biometric information.

2. The operation method of claim 1, wherein the sensor is included in at least one button to receive a command associated with the electronic apparatus, or is included in at least a partial region of a touchscreen of a user interface device associated with the electronic apparatus.

3. The operation method of claim 1, wherein the determining whether the setting information is set includes:

performing a login to an account corresponding to the user based on the biometric information; and

determining whether the setting information is set to perform the image forming operation corresponding to the user, based on a mode in which the user presses the sensor, or a position at which the user presses the sensor.

4. The operation method of claim 1, wherein the setting of the setting information includes:

when a workflow of the image forming operation is performed in the electronic apparatus, mapping the workflow to the biometric information of the user;

receiving condition information of the sensor to perform the workflow and custom information corresponding to the user associated with the workflow; and based on the condition information and the custom information, setting the setting information to perform the workflow of the image forming operation when the biometric information is recognized.

5. The operation method of claim 1, wherein the setting of the setting information includes:

displaying a fingerprint recognition screen to acquire and register a fingerprint of the user to register fingerprint information of the user as the biometric information of the user, on a touchscreen of a user interface device corresponding to the electronic apparatus;

when the fingerprint information includes a plurality of fingerprints, acquiring fingerprint information corresponding to a finger of the user through the fingerprint recognition screen; and

setting an image forming operation mapped to each acquired fingerprint.

6. The method of claim 5, wherein the setting of the image forming operation mapped to each acquired fingerprint includes setting condition information to perform an image forming operation mapped to each acquired fingerprint, based on a mode in which the user presses the sensor, or a position at which the user presses the sensor.

7. The operation method of claim 6, wherein the mode in which the user presses the sensor is determined based on one or more modes of a time period for which the sensor is pressed, or a pressure applied to the sensor.

8. The operation method of claim 1, wherein the setting the setting information based on the input of the user includes receiving a setting input to map, to the biometric information, as the image forming operation, at least one of

copying first information input to an input window displayed on a user interface device corresponding to the image forming apparatus and
pasting second information to the input window.

9. The operation method of claim 1, wherein the setting the setting information based on the input of the user includes:

receiving a setting input to map, to the biometric information, connection information used to communicatively connect the electronic apparatus to an electronic apparatus; and

setting, based on the setting input, setting information to perform a process of communicatively connecting the electronic apparatus to the electronic apparatus when the biometric information is recognized.

10. The operation method of claim 1, wherein the determining whether the setting information set to perform the image forming operation mapped to the recognized biometric information includes determining, through a server managing the electronic apparatus, whether the biometric information is mapped to the image forming operation and stored, and

the performing the image forming operation mapped to the biometric information includes performing the image forming operation based on data associated with the image forming operation received from the server.

11. computer-executable instructions stored in a non-transitory storage medium in combination with an electronic apparatus, the computer-executable instructions, when executed, to cause:

recognizing biometric information corresponding to a user through a sensor associated with the electronic apparatus;

determining whether setting information is set to perform an image forming operation related to image forming according to the recognizing of the biometric information;

when determined that the setting information is not set, setting the setting information to map, based on an input of the user, the biometric information to

the image forming operation to perform image forming operation mapped to the biometric information.

12. An electronic apparatus comprising:

a communication device;

a user interface device;

a sensor to recognize biometric information associated with a user;

a processor; and

a memory storing instructions executable by the processor,

wherein the processor is to execute the instructions to:

acquire the biometric information associated with a user recognized through the sensor;

determine whether setting information is set to perform an image forming operation related to image forming according to the processor acquiring the biometric information;

when determined that the setting information is not set, set the setting information to map, based on an input of the user, the biometric information to the image forming operation to perform the image forming operation mapped to the biometric information.

13. The electronic apparatus of claim 12, wherein the processor is to execute the instructions to cause:

when a workflow of the image forming operation is performed in the electronic apparatus, map the workflow to the biometric information of the user;

receive condition information of the sensor to perform of the workflow and custom information corresponding to the user associated with the workflow; and

based on the condition information and the custom information, set the setting information to perform the workflow of the image forming operation when the biometric information is recognized.

14. The electronic apparatus of claim 12, wherein the processor is to execute the instructions to cause:

display a fingerprint recognition screen to acquire and register a fingerprint of the user to acquire fingerprint information of the user as the biometric information of the user, on a touchscreen of the user interface device corresponding to the electronic apparatus;

when the fingerprint information includes a plurality of fingerprints, acquire the fingerprint information corresponding to a finger of the user through the fingerprint recognition screen; and

set an image forming operation mapped to each acquired fingerprint.

15. The electronic apparatus of claim 12, wherein

the user interface device displays at least one user interface to receive an input of an execution command of the image forming operation,

the sensor includes a fingerprint recognition sensor, and

the fingerprint recognition sensor is arranged in a region where the at least one user interface is displayed or in a region where a certain input window provided in the user interface device is displayed.

FIG. 1

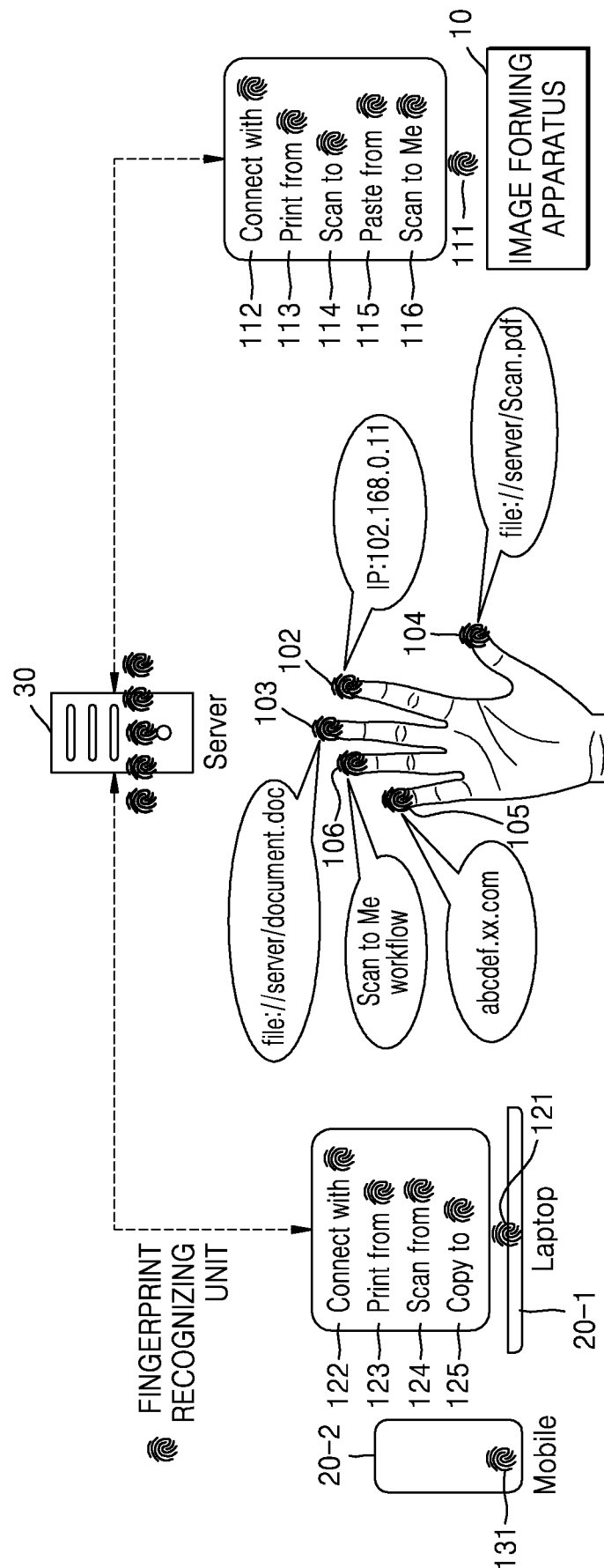


FIG. 2

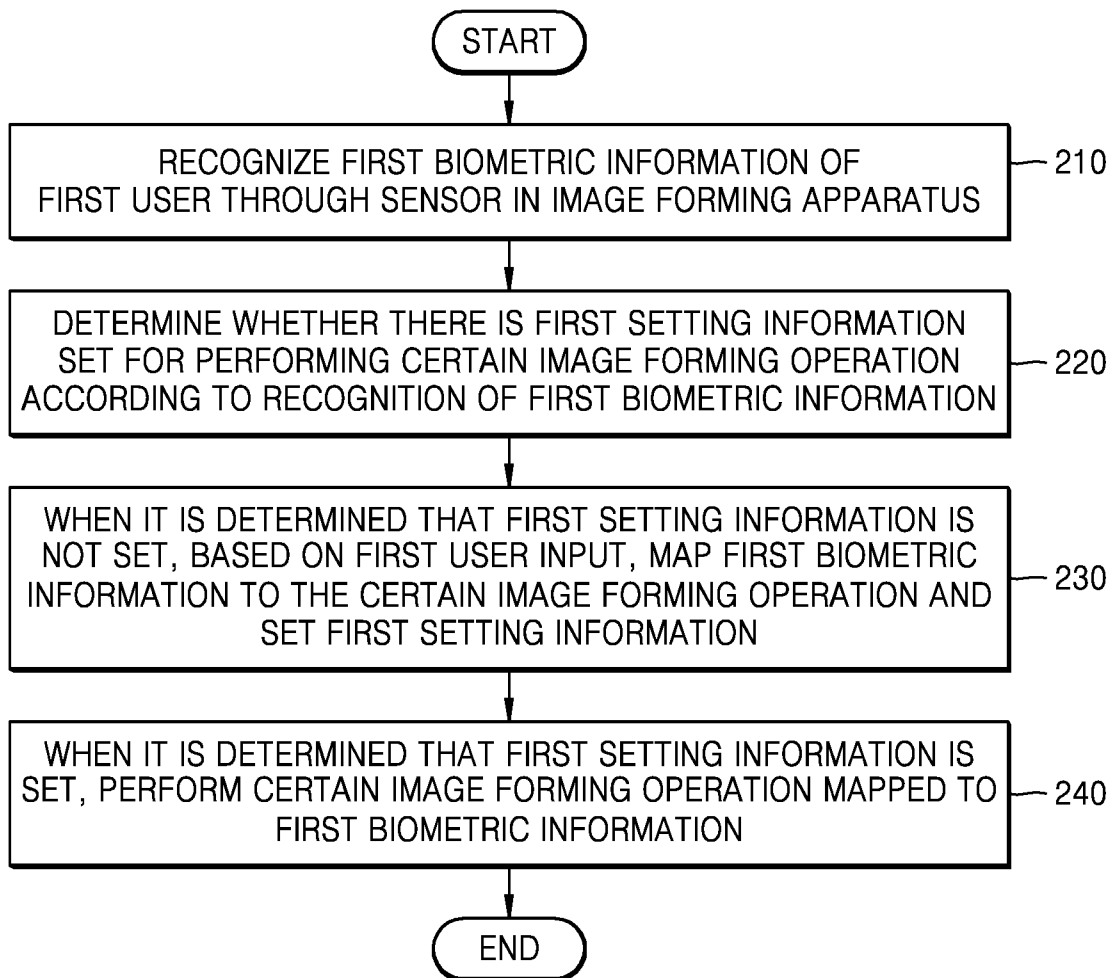


FIG. 3

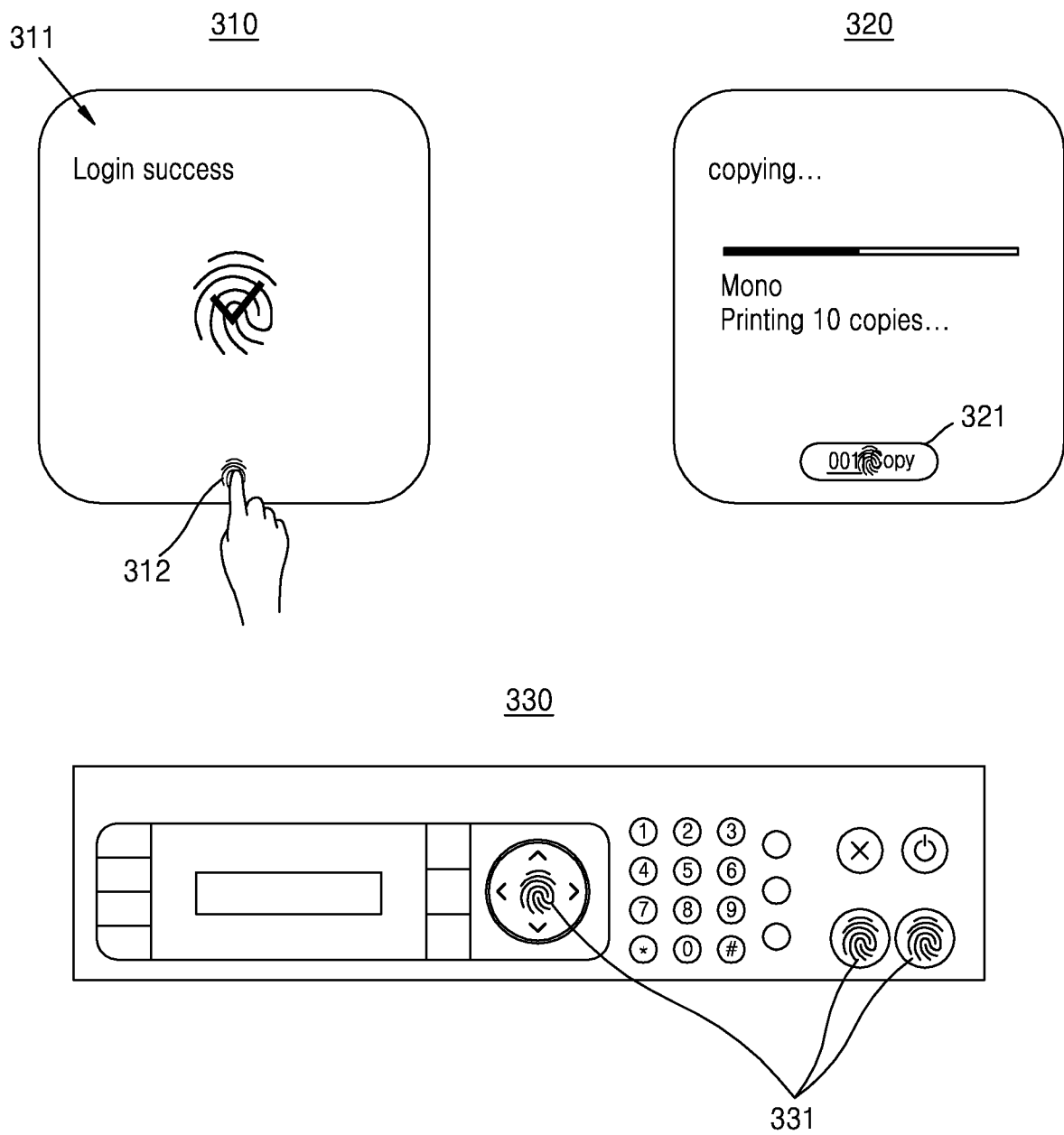
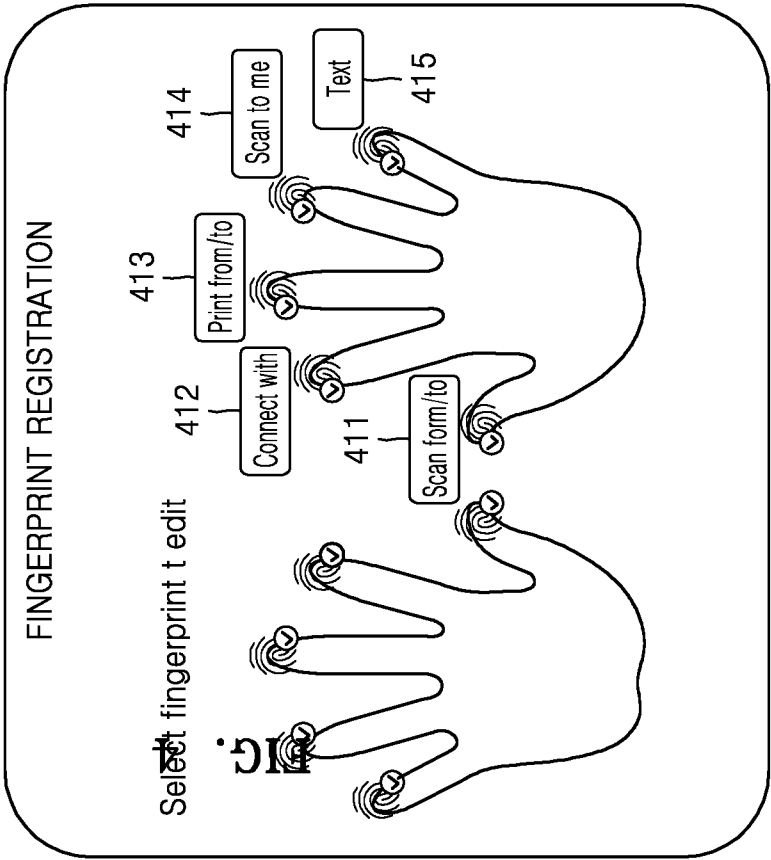


FIG. 4

410



420

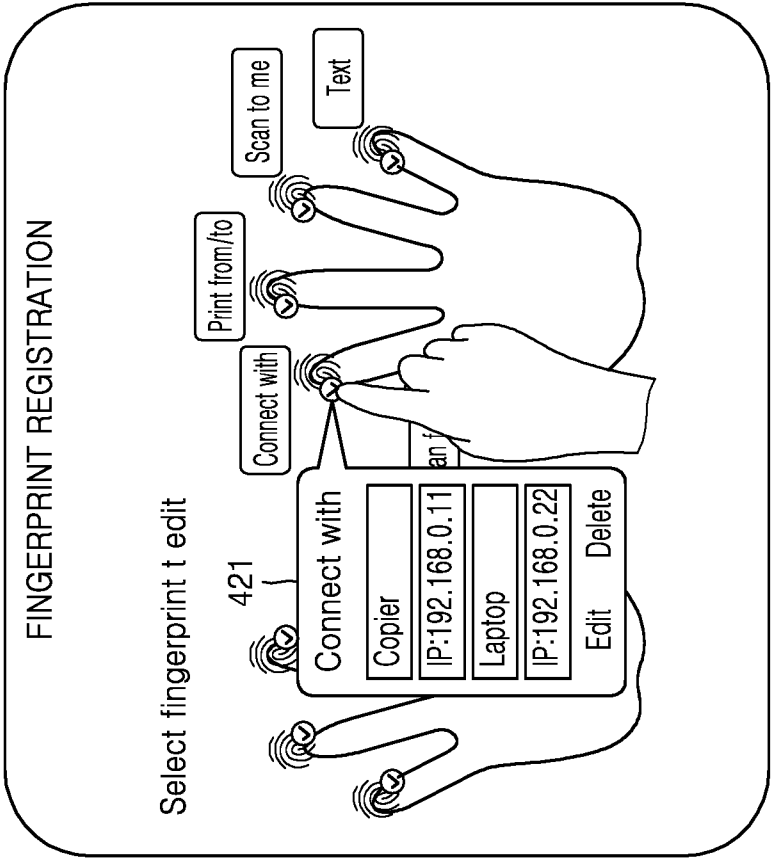


FIG. 5

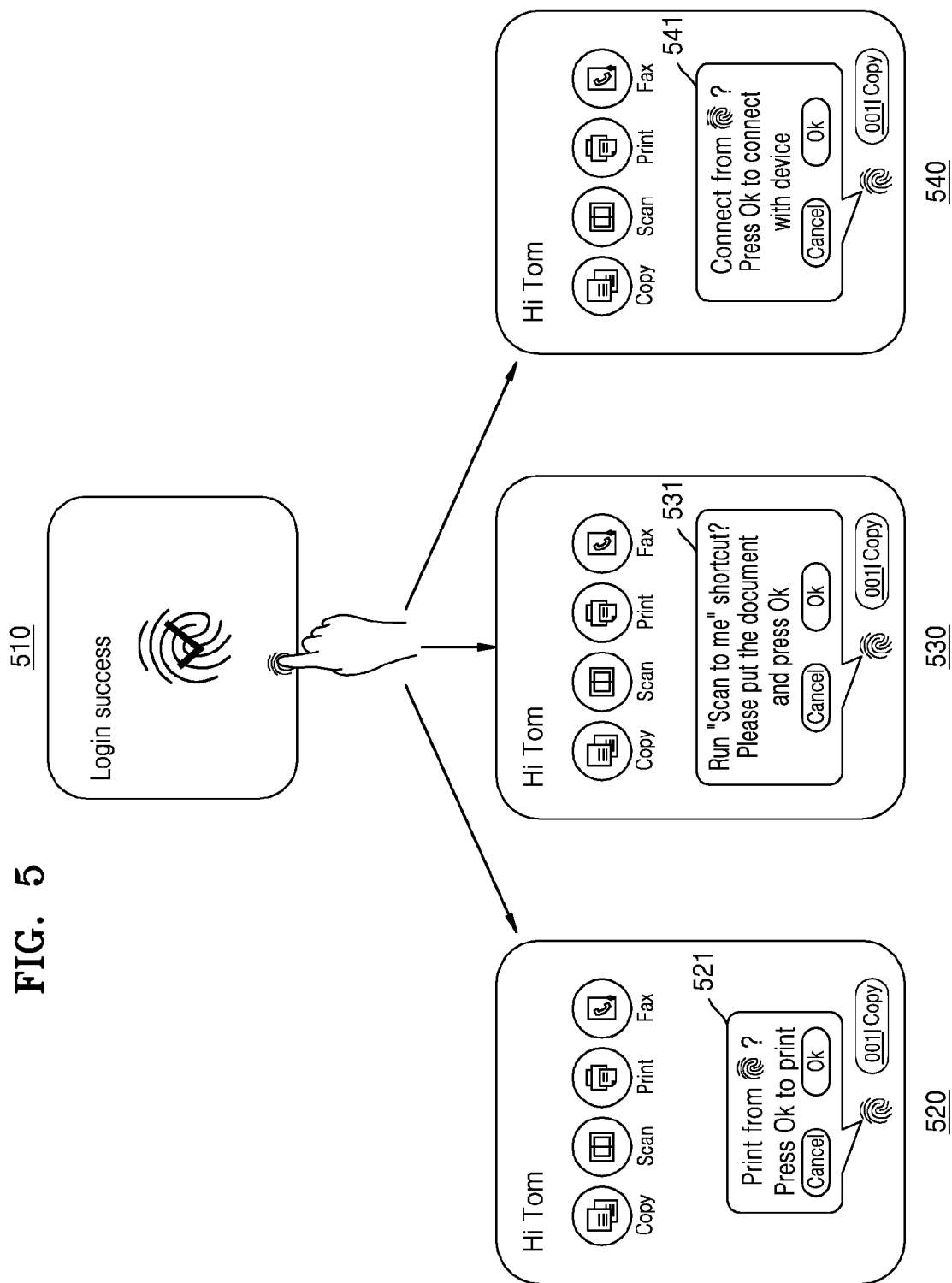


FIG. 6

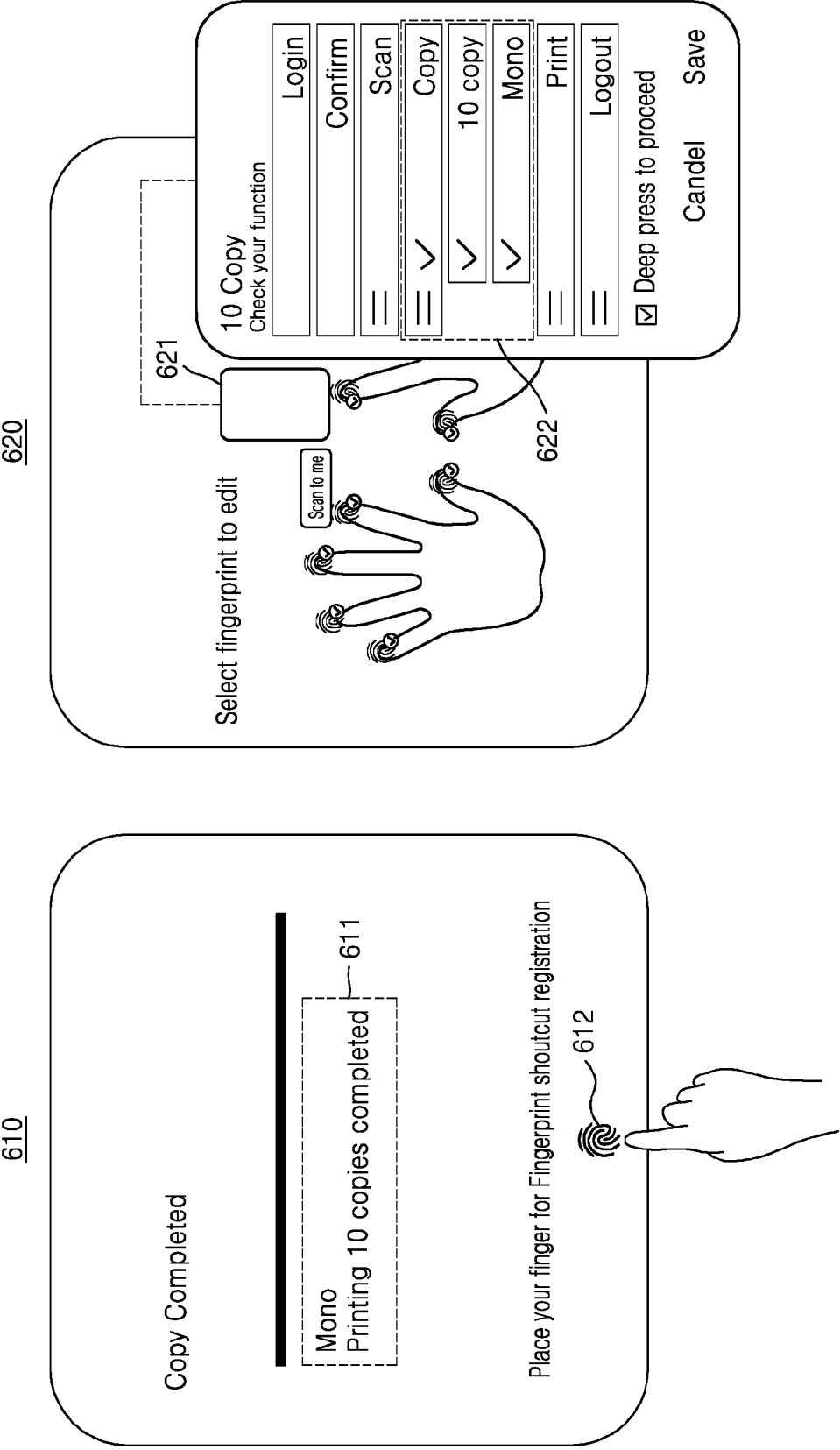


FIG. 7

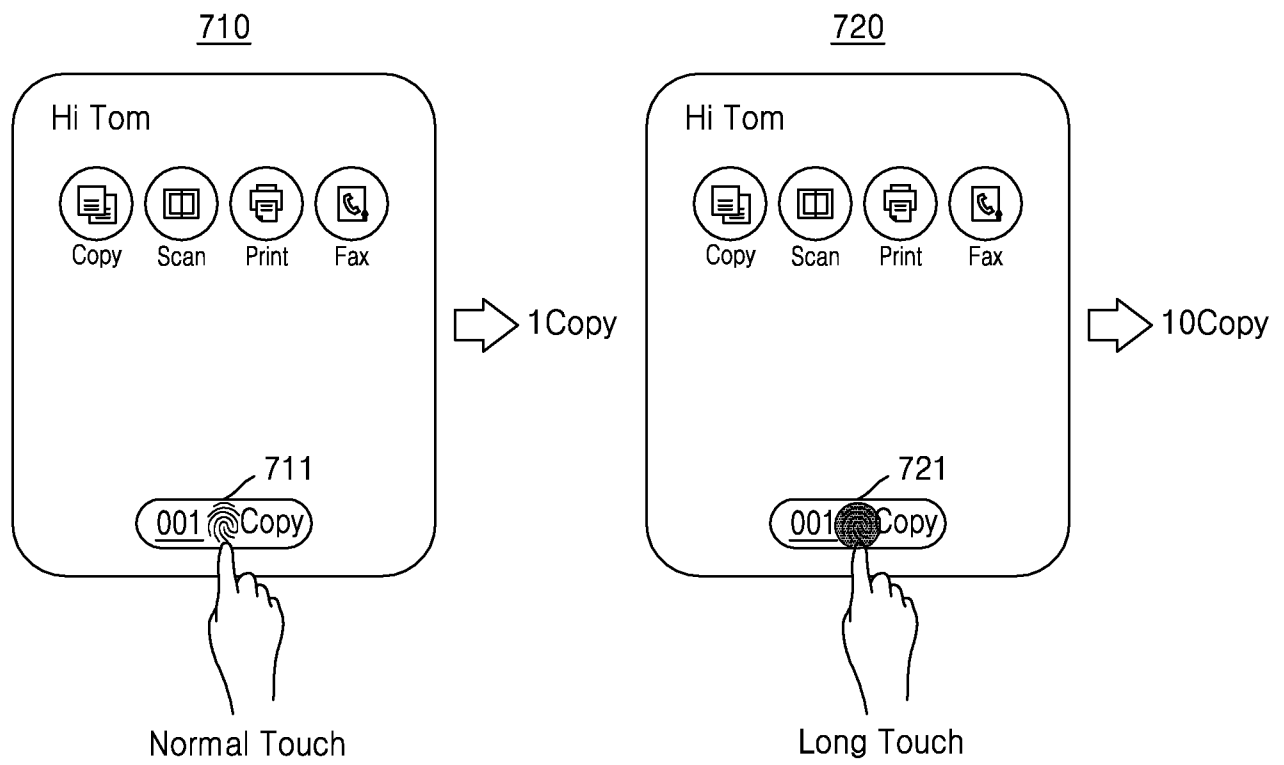


FIG. 8

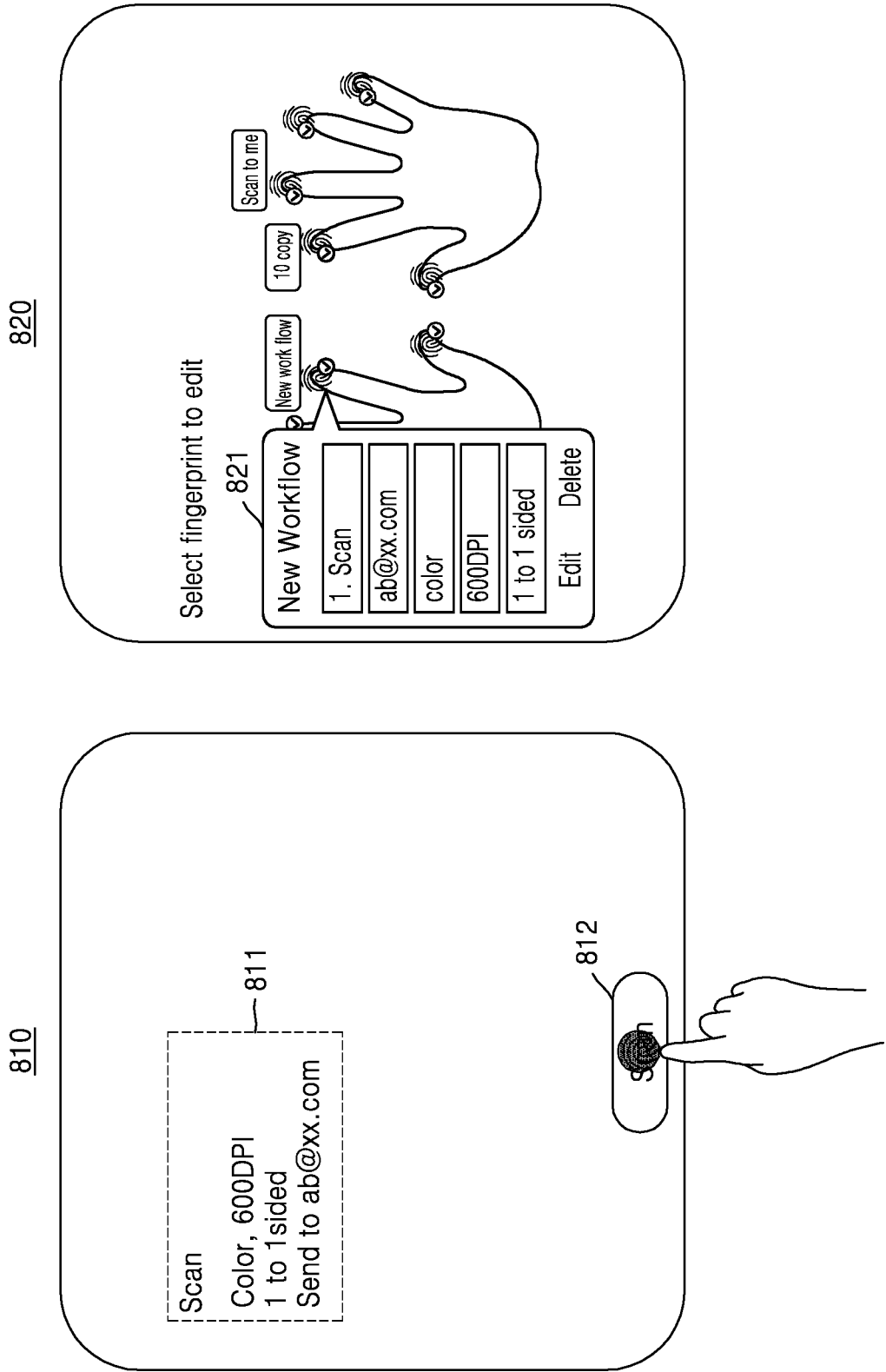


FIG. 9

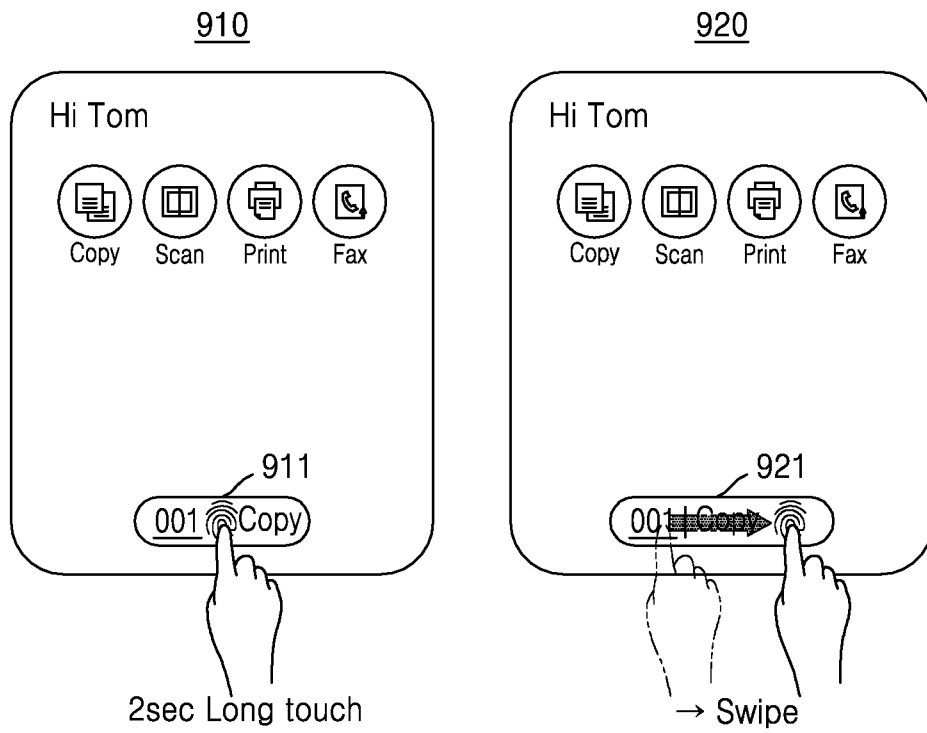


FIG. 10

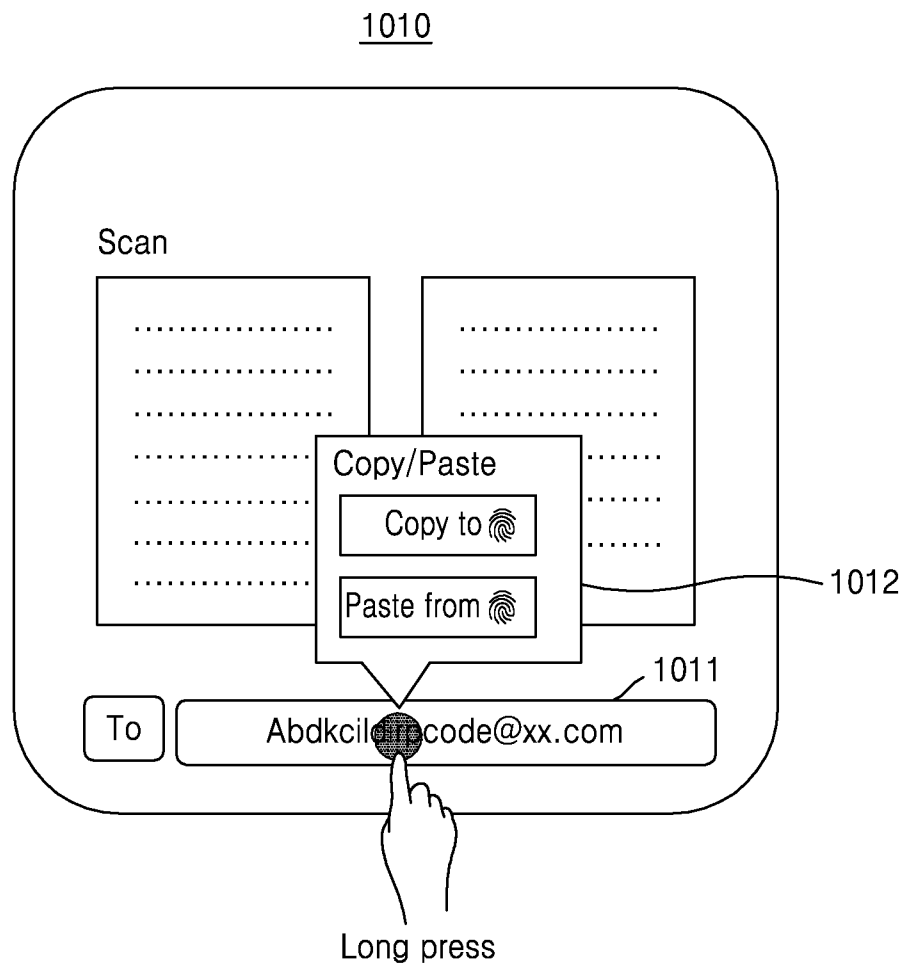


FIG. 11

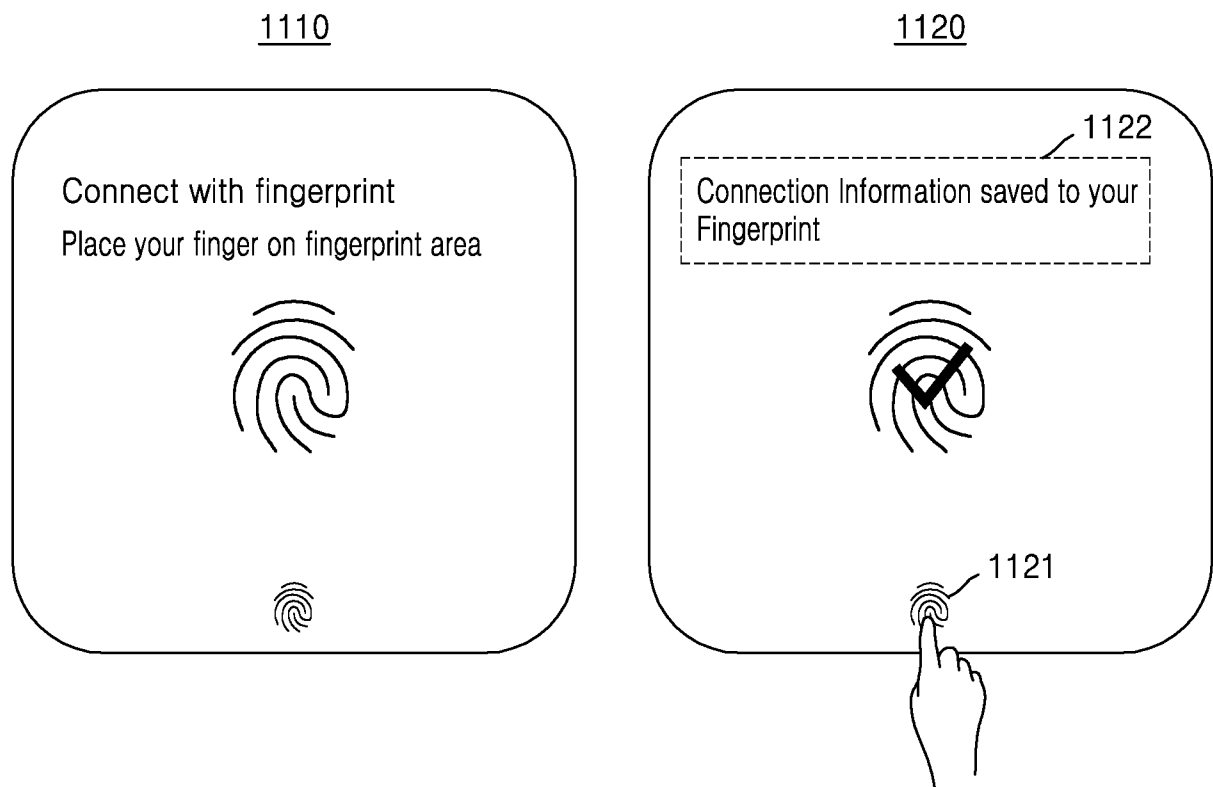


FIG. 12

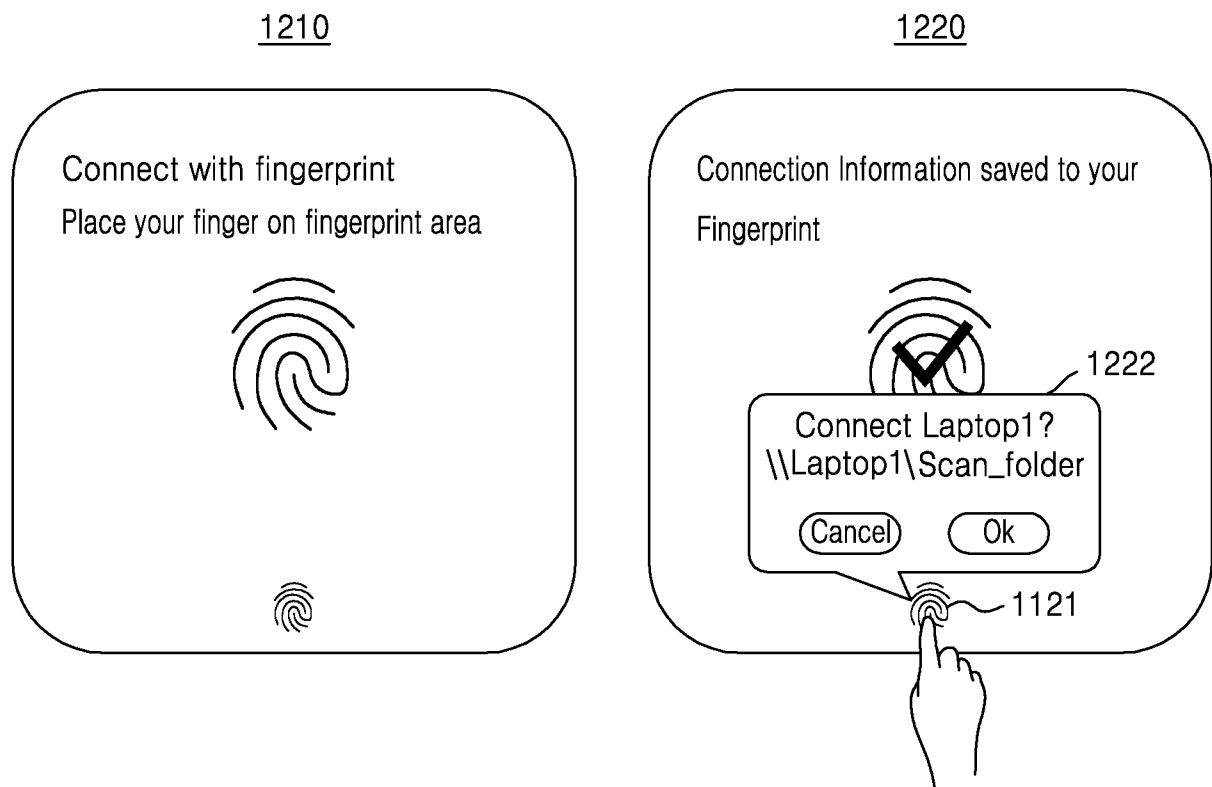
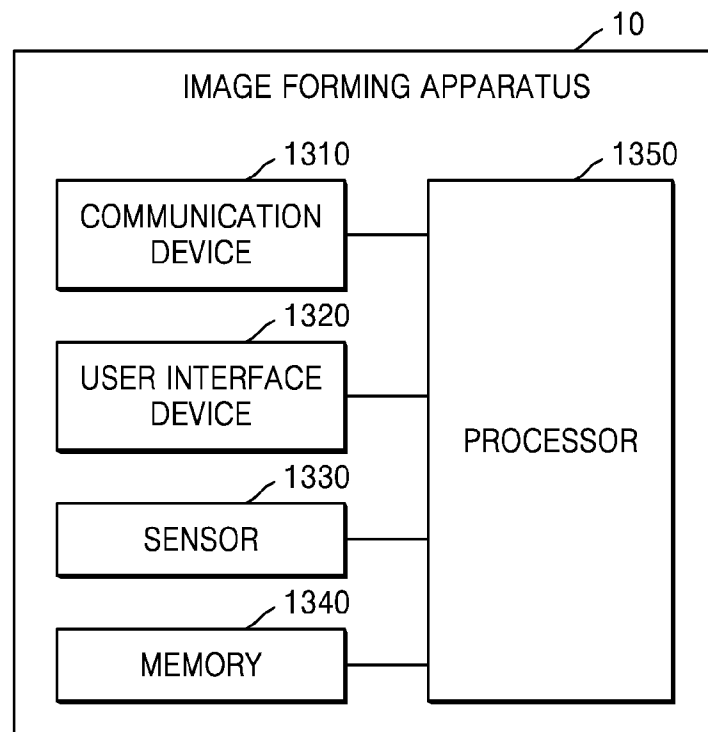


FIG. 13



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 2019/044844

A. CLASSIFICATION OF SUBJECT MATTER		
G06F 21/32 (2013.01) G06K 9/62 (2006.01) H04W 12/06 (2009.01)		
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 3/00-3/041, 7/00-7/04, 21/00-21/32, G06K 9/00-9/62, H04W 12/00-12/06, A61B 5/00-5/117, H04M 1/00-1/725		
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)		
PatSearch (RUPTO internal), USPTO, PAJ, Esp@cenet, Information Retrieval System of FIPS		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/0169503 A1 (MARK J. HOWELL et al.) 04.08.2005, paragraphs [0002], [0015], [0030], [0032], [0037]-[0039], [0048], [0058]-[0061], [0065], [0075], [0082]	1, 3-6, 9, 10-14
Y		2, 7, 8, 15
X	US 2003/0095691 A1 (KEIJI NOBUHARA et al.) 22.05.2003, paragraphs [0006], [0009], [0034], [0035], [0037]-[0045]	1, 11, 12
Y	US 2013/0278383 A1 (AUTHENTEC, INC.) 24.10.2013, paragraphs [0023]-[0025]	2, 15
Y	US 2015/0106765 A1 (LG ELECTRONICS INC.) 16.04.2015, paragraphs [0134]	7
Y	US 2011/0310044 A1 (KYOCERA CORPORATION) 22.12.2011, paragraphs [0060]-[0062], [0064]	8
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
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Date of the actual completion of the international search		Date of mailing of the international search report
15 October 2019 (15.10.2019)		07 November 2019 (07.11.2019)
Name and mailing address of the ISA/RU: Federal Institute of Industrial Property, Berezhkovskaya nab., 30-1, Moscow, G-59, GSP-3, Russia, 125993 Facsimile No: (8-495) 531-63-18, (8-499) 243-33-37		Authorized officer E. Bykova Telephone No. (495) 531-64-81