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(54) Title: EVALUATING AND RECYCLING ELECTRONIC DEVICES

(57) Abstract: Methods, apparatus, and systems for generating a price of a target device are disclosed herein. An evaluator device obtains technical properties associated with the target device. The technical properties include a make and a model of the target device. Physical properties associated with the target device are obtained. The physical properties include information related to wear and tear of the target device. Obtaining the physical properties includes indicating to a user that the user should position the target device in multiple predetermined positions and that the evaluator device records an image of the target device in each of the multiple predetermined positions. A video of the target device is recorded while the target device is positioned in the multiple predetermined positions. The obtained physical properties are evaluated to generate a condition metric value of the target device. Based on the generated condition metric value, the price of the target device is determined.

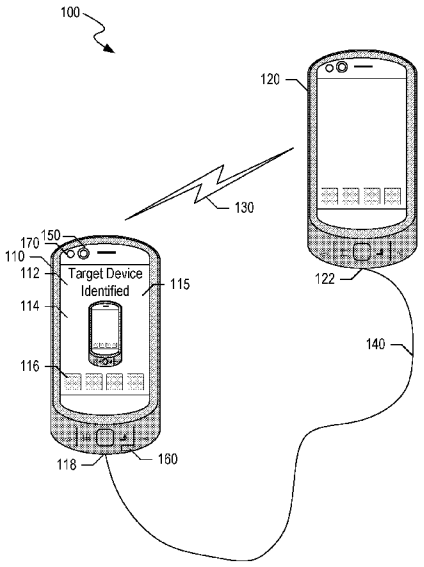


FIG. 1

WO 2022/047473 A1

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EVALUATING AND RECYCLING ELECTRONIC DEVICES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 63/070,207, filed August 25, 2020 (attorney docket no. 111220-8060.US00), which is incorporated by reference in its entirety herein.

TECHNICAL FIELD

[0002] The present disclosure is directed generally to methods and systems for evaluating and recycling mobile phones and other consumer electronic devices and, more particularly, to hardware and/or software for facilitating device identification, evaluation, purchase, and/or other processes associated with electronic device recycling.

BACKGROUND

[0003] Consumer electronic devices, such as mobile phones, laptop computers, notebooks, tablets, PDAs, MP3 players, wearable smart devices, etc., are ubiquitous. Currently there are over 14.02 billion mobile devices in use in the world. In other words, there are more mobile devices in use than there are people on the planet. Part of the reason for the rapid growth in the number of consumer electronic devices is the rapid pace at which these devices evolve, and the increased usage of such devices in third world countries.

[0004] As a result of the rapid pace of development, a relatively high percentage of consumer electronic devices are replaced every year as consumers continually upgrade their mobile phones and other electronic devices to obtain the latest features or a better operating plan. According to the U.S. Environmental Protection Agency, the U.S. alone disposes of over 370 million mobile phones, PDAs, tablets, and other electronic devices every year. Millions of other outdated or broken mobile phones and other electronic devices are simply tossed into junk drawers or otherwise kept until a suitable disposal solution arises.

[0005] Although many electronic device retailers and cell carrier stores now offer mobile phone trade-in or buyback programs, many old mobile phones still end up in

landfills or are improperly disassembled and disposed of in developing countries. Unfortunately, however, mobile phones and similar devices typically contain substances that can be harmful to the environment, such as arsenic, lithium, cadmium, copper, lead, mercury, and zinc. If not properly disposed of, these toxic substances can seep into groundwater from decomposing landfills and contaminate the soil with potentiality harmful consequences for humans and the environment.

[0006] As an alternative to retailer trade-in or buyback programs, consumers can now recycle and/or sell their used mobile phones using self-service kiosks located in malls, retail stores, or other publicly accessible areas. Such kiosks are operated by ecoATM, LLC, the assignee of the present application, and aspects of these kiosks are described in, for example: U.S. Patent Nos. 7,881,965, 8,195,511, 8,200,533, 8,239,262, 8,423,404 and 8,463,646, which are incorporated herein by reference in their entireties.

[0007] There continues to be a need for improving the means available to consumers for recycling or reselling their mobile phones and other consumer electronic devices. Simplifying the recycling/reselling process, enhancing the consumer experience, and discouraging fraud can incentivize consumers to dispose of their old electronic devices in an efficient and environmentally conscientious way.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Figure 1 illustrates an embodiment of a suitable computing environment for implementing various aspects of the present technology.

[0009] Figure 2 is a block diagram illustrating various components typically incorporated in computing systems and other devices on which the present technology can be implemented.

[0010] Figure 3 shows a user interface presented by an application running on an evaluator device or a target device according to some embodiments of the present technology.

[0011] Figure 4 shows a series of user interfaces presented to the user when the user wants to sell a target device according to some embodiments of the present technology.

[0012] Figures 5A-5D show a series of user interfaces associated with an application running on an evaluator device to guide the user in evaluating a target device according to some embodiments of the present technology.

[0013] Figure 6 shows a series of user interfaces that display a guaranteed price and various payment options according to some embodiments of the present technology.

[0014] Figure 7 shows a user interface that displays tests of the target device including touchscreen functionality according to some embodiments of the present technology.

[0015] Figure 8 shows a user interface that displays a test of the microphone of the target device according to some embodiments of the present technology.

[0016] Figure 9 shows a user interface that displays a test of the global positioning system (GPS) of the target device according to some embodiments of the present technology.

[0017] Figure 10 shows a user interface that displays a test of the display of the target device according to some embodiments of the present technology.

[0018] Figure 11 shows a map displaying kiosks and associated prices.

[0019] Figure 12 is an isometric view of a kiosk for recycling and/or other processing of mobile phones and other consumer electronic devices in accordance with some embodiments of the present technology.

[0020] Figure 13 is a high-level flow diagram of a routine to generate a guaranteed price of a target device (e.g., a mobile phone, tablet computer, thumb drive, television, SLR, etc.) for recycling in accordance with some embodiments of the present technology.

[0021] Figure 14 is a flow diagram of a routine for remotely evaluating a target device for recycling in accordance with some embodiments of the present technology.

[0022] DETAILED DESCRIPTION

[0023] The following disclosure describes various embodiments of hardware and/or software systems and methods that facilitate the identification, evaluation, purchase, and/or other processes associated with recycling of electronic devices. In

various embodiments, for example, the systems and methods described in detail herein enable a user to connect a first electronic device (an "evaluator device"), such as a mobile phone, to a second electronic device (a "target device"), such as another mobile phone, computer, appliance, peripheral, and so on, to accurately assess the condition and secondhand or resale market value of the target device. For example, a user could connect a first mobile phone evaluator device to a second mobile phone target device to get information about the second device, evaluate that information, and thus find out how much the second device is worth. The term "target device" is used herein for ease of reference to generally refer to an electronic device that a user may wish to evaluate for recycling. The term "evaluator device" is used herein for ease of reference to generally refer to an electronic device configured to obtain information from and/or about a target device and facilitate processing (e.g., recycling) of the target device. The evaluator device can include application software (an "app") and/or hardware for connecting to and evaluating the target device (e.g., via a wired or wireless connection). In various embodiments, the app enables device owners and/or other users to conveniently evaluate and price their target devices without having to leave their home or office. The present technology enables device owners to maintain awareness of the market value of their target devices with minimal user input, and provides certainty so that owners can have a quick and predictable experience selling their target devices (e.g., at an associated recycling kiosk, via mail-in of device, at a physical store, etc.). In some embodiments, the evaluator device can inform the user of the values of their target devices, manage a portfolio of target devices for recycling, and offer recommendations for where and when to recycle target devices.

[0024] Further, the present technology prevents users from incorrectly overestimating a phone's condition, such as claiming that the phone is in good condition when the phone screen is cracked or the phone is otherwise damaged. When a user incorrectly overestimates the phone's condition, a final price for the phone is significantly lower than an expected estimated price. In such a case, the user usually rejects the final price, which then leads to a lost transaction and a negative experience for the user which can affect goodwill of the entity facilitating the phone's return (and recycling). The present technology addresses this problem by providing the user with a "guaranteed" price that will not change if the user submits the target device for sale, and thereby avoids or at least greatly reduces the occurrence of incomplete transactions and

disgruntled users. The present technology enables the user to evaluate a target device using the evaluator device at home (or any other location), thus decreasing the time and interaction required for a user selling the target device at a physical location (e.g., a kiosk).

[0025] Certain details are set forth in the following description and in Figures 1-14 to provide a thorough understanding of various embodiments of the present technology. In other instances, well-known structures, materials, operations and/or systems often associated with smartphones and other handheld devices, consumer electronic devices, computer hardware, software, and network systems, etc. are not shown or described in detail in the following disclosure to avoid unnecessarily obscuring the description of the various embodiments of the present technology. Those of ordinary skill in the art will recognize, however, that the present technology can be practiced without one or more of the details set forth herein, or with other structures, methods, components, and so forth.

[0026] The terminology used below is to be interpreted in its broadest reasonable manner, even though it is being used in conjunction with a detailed description of certain examples of embodiments of the present technology. Indeed, certain terms may even be emphasized below; however, any terminology intended to be interpreted in any restricted manner will be specifically defined as such in this Detailed Description section.

[0027] The accompanying Figures depict embodiments of the present technology and are not intended to be limiting of its scope. The sizes of various depicted elements are not necessarily drawn to scale, and these various elements may be arbitrarily enlarged to improve legibility. Component details may be abstracted in the Figures to exclude details such as position of components and certain precise connections between such components when such details are unnecessary for a complete understanding of how to make and use the embodiments disclosed herein.

[0028] In the Figures, identical reference numbers identify identical, or at least generally similar, elements. To facilitate the discussion of any particular element, the most significant digit or digits of any reference number refers to the Figure in which that element is first introduced. For example, element 110 is first introduced and discussed with reference to Figure 1.

[0029] Figure 1 illustrates an embodiment of a suitable computing environment 100 for implementing various aspects of the present technology. The environment 100 includes a first electronic device (e.g., an evaluator device 110) and a second electronic device (e.g., a target device 120). In the illustrated embodiment, the evaluator device 110 and the target device 120 are depicted as a handheld computing device such as a smartphone or other mobile phone. However, in other embodiments, the evaluator device 110 and/or the target device 120 can be any manner of electronic device. For example, the evaluator device 110 and the target device 120 could be, for example, a tablet, a handheld gaming device, a media player, all manner of mobile phones; smartphones; handheld devices; personal digital assistants (PDAs); MP3 or other digital music players; tablet, notebook, Ultrabook and laptop computers; e-readers; all types of cameras; GPS devices; set-top boxes and other media players; VoIP phones; universal remote controls; speakers; headphones; wearable computers; larger consumer electronic devices, such as desktop computers, televisions, projectors, DVRs, game consoles, Blu-ray Disc™ players, printers, network attached storage devices, etc.; as well as smaller electronic devices such as Google® Glass™, smartwatches (e.g., the Apple Watch™, Android Wear™ devices such as the Moto 360®, or the Pebble Steel™ watch), fitness bands, thumb drives, wireless hands-free devices; unmanned aerial vehicles; etc. Although many embodiments of the present technology are described herein in the context of mobile phones, aspects of the present technology are not limited to mobile phones and generally apply to other consumer electronic devices. Such devices include, as non-limiting examples, desktop computers, TVs, game consoles, etc.

[0030] In one embodiment, the evaluator device 110 can execute a software application to aid in the evaluation of the target device 120. For example, the evaluator device 110 can have a camera 150 and a flashlight 170, and can use the camera and the flashlight to take pictures and record videos of the target device 120. The evaluator device 110 can provide instructions to the user through speakers 160 and/or display 115 of the evaluator device 110 to direct the user how to position the target device 120 with respect to the camera 150 and/or flashlight 170, as described in more detail below. The flashlight can be a flash used in taking pictures or can include flashlight functionality of a device. In embodiments, the flashlight 170 is strobed instead of remaining on for longer periods of time.

[0031] In some embodiments, both the evaluator device 110 and the target device 120 can execute one or more applications. The one or more applications can communicate with each other, and the evaluator device 110 and the target device 120 can work in a server-client relationship to determine a price for the target device 120. For example, the application executed by the target device 120 can provide information about the target device 120 to the application executed by the evaluator device 110. Information can include, but is not limited to, make and model of the target device 120, operating system version, memory/storage capacity of the target device 120, service provider to the target device 120, IMEI number of the target device 120, network capabilities (e.g., 4G, 5G, etc.) of the target device 120, and so on.

[0032] In some embodiments, the target device 120 includes a communication interface (e.g., a connector port 122 and/or a wireless transceiver (not shown)) and the evaluator device 110 similarly includes a communication interface (e.g., a connector port 118 and/or a wireless transceiver (not shown)). In this embodiment, the evaluator device 110 can be electrically connected to the target device 120 via a wireless connection 130 between the respective device transceivers, such as a Wi-Fi or Bluetooth network or a near-field communication (NFC) link; or via a wired connection 140, such as a universal serial bus (USB), Ethernet, or Lightning cable connected between the device connector ports 118 and 122. The evaluator device 110 can run special software configured to evaluate the target device 120. The evaluator device 110 and the target device 120 can be connected via a USB cable. A display screen 115 of the evaluator device 110 can display information such as textual information 112 indicating that the evaluator device 110 has identified the target device 120, an image 114 representing the target device 120, and/or icons or buttons 116 enabling the user to select various options or actions such as confirming the correct identification of the target device 120, pricing the target device 120, saving the target device 120 in a list of devices, etc.

[0033] As described in detail below, the present technology enables the evaluator device 110 to obtain information from the target device 120 over the wireless connection 130 and/or the wired connection 140, and evaluate the obtained information to facilitate recycling and/or other processing of the target device 120. The term "processing" is used herein for ease of reference to generally refer to all manner of services and operations that may be performed on, with, or otherwise in relation to a target device.

Such services and operations can include, for example, selling, reselling, recycling, upcycling, donating, exchanging, identifying, evaluating, pricing, auctioning, decommissioning, transferring data from or to, reconfiguring, refurbishing, etc. mobile phones and other target devices. The term "recycling" is used herein for ease of reference to generally refer to selling, purchasing, reselling, exchanging, donating, and/or receiving target devices. For example, owners may elect to sell their used target devices, and the target devices can be recycled for resale, reconditioning, repair, recovery of salvageable components, environmentally conscious disposal, etc.

[0034] Figure 2 is a block diagram showing some of the components 200 typically incorporated in computing systems and other devices on which the present technology can be implemented. In the illustrated embodiment, the evaluator device 110 includes a processing component 230 that controls operation of the evaluator device 110 in accordance with computer-readable instructions stored in memory 240. The processing component 230 may be any logic processing unit, such as one or more central processing units (CPUs), graphics processing units (GPUs), digital signal processors (DSPs), application-specific integrated circuits (ASICs), etc. The processing component 230 may be a single processing unit or multiple processing units in an evaluator device or distributed across multiple devices. Aspects of the present technology can be embodied in a special purpose computing device or data processor that is specifically programmed, configured, or constructed to perform one or more of the computer-executable instructions explained in detail herein. Aspects of the present technology can also be practiced in distributed computing environments in which functions or modules are performed by remote processing devices that are linked through a communications network, such as a local area network (LAN), wide area network (WAN), or the Internet. In a distributed computing environment, modules can be located in both local and remote memory storage devices.

[0035] The processing component 230 is connected to memory 240, which can include a combination of temporary and/or permanent storage, and both read-only memory (ROM) and writable memory (e.g., random-access memory or RAM), writable non-volatile memory such as flash memory or other solid-state memory, hard drives, removable media, magnetically or optically readable discs, nanotechnology memory, biological memory, and so forth. As used herein, memory does not include a transitory propagating signal per se. The memory 240 includes data storage that contains

programs, software, and information, such as an operating system 242, application programs 244, and data 246. Evaluator device 110 operating systems can include, for example, Windows®, Linux®, Android™, iOS®, and/or an embedded real-time operating system. The application programs 244 and data 246 can include software and databases configured to control evaluator device 110 components, process target device 120 information and data (e.g., to evaluate device make, model, condition, pricing, etc.), communicate and exchange data and information with remote computers and other devices, etc.

[0036] The evaluator device 110 can include input components 210 that receive input from user interactions and provide input to the processor 230, typically mediated by a hardware controller that interprets the raw signals received from the input device and communicates the information to the processor 230 using a known communication protocol. Examples of an input component 210 include a keyboard (with physical or virtual keys), a pointing device (such as a mouse, joystick, dial, or eye tracking device), a touchscreen 212 that detects contact events when it is touched by a user, a microphone 214 that receives audio input, and a camera 216 for still photographs and/or video capture. The evaluator device 110 can also include various other input components 210 such as GPS or other location determination sensors, motion sensors, wearable input devices with accelerometers (e.g., wearable glove-type input devices), biometric sensors (e.g., fingerprint sensors), light sensors, card readers (e.g., magnetic stripe readers or memory card readers), and so on.

[0037] The processor 230 can also be connected to one or more various output components 220, for example, directly or via a hardware controller. The output devices can include a display 115 on which text and graphics are displayed. The display 115 can be, for example, an LCD, LED, or OLED display screen (such as a desktop computer screen, handheld device screen, or television screen), an e-ink display, a projected display (such as a heads-up display device), and/or a display integrated with a touchscreen 212 that serves as an input device as well as an output device that provides graphical and textual visual feedback to the user. The output devices can also include a speaker 224 for playing audio signals, haptic feedback devices for tactile output such as vibration, etc. In some implementations, the speaker 224 and the microphone 214 are implemented by a combined audio input-output device.

[0038] In the illustrated embodiment, the evaluator device 110 further includes one or more communication components 250. The communication components can include, for example, a wireless transceiver 252 (e.g., one or more of a Wi-Fi transceiver; Bluetooth transceiver; NFC device; wireless modem or cellular radio utilizing GSM, CDMA, 3G, and/or 4G technologies; etc.) and/or a wired network connection 118 (e.g., one or more of an Ethernet port, cable modem, FireWire cable, Lightning connector, USB port, etc.). The communication components 250 are suitable for communication between the evaluator device 110 and other local and/or remote computing devices, for example, the target device 120, directly via a wired or wireless peer-to-peer connection and/or indirectly via the communication link 270 (which can include the Internet, a public or private intranet, a local or extended Wi-Fi network, cell towers, the plain old telephone system (POTS), etc.). For example, the wireless transceiver 252 of the evaluator device 110 can connect to the wireless transceiver 282 of the target device 120 via the wireless connection 130, and/or the wired connector 140 of the evaluator device 110 can connect to the wired connector 122 of the target device 120 via the wired connection 140. The evaluator device 110 further includes power 260, which can include battery power and/or facility power for operation of the various electrical components associated with the evaluator device 110.

[0039] Unless described otherwise, the construction and operation of the various components shown in Figure 2 are of conventional design. As a result, such components need not be described in further detail herein, as they will be readily understood by those skilled in the relevant art. In other embodiments, the evaluator device 110 and/or the target device 120 can include other features that may be different from those described above. In still further embodiments, the evaluator device 110 and/or the target device 120 can include more or fewer features similar to those described above.

[0040] Figure 3 shows a user interface presented by an application running on the evaluator device or the target device according to some embodiments of the present technology. The user interface 300 presents several buttons 310, 320, 330, 340 to the user.

[0041] When the user selects button 310, an application running on the device determines that the user wants to sell the device displaying the user interface 300.

When the user selects the button 320, the application determines the user wants to sell another device, for example, the target device 120 in Figure 1, and use the device displaying the user interface 300 as the evaluator device 110 in Figure 1.

[0042] When the user selects the button 330, the application displays to the user previous offers received for various devices that the user previously offered for sale. The user can have an account with an entity (e.g., ecoATM). The user can login to that account and retrieve previous offers. When the user selects the button 340, the application provides the user additional information about trading in the user's devices (e.g. terms of service, privacy notices, recycling policies, etc.).

[0043] Figure 4 shows a series of user interfaces presented to the user when the user wants to sell a target device according to some embodiments of the present technology. When the user selects the button 310 in Figure 3, the application running on the device determines that the user has a single device that the user wants to sell. In step 400, the application provides information to the user encouraging the user to obtain a second device, such as an evaluator device 110 in Figure 1 to obtain a more precise quote. The application provides two buttons 410 and 420. If the user wants to proceed with a single device, the user can select button 410, in which case the application provides a rough quote to the user. When the user selects button 420, the user can go back to the user interface 300 in Figure 3 and can select button 320 in Figure 3.

[0044] If the user wants to proceed with a single device, the application can gather information about the device by querying the user or automatically. For example, in step 430, asks the user to specify a type of device, such as iPhone, Samsung, Huawei, Dell, Lenovo, etc. In step 440, the application presents options 442, 444 (only two labeled for brevity) to the user to select a make of the device. In step 450, the application presents options 452, 454 (only two labeled for brevity) to the user to select a carrier/telecommunications service provider.

[0045] In step 460, the application presents options 462, 464 (only two labeled for brevity) to the user to select the memory capacity of the device. The application can also query the user whether the target device 120 is currently under contract or is a company phone.

[0046] In step 470, the application presents multiple questions 472, 474 (only two labeled for brevity) to prompt the user to describe the condition of the device, such as whether there is a crack on the front glass, crack in the back glass, issues with the display, broken buttons, broken cameras, etc. If in step 470 the user indicates that the device is in mint condition by, for example, not selecting a "Yes" button 476 for any of the questions, the application can request the user to provide additional information about the device, as described in Figure 5 below.

[0047] In addition, the application can automatically gather information about the target device 120, thus shortening the user-UI interaction by obtaining parameters directly from the target device 120. To determine whether the device is an Android or an Apple device, the application can determine the operating system (OS) of the target device 120. If the operating system is iOS, the application can determine that the target device 120 is an Apple device. If the operating system is Android, the application can query the manufacturer of the device for the type of the device such as Samsung, Google, HTC, etc.

[0048] To determine the make, model, memory capacity, and/or carrier information of the target device 120, the application can obtain information from the target device 120, and can present the determined make, model, memory capacity, and/or carrier information for the user to confirm.

[0049] To test the ability of the target device 120 ability to connect over a wireless network, the application can ask the user's permission to automatically dial a number or send a text message. If the call is successfully placed and/or the text is successfully sent, the application can determine that the target device 120 has network capability.

[0050] To test whether the target device 120 has logged out of user's personal accounts, such as Gmail and/or iCloud, the application can attempt to access the user's personal accounts automatically. If the login attempts are unsuccessful, the application can determine that the user has successfully logged out of the user's personal accounts.

[0051] In step 480, based on information that the user has provided to the application, the application provides a price estimate 482 of the device to the user. However, in this case, the price estimate 482 is not a guarantee of a minimum price that the user is going to receive once the user submits the device for inspection and/or sale. The price estimate 482 can be reduced once the user submits the device (e.g., the user

takes the device to a physical kiosk, mails-in the device to an evaluating entity, submits the device at a physical store, etc.).

[0052] Finally, in step 490, the application can present an alternative offer to the user. For example, as shown in Figure 4, the offer can be to trade in the device for an upgraded device and receive a discount on the upgraded device. The discount can be higher than the price estimate 482 received in step 480. The offer can include credits for unrelated services such as an Uber or a Lyft ride, various accessories that can be traded for the device, credits towards accessory, gift cards, points, mileage credits, etc. For example, employers can offer trade-in for employee devices in exchange for carbon credits for which the employer can apply. Alternatively, the employer can reimburse employees for the traded-in devices.

[0053] Figures 5A-5D show a series of user interfaces associated with an application running on an evaluator device to guide the user in evaluating a target device according to some embodiments of the present technology. The application running on the evaluator device 110 can vary the steps of target device 120 evaluation, as explained in Figures 5A-5D, depending on what type of target device 120 is being evaluated, what type of damage has been disclosed by the user, etc.

[0054] Figure 5A shows a display of the evaluator device 110 in Figure 1 showing an initial step in evaluating the target device 120. Display element 500 can show all the steps needed to complete the evaluation of the target device 120. An image of the current step 510 can be highlighted to attract the user's attention, while the images of the rest of the steps 520, 530, 540, 550 can presented to appear less visible, such as by darkening them.

[0055] An application running on the evaluator device 110 can direct the user via audio, text, picture, video, or other similar means to logout of the user's personal accounts stored in the target device 120, and to display on the target device 120 an application verifying that the user has been logged out from the user's personal accounts. The user's personal accounts can include iCloud, Google, Dropbox, etc. The application, such as settings, can verify that the user has been logged out from the user's personal accounts. Further, the evaluator device 110 can direct the user, via audio, text, picture, video, or other similar means, to point the camera 150 in Figure 1

of the evaluator device 110 to the display of target device 120 to record the display created by the verifying application such as Settings.

[0056] In addition, the application running on the evaluator device 110 can request the user to factory reset the target device 120. To verify that the target device 120 has gone or is going through the process of factory reset, the camera 150 of the evaluator device 110 can record progress or completion of the factory reset being completed on the target device.

[0057] The evaluator device 110 can record a picture (and/or video) of the target device 120 and produce an indication, such as a clicking sound, that the picture has been recorded. The evaluator device 110 can perform optical character recognition (OCR) to determine from the recorded image whether the user has logged out from the user's personal accounts.

[0058] In addition, the evaluator device 110 can provide a help button 560. When the user selects the button 560, evaluator device 110 can provide more detailed instructions to the user, provide a list of frequently asked questions (FAQ), and/or provide contact information of technical support.

[0059] In step 520 shown in Figure 5B, the evaluator device 110 can direct the user to display the target device 120's unique identifier 590, such as primary and secondary International Mobile Equipment Identity (IMEI) for devices with multiple subscriber identity modules (SIMs), Unique Device Identification (UDI), media access control (MAC) address, Bluetooth MAC address, WiFi MAC Address, Universally Unique Identifier (UUID), Internet protocol (IP) Address (ipvc4/6), target device's phone number, target device model and serial numbers, etc. To get the unique identifier 590, e.g. IMEI, the user can also dial *#06# on the target device 120 to bring up the unique identifier. The evaluator device 110 can perform OCR on the unique identifier 590. In some embodiments, when all three of the memory/storage capacity 570 of the target device 120, service provider 580 to the target device 120, and IMEI number of the target device 120 are available, the evaluator device 110 can grade the target device 120 more efficiently. Therefore, during the OCR phase if only two of these pieces of information can be displayed on the screen of the target device 120 at the same time, the evaluator device 110 can direct the user to "scroll down," such that the third piece of information can be read.

[0060] In addition, the evaluator device 110 can also request information about the capacity 570 and carrier 580 of the target device 120, as shown in Figure 5B. The evaluator device 110 can get the unique identifier 590 from a previously installed application such as an application installed by a phone manufacturer. To prevent the user from photographing the IMEI of a damaged target device 120 and then taking a video of an undamaged device and attempting to sell the damaged target device 120, the application running on the evaluator device 110 can instruct the user to keep the evaluator device 110 constantly focused on the target device 120. When the app detects that the evaluator device 110 is not constantly (or substantially constantly) focused on the target device 120, it can present an error message to the user (e.g., as an audio alert (e.g. beeping sound), visual alert (e.g., a flashing/blinking light), and so on).

[0061] An application running on the evaluator device 110 can direct the user via audio, text, picture, video, or other similar means how to display the information containing the unique identifier 590, the capacity 570 and the carrier 580 on the display of the target device 120. For example, the evaluator device 110 can communicate to the user to go to settings, select the "general" button, and then select "about" to obtain the needed information.

[0062] The application running on the evaluator device 110 can direct the user to record a picture of the target device 120 showing the needed information. The evaluator device 110 can produce an indication, such as a sound, that the picture is recorded. Once the picture is recorded, the evaluator device 110 can use OCR to obtain the needed information from the picture.

[0063] As described herein, the evaluator device 110 obtains a unique identifier of the target device 120. In some embodiments, the evaluator device 110 determines whether the target device 120 has been evaluated previously based on the unique identifier 590. Upon determining that the target device 120 has been evaluated previously, the evaluator device 110 retrieves data describing the target device 120 from a database.

[0064] Once the evaluator device 110 obtains the unique identifier 590, the evaluator device 110 can determine whether the unique identifier 590 has been evaluated before, such as if the user has tried to scan the target device 120 multiple

times. If the unique identifier 590 has been evaluated before, the evaluator device 110 can pre-populate the device information using the previously stored information such as IMEI number, storage capacity, etc. In addition, once the evaluator device 110 has the unique identifier 590, the evaluator device 110 can gather some info automatically. For example, the evaluator device 110 can query the wireless telecommunication provider database to get additional information about the device, such as technical specifications, age, number of resales, etc.

[0065] In step 515, shown in Figure 5C, the evaluator device 110 can instruct the user to turn off the target device 120's screen prior to proceeding to the final three steps 530, 540, 550. The reason to turn off the target device 120's screen is to increase the visibility of any screen imperfections (e.g., cracks) on the target device 120 in the steps described in Figure 5D. When the user turns off the display screen, the user can communicate to the evaluator device 110 to move to the final three steps 530, 540, 550 by selecting the button 525.

[0066] Figure 5D shows the remaining steps needed to evaluate the target device 120. In these three steps, 530, 540, 550, the application running on the evaluator device 110 directs the user, via audio, text, picture, video, or other similar means, to take several pictures, such as three pictures, of the target device 120, as shown in Figure 5D. The guide 505 displayed on the evaluator device 110 indicates how to position the target device 120 within the camera view of the evaluator device 110. The guide 505 can be any color and/or shape, such as a green rounded rectangle, a red rounded rectangle with broken lines, etc. In some embodiments, no guide is displayed. The pictures can be from approximately a three-quarters view to the left of the target device 120, three-quarters view to the right of the target device 120, and from the front. Additional pictures such as from the back and or the sides can also be taken. In one embodiment, steps 530, 540, 550 can be performed once for the display side of the target device 120, and once for the back side of the target device 120. For example, during evaluation, the evaluator device 110 can ask the user to position the target device 120 to take pictures of the back side of the target device 120, since most devices today have glass backs.

[0067] In some embodiments, a remote operator detects that a second device has replaced the target device 120 by analyzing the video. It is determined that the obtained

physical properties are inaccurate in response to detecting that the second device has replaced the target device 120. For example, while the user is positioning the target device 120 to take the pictures, unknown to the user, the evaluator device 110 can record a video of the user's actions. The reason that the evaluator device 110 records the video unknown to the user is to prevent the user from switching out the target device 120 with another device (sometimes referred to as a “second device”) that is in better condition than the target device 120. While the user is recording a video, a remote operator can receive the video in real time and can detect whether the user has switched out the target device 120 for a device that is in better condition. If the remote operator detects the switch, the remote operator can instruct the evaluator device 110 to abort the evaluation and produce a notification to the user that the evaluation has been aborted. In some embodiments, detecting that the second device has replaced the target device is performed using an artificial intelligence module. For example, the remote operator can be an artificial intelligence module trained to detect the device switch.

[0068] In some embodiments, the evaluator device 110 records the video of the target device 120 by flashing or strobing the flashlight 170 of the evaluator device 110 and moving the camera 150 of the evaluator device 110 over the target device 120. The camera 150 of the evaluator device 110 is moved over the target device 120 using sweeping movements and different angles, such that the camera 150 captures screen and/or device imperfections (e.g., cracks) that may not be otherwise visible in picture format. In some embodiments, the video is about 30 seconds long, such that at some point in that time period glints or cracks are revealed. The sweeping movements can be from left to right, top to bottom, bottom to top, etc., such that the camera 150 of the evaluator device 110 is moved through a variety of motions to enable the camera 150 to view and record different areas and perspectives of the target device 120. The artificial intelligence module can also be trained to detect screen and/or device imperfections (e.g., cracks) that may not be otherwise visible in picture format from the recorded video. In some embodiments, the artificial intelligence module processes the video in real time, i.e., while the video is being recorded. As soon as the artificial intelligence module determines an imperfection in the target device 120, the evaluator device 110 can proceed to a pricing screen of a user interface of the evaluator device 110 and instruct the user to stop photographing the target device 120. As a backup

feature, if the Internet connection of the target device 120 has insufficient speed the video is processed locally in the evaluator device 110 and not uploaded to the cloud. This feature is used when the target device 120 uses 3G instead of LTE or W-Fi.

[0069] The artificial intelligence module is implemented using the components illustrated and described in more detail with reference to Figures 1-2. For example, the artificial intelligence module can be implemented on the evaluator device 110 using instructions programmed in the memory 240 illustrated and described in more detail with reference to Figure 2. Likewise, embodiments of the artificial intelligence module can include different and/or additional components, or be connected in different ways. The artificial intelligence module is sometimes referred to as a machine learning module.

[0070] In some embodiments, the artificial intelligence module includes a feature extraction module implemented using the components illustrated and described in more detail with reference to Figure 2. The feature extraction module extracts a feature vector from the recorded video. The feature extraction module reduces the redundancy in the input data, e.g., repetitive data values, to transform the input data into a reduced set of features. The feature vector contains the relevant information from the input data, such that properties of a target device under evaluation or data value thresholds of interest can be identified by the artificial intelligence module by using this reduced representation. In some example embodiments, the following dimensionality reduction techniques are used by the feature extraction module: independent component analysis, Isomap, Kernel PCA, latent semantic analysis, partial least squares, principal component analysis, multifactor dimensionality reduction, nonlinear dimensionality reduction, Multilinear Principal Component Analysis, multilinear subspace learning, semidefinite embedding, Autoencoder, and deep feature synthesis.

[0071] In alternate embodiments, the artificial intelligence module performs deep learning (also known as deep structured learning or hierarchical learning) directly on input data to learn data representations, as opposed to using task-specific algorithms. In deep learning, no explicit feature extraction is performed; features are implicitly extracted by the artificial intelligence module. For example, the artificial intelligence module can use a cascade of multiple layers of nonlinear processing units for implicit feature extraction and transformation. Each successive layer uses the output from a

previous layer as input. The artificial intelligence module can thus learn in supervised (e.g., classification) and/or unsupervised (e.g., pattern analysis) modes. The artificial intelligence module can learn multiple levels of representations that correspond to different levels of abstraction, wherein the different levels form a hierarchy of concepts. In this manner, the artificial intelligence module can be configured to differentiate features of interest from background features.

[0072] In some embodiments, the artificial intelligence module, e.g., in the form of a convolutional neural network (CNN) generates output, without the need for feature extraction, directly from input data. The output is provided to the evaluator device 110. A CNN is a type of feed-forward artificial neural network in which the connectivity pattern between its neurons is inspired by the organization of a visual cortex. Individual cortical neurons respond to stimuli in a restricted region of space known as the receptive field. The receptive fields of different neurons partially overlap such that they tile the visual field. The response of an individual neuron to stimuli within its receptive field can be approximated mathematically by a convolution operation. CNNs are based on biological processes and are variations of multilayer perceptrons designed to use minimal amounts of preprocessing.

[0073] In some embodiments, the artificial intelligence module is trained based on training data, to correlate the feature vector to expected outputs in training data. The training data includes a positive training set of features that have been determined to have a desired property in question, and, in some embodiments, a negative training set of features that lack the property in question. Machine learning techniques are used to train the artificial intelligence module, that when applied to a feature vector, outputs indications of whether the feature vector has an associated desired property or properties, such as a probability that the feature vector has a particular Boolean property, or an estimated value of a scalar property. The artificial intelligence module can further apply dimensionality reduction (e.g., via linear discriminant analysis (LDA), principle component analysis (PCA), or the like) to reduce the amount of data in the feature vector to a smaller, more representative set of data.

[0074] Supervised machine learning can be used to train the artificial intelligence module, with feature vectors of the positive training set and the negative training set serving as the inputs. In some embodiments, different machine learning techniques,

such as linear support vector machine (linear SVM), boosting for other algorithms (e.g., AdaBoost), logistic regression, naïve Bayes, memory-based learning, random forests, bagged trees, decision trees, boosted trees, boosted stumps, neural networks, CNNs, etc., are used. In some example embodiments, a validation set is formed of additional features, other than those in the training data that have already been determined to have or to lack the property in question. The artificial intelligence module can apply a trained machine learning model to the features of the validation set to quantify the accuracy of the machine learning model. Common metrics applied in accuracy measurement include: Precision and Recall, where Precision refers to a number of results the artificial intelligence module correctly predicted out of the total it predicted, and Recall is a number of results the artificial intelligence module correctly predicted out of the total number of features that did have the desired property in question. In some embodiments, the artificial intelligence module is iteratively re-trained until the occurrence of a stopping condition, such as the accuracy measurement indication that the artificial intelligence module is sufficiently accurate, or a number of training rounds having taken place.

[0075] Returning now to Figures 5A-5D, when the user positions the device according to the instructions, the user can select the button 535, and the evaluator device 110 can indicate that the picture has been taken by, for example, producing a clicking sound, even though the evaluator device 110 is recording a video. The reason to indicate that the picture has been taken is to lead the user to believe that the app is recording pictures, thus leading the user who wants to switch out the target device 120 to be less careful when switching the devices.

[0076] When recording the video in steps 530, 540, 550, the evaluator device 110 can have the flashlight 170 in Figure 1 on, so that any fractures on the target device 120 reflect the flashlight and create highlights, which can be detected as cracks on the target device 120. In one embodiment, the application running on the evaluator device 110 can check whether the target device 120 has a white frame around the display. If the target device 120 has a white frame, the application can perform steps 530, 540, 550 twice, once with the flashlight 170 on, and once with the flashlight 170 off.

[0077] If the evaluator device 110 determines that the target device 120 has a white or gray border or back, the evaluator device 110 can choose to not turn on the

flashlight because the flashlight helps with detecting highlights and/or glints of the cracked glass when the glass is over a black sub-surface, e.g. LCD. However, when the cracked glass is on top of a white or a gray surface, the evaluator device 110 can detect drop shadows on top of the white or gray surface. In that case, turning on the flashlight can deter the detection of the drop shadows by illuminating them and washing them out. Consequently, the evaluator device 110 can ask the user to take two pictures of a single side of the target device 120, such as a front side or the backside of the target device 120. The first picture can be taken with the flashlight, and the second picture can be taken without the flashlight.

[0078] Steps 510, 520, 530, 540, 550 can be repeated numerous times, independently of each other. For example, step 510 can be repeated three or four times, while steps 530, 540, 550 are repeated twice. The number of pictures taken and the number of videos taken can vary depending on the information provided by the user, and information detected in the pictures and videos recorded. For example, if the remote operator detects a potential crack in the front of the screen based on a video of the front of the screen, the remote operator can request an additional video recording of the front of the screen under different lighting conditions.

[0079] As explained in this application, the evaluator device 110 can be, for example, a laptop, or a desktop, and the user can receive a quote for the target device 120 using a web browser running on the evaluator device 110. The evaluator device 110 can ask the user's permission to turn on the evaluator device's 110 camera 150. If the user approves, the browser tells the user to move the target device 120 through the various positions so the fixed camera 150 can record the video for the remote operator such as an AI to analyze. In this scenario, the user can optionally place a flashlight (e.g., the flash of a working phone) resting on their evaluator device's 110 screen, facing the user, so that the camera 150 can better record any cracks in the target device 120.

[0080] Figure 6 shows a series of user interfaces that display a guaranteed price and various payment options according to some embodiments of the present technology. After performing the target device 120 evaluation, the application running on the evaluator device 110 can present a guaranteed price 600 to the user. If the user refuses the guaranteed price 600, the application running on the evaluator device 110 can present an option to the user to explain the reasoning behind the offer price, such

as a crack in the target device 120 was detected. If the user accepts the guaranteed price 600, in step 610, the application can offer to the user store credit such as store points, a gift card, a better quality device, device accessories, credits for unrelated services such as an Uber or a Lyft ride, points, mileage credits, etc.

[0081] In step 620, the application can present to the user options 630, 640, 650 on how to receive payment. None of the options 630, 640, 650 require further investigation of the target device 120, because the guaranteed price 600 is an accurate quote.

[0082] If the user selects option 630, the user can take the target device 120 to a store or a kiosk and receive cash payment. The kiosk or a device at the store can read the target device 120's IMEI, electrically or via OCR. The kiosk or the device at the store can pay the user without needing to do any further interrogation. Consequently, kiosks or devices at the store do not have to include any grading capabilities, and can be cheap devices that confirm IMEI and identity, and pay customers.

[0083] If the user selects option 640, the user can print the label and ship the target device 120 to the store or the kiosk. The cost of the shipping can be subtracted from the guaranteed price 600. If the user selects the third option 650, the user can receive a shipping box with the shipping label. The cost of the box and the shipping label can also be subtracted from the guaranteed price 600. Alternatively, the user can receive payment for the target device 120 from a third party such as a GrubHub™, Uber™, or Lyft™ driver that comes to pick up the target device 120 and take the target device 120 to a store or a kiosk for a nominal fee.

[0084] The user can increase the evaluation of the target device 120 by testing the target device 120's touchscreen functionality, display quality, Wi-Fi, camera, microphone, GPS, etc. To test additional functionality, the application running on the evaluator device 110 can display a code, such as a QR code. The application running on the evaluator device 110 can instruct the user, via audio, video, text, picture or other similar means, to point a camera of the target device 120 toward the code.

[0085] Once the target device 120 scans the code, the target device 120 can execute instructions to test the target device 120's touchscreen functionality, display quality, network access such as data, Wi-Fi, camera, microphone, GPS, etc. The instructions can be provided to the target device 120 through an application installed on

the target device 120 or can be provided to the target device 120 when the target device 120 visits a specified webpage.

[0086] Figure 7 shows a user interface that displays tests of the target device 120 including touchscreen functionality according to some embodiments of the present technology. The user can run the tests if the user has selected "Sell This Phone" 310 in Figure 3, or "Sell Another Phone" 320 in Figure 3.

[0087] If the user selects the "Sell This Phone" and completes the self-evaluation, e.g. the evaluator device 110 in Figure 1 determines the make and model of the target device 120 in Figure 1, the evaluator device 110 can choose to run the tests described in Figures 7-10 based on the make and model of the target device 120. For example, if the target device 120 is a more expensive device, such as an iPhone™ 11 Pro Max, the evaluator device 110 can run the tests in Figures 7-10. If the target device 120 is a less inexpensive device, such as an iPhone™ 5, the evaluator device 110 can skip the tests in Figures 7-10.

[0088] If the user selects "Sell Another Phone" 320, the evaluator device 110 can run the tests in Figures 7-10, and the applications on the evaluator device 110 and the target device 120 can communicate with each other to determine the final price 600. The target device 120 can report its condition, and with that data, the evaluator device 110 can determine the final price.

[0089] To run the tests on the target device 120, in one embodiment, the evaluator device can ask the user to download the test application to the target device 120, where the test application is configured to run the tests. In other embodiments, to streamline the process, and not require the user to download another application, the evaluator device 120 can show a QR code on its screen and ask the target device 120 to point the target device 120's camera at the QR code. When the target device 120 detects the QR code, the target device 120 can launch a web browser and take the user to a website. The website, via HTML5 and Javascript, can run one or more of the tests in Figures 7-10 via the target device 120's browser.

[0090] The evaluator device 110 can run the tests in Figures 7-10, either before or after providing the quote 482 in Figure 4, 600 in Figure 6. For example, if the evaluator device 110 runs the tests in Figures 7-10 before providing the quote 482, the evaluator device 110 can offer the user the highest price. In another example, evaluator device

110 can run the tests in Figures 7-10 only after providing the quote 482, 600 and the user declines the quote. After the user declines the quote, the evaluator device 110 can try to win the user back by offering a chance for a higher quote, such as by asking "Want $10 more?" If the user indicates that they do want a higher quote, the evaluator device 110 can run the tests in Figures 7-10.

[0091] To test network access of the target device 120, the target device 120 can be asked to access a particular webpage 700. If the target device 120 successfully accesses the webpage 700, that is an indication that the target device 120 has functioning network access. To test the camera of the target device 120, the target device 120 scans a QR code that can initiate testing of other functionalities of the target device 120.

[0092] To test the touchscreen functionality, the target device 120 can display a square 710, that can move horizontally and vertically across the screen 720. In each position of the square 710, the target device 120 can ask the user to select the square 710. The target device 120 can determine whether the selection was detected, and whether the selection matches the location of the square 710. If the selection matches the location of the square 710 for all positions of the square 710 across the screen 720, the target device 120 can determine that the touchscreen functionality works.

[0093] Figure 8 shows a user interface that displays a test of the microphone of the target device 120 according to some embodiments of the present technology. The target device 120 or the evaluator device 110 can instruct the user, via audio, video, text, picture or other similar means, how to test the microphone. For example, the target device 120 can provide a button to start the test and record the audio, and a button 800 to stop the test. The target device 120 can display a visualization 810 of the recorded audio. In some embodiments, during the microphone test, the evaluator device 110 produces audio signals at, e.g., 12,000 Hz. The microphone of the target device 120 captures the audio signals at the test frequency. The process is repeated for the different speakers and microphones available.

[0094] Figure 9 shows a user interface that displays a test of the GPS of the target device 120 according to some embodiments of the present technology. The target device 120 can test the GPS by determining the location of the target device 120 using the GPS and communicating the location of the target device 120 to the user, via audio,

video, text, picture or other similar means. For example, the target device 120 can display the detected location 900 of the target device 120 on a map. The target device 120 can request a confirmation from the user, such as using buttons 910, 920 or an audio communication. In embodiments, the GPS of the target device 120 is tested by using the evaluator device 110 to record a value that the target device 120 generates as its location. The evaluator device 110 records the value using the QR code procedure disclosed herein. The evaluator device 110 compares the recorded value to a location value generated by the GPS of the evaluator device 110 to perform the test.

[0095] Figure 10 shows a user interface that displays a test of the display of the target device 120 according to some embodiments of the present technology. The target device 120 can display the colors, such as red, blue, and green, on the display screen 1000 of the target device 120. The target device 120 can present a query to the user, via audio, video, text, picture or other similar means, such as: "in the areas where we are cycling through colors, do you see any pixels, elements, or spots that are not shifting colors?". The user can respond to the query using buttons 1010, 1020, or by using audio communication.

[0096] Figure 11 shows a map displaying kiosks and associated prices. Once the user accepts the guaranteed price 600 in Figure 6, the evaluator device 110 can present a map 1100 of kiosks and/or stores to the user, indicating where the user can redeem the target device 120. The map 1100 can also present a price 1110, 1120 (only two labeled for brevity) that can be obtained at the various kiosks. The price 1110, 1120 can depend on the method of payment selected by the user, such as methods described in Figure 6, and/or the distance to the kiosk.

[0097] Figure 12 is an isometric view of a kiosk 1200 for recycling and/or other processing of mobile phones and other consumer electronic devices in accordance with some embodiments of the present technology.

[0098] In the illustrated embodiment, the kiosk 1200 is a floor-standing, self-service kiosk configured for use by a user 1201 (e.g., a consumer, customer, etc.) to recycle, sell, and/or perform other operations with a target device 120 such as a mobile phone or other consumer electronic device. In other embodiments, the kiosk 1200 can be configured for use on a countertop or a similar raised surface. Although the kiosk 1200 is configured for use by consumers, in various embodiments, the kiosk 1200

and/or various portions thereof can also be used by other operators, such as a retail clerk or kiosk assistant, to facilitate the selling or other processing of target devices 120 such as mobile phones and other consumer electronic devices.

[0099] The kiosk 1200 can be used in a number of different ways to efficiently facilitate the recycling, selling, and/or other processing of target devices 120 such as mobile phones and other consumer electronic devices. For example, a user wishing to sell a used mobile phone or other target device 120 can bring the target device 120 to the kiosk 1200 for recycling. In some embodiments, the kiosk 1200 can perform a visual analysis and/or an electrical analysis, verify the user's identity, and pay the user 1201 for the target device 120 using one or more of the methods and/or systems described in detail in the commonly owned patents and patent applications identified herein and incorporated by reference in their entireties.

[0100] As those of ordinary skill in the art will appreciate, various embodiments of the kiosk 1200 can be used for recycling virtually any consumer electronic device, such as mobile phones, MP3 players, tablet computers, laptop computers, e-readers, PDAs, Google® Glass™, smartwatches, and other portable or wearable devices, as well as other relatively non-portable electronic devices such as desktop computers, printers, televisions, DVRs, devices for playing games, and entertainment or other digital media on CDs, DVDs, Blu-ray™, etc.

[0101] Figure 13 is a high-level flow diagram of a routine 1300 to generate a guaranteed price of a target device 120 (e.g., a mobile phone, tablet computer, thumb drive, television, SLR, etc.) for recycling in accordance with some embodiments of the present technology. In various embodiments, an app running on an evaluator device (e.g., the evaluator device 110 of Figure 1) such as a mobile phone or computer, and/or another processing device operatively connectable to the app, such as a remote computer (e.g., a server), can perform some or all of the routine 1300. In some instances, for example, a user who owns a target device 120 (e.g., a game console, laptop, etc.) may want to know how much the target device 120 is worth so that he or she can decide whether to sell it. The routine 1300 of Figure 13 enables the user to use another electronic device (e.g., the evaluator device 110) to quickly obtain a current price for the target device 120, without requiring the user to bring the target device 120

to a recycling kiosk 1200, a retail outlet, or another location, and without requiring the user to manually provide information about the target device 120 and its configuration.

[0102] In various embodiments, the routine 1300 and the other flow routines described in detail herein can be implemented by an evaluator device 110 running an app that can obtain information about a connected target device 120. The target device 120 may be, for example, one of various consumer electronic devices, such as a used mobile telecommunication device, which includes all manner of handheld devices having wired and/or wireless communication capabilities (e.g., a smartphone, computer, television, game console, home automation device, etc.). In some embodiments, the user downloads the app to the evaluator device 110 from an app store or other software repository associated with the device manufacturer or a third party (e.g., the Apple® Appstore™, Google Play™ store, Amazon® Appstore™, and so on), from a website, from a kiosk such as the kiosk 1200 (e.g., sideloading an app over a wired or wireless data connection), from a removable memory device such as an SD flashcard or USB drive, etc. In other embodiments, the app is loaded on the evaluator device 110 before it is first acquired by the user (e.g., preinstalled by the device manufacturer, a wireless service carrier, or a device vendor).

[0103] In block 1302, the evaluator device 110 can obtain technical properties associated with the target device 120. The technical properties can include make and model of the device, computation capacity of the device, memory capacity of the device, carrier providing data, and/or cellular connectivity to the device, etc.

[0104] In block 1304, the evaluator device 110 can obtain physical properties associated with the target device 120. The physical properties can include wear and tear of the target device 120. To obtain the physical properties, the evaluator device 110 can instruct a user of the target device 120 to position the target device 120 in multiple predetermined positions, such as front, back, sides; three-quarter view from the top, bottom, and left of the front; and/or three-quarter view from the top, bottom, and left of the back of the target device 120.

[0105] While obtaining the physical properties of the target device 120, the evaluator device 110 can indicate to the user that the evaluator device 110 has recorded an image of each of the multiple predetermined positions. The indication can include a click, a voice explaining that the picture has been taken, or a visual display indicating

that the picture has been taken. In addition, the evaluator device 110 can record a video of handling of the target device 120 while the target device 120 is being positioned into the multiple predetermined positions, without informing the user that the video is being recorded. By not informing the user that the video is being recorded, the user who wants to commit fraud, and for example, switch the target device 120 with a second device in a better condition, is less careful, and can switch out the devices between pictures. However, because the evaluator device 110 is recording a video, the evaluator device 110 can record the switching out of the devices.

[0106] In block 1306, the evaluator device 110 can evaluate the obtained information of the physical properties to generate a condition metric value of the target device 120 by analyzing the video. The condition metric value can indicate the wear and tear of the target device 120. The condition metric value can be a numerical value indicating the condition of the target device 120 in a predetermined scale, such as a scale from 1 to 100, where 100 indicates mint condition, and 1 indicates that a replacement needed. The condition metric value can be a vector or a matrix, indicating the condition of the device for various factors. For example, the condition metric value can be a vector (50, 10, 70…), where the first entry indicates the condition of the screen, the second entry indicates the condition of the battery, the third entry indicates the memory capacity of the device, etc. The condition metric value to generate a condition metric value of the target device 120 can also be a scalar value representing a weighted sum of the vector entries.

[0107] To determine the wear and tear of the target device 120, the evaluator device 110 can activate its flashlight to illuminate the target device 120, prior to or while the target device 120 is positioned into the multiple predetermined positions. The flashlight can create highlights, or glints, in the cracks on the surface of the target device 120. The evaluator device 110 can detect the highlights, or glints, appearing on a surface of the target device 120.

[0108] The video analysis can be performed by a remote operator such as an AI. The AI can detect an inaccurate determination of the wear and tear of the target device 120 by detecting from the video whether a second device has replaced the target device 120. If the AI detects a switch in the devices, the AI can alert the user and/or a system administrator that a switch has been detected.

[0109] In block 1308, based on the generated condition metric value, the evaluator device 110 can determine the guaranteed price of the target device 120, as explained in this application. In block 1310, the evaluator device 110 can present to the user the guaranteed price of the target device 120.

[0110] The evaluator device 110 can determine whether the target device 120 has been evaluated previously, such as by determining whether the unique device identifier has been previously evaluated by the system. Upon determining that the target device 120 has been evaluated previously, the evaluator device 110 can obtain from a database, properties of the target device 120 and can populate the technical properties and the physical properties from the data contained in the database.

[0111] Figure 13 and the flow diagrams that follow are representative and may not show all functions or exchanges of data, but instead they provide an understanding of commands and data exchanged under the system. Those skilled in the relevant art will recognize that some functions or exchange of commands and data may be repeated, varied, omitted, or supplemented, and other (less important) aspects not shown may be readily implemented. Those skilled in the art will appreciate that the blocks shown in Figure 13 and in each of the flow diagrams discussed below may be altered in a variety of ways. For example, while processes or blocks are presented in a given order, alternative implementations may perform routines in a different order, and some processes or blocks may be rearranged, deleted, moved, added, subdivided, combined, and/or modified to provide alternative or sub-combinations. Each of these processes or blocks may be implemented in a variety of different ways. Also, although processes or blocks are at times shown as being performed in series, these processes or blocks may instead be performed or implemented in parallel, or may be performed at different times. Some of the blocks depicted in Figure 13 and the other flow diagrams are of a type well known in the art, and can themselves include a sequence of operations that need not be described herein. Those of ordinary skill in the art can create source code and/or microcode, program logic arrays, or otherwise implement the embodiments disclosed herein based on the flow diagrams and the Detailed Description provided herein.

[0112] In various embodiments, all or a portion of the routine 1300 and the routines in the other flow diagrams herein can be implemented by means of a consumer or

another user (such as a retail employee) operating one or more of the electronic devices and systems described above. For example, in some embodiments, the routine 1300 and other routines disclosed herein can be implemented by a mobile device, such as the evaluator device 110 described above with reference to Figure 1. For example, in some instances the app can run on one or more evaluator devices 110 and/or on one or more target devices 120. Accordingly, the description of the routine 1300 and the other routines disclosed herein may refer interchangeably to the routine, the app, the evaluator device 110, the target device 120, and/or the kiosk 1200 performing an operation, with the understanding that any of the above devices, systems, and resources can perform all or part of the operation.

[0113] While various embodiments of the present technology are described herein using mobile phones and other handheld devices as examples of electronic devices, the present technology applies generally to all types of electronic devices. For example, in some embodiments, the app can be installed and/or run on a larger evaluator device 110 and/or target device 120, e.g., a laptop or tower computer, to perform all or a portion of the routine 1300. For example, the app can inventory a laptop or desktop computer and provide the user a confirmation code that the user can print out and bring to a kiosk or to an associated retailer location or point of sale (or send in with the computer via, e.g., courier, mail, or package delivery service) as a receipt. The code can identify the target device 120 and represent the agreed price determined according to the valuation performed by the app based on the information it obtained from the target device 120 and on any user-provided supplemental information. In some embodiments, the app and/or the receipt can indicate any elements that require independent verification (e.g., undamaged screen glass) for the user to receive the agreed price for the target device 120. The user can then take the target device 120 to the retail storefront or point of sale (or, e.g., to the kiosk 1200 for viewing by a remote kiosk operator) for its condition to be independently verified, after which the user can deposit the target device 120. The user can then receive the price upon verified receipt of the target device 120, such as a retailer or the kiosk 1200 issuing cash, a credit, or a card such as a gift card.

[0114] Figure 14 is a flow diagram of a routine 1400 for remotely evaluating a target device 120 for recycling in accordance with some embodiments of the present technology. In various embodiments, the kiosk 1200 and/or another processing device operatively connectable to the kiosk 1200, such as a remote server, can perform some

or all of the routine 1400. In some embodiments, the routine 1400 can be performed in conjunction with the routine 1300 of Figure 13 performed by the evaluator device 110, which can be remote from the kiosk 1200. For example, the kiosk 1200 and/or a remote server can provide software (e.g., the app described above) to be installed on the evaluator device 110, and then the kiosk and/or server can remotely receive information about the target device 120 via the app installed on the evaluator device 110, use the information to provide an offer price for the target device 120, and record the offer price so that the user can recycle the target device 120 for the quoted offer price when the user brings the target device 120 to the kiosk 1200.

[0115] In block 1402, the routine 1400 provides the app described above to install on the evaluator device 110. The routine 1400 can provide the app to the evaluator device 110 by various avenues: for example, from the kiosk 1200 (e.g., sideloading the app over a wired or wireless data connection); through a website (e.g., a website associated with the kiosk operator); from a software repository run by the device manufacturer or a third party (e.g., the Apple® Appstore™, Google Play™ store, Amazon® Appstore™, etc.); via a removable memory device such as an SD flashcard or USB drive; by preinstallation on the evaluator device 110 by the device manufacturer, a wireless service carrier, or a device vendor; and so on.

[0116] In block 1404, the routine 1400 receives information about the target device 120 and/or the user via the app on the evaluator device 110. The information can include, for example, a device identifier such as a serial number, IMEI number, or hardware address; a device make and/or model name, number, or code; data describing the device configuration, characteristics, and/or capabilities; owner information, such as a name, driver's license number, and/or account identifier; etc. For example, the user may download and run the app on the evaluator device 110 to obtain such information about the target device 120, and the app can store information about the target device 120, and/or transmit the information, for example, to a remote server computer. In various embodiments, the routine 1400 can access the stored or transmitted information, such as by receiving the information at the server computer.

[0117] In block 1406, the routine 1400 records one or more identifiers of the target device 120 (and/or the evaluator device 110) and/or the user. In some embodiments, the routine 1400 utilizes an identifier associated with the target device 120 that was

included in the information that the routine 1400 received in block 1404. Examples of such target device 120 identifiers include the IMEI of a mobile phone, the model and/or serial numbers of a laptop computer, a unique wireless identifier of the target device 120 such as a Wi-Fi interface MAC address, a product bar code, USB vendor ID and device ID (and release number) codes, etc. The identifier can also be a derived code such as a unique hash (based on, e.g., the information received in block 1404), and/or a serially or randomly assigned code such as by generating a globally unique identifier (GUID) for the target device 120 and/or user. In some embodiments, the routine 1400 can generate an identifier after pricing the target device 120, so that the identifier reflects the pricing. User-related identifiers can include, for example, a driver's license number, account credentials such as a username and password, etc. The routine 1400 can record the identifiers in a registry database that indexes identifiers against, for example, evaluator devices 110 to which the app has been installed, target devices that the system has priced (e.g., remotely via the app), and/or target devices that the kiosk 1200 has previously evaluated, for example. The database can be, for example, one or more of the databases associated with the server computer, can be stored in the cloud storage facility, can be distributed among the kiosks 1200, and so on.

[0118] In block 1408, the routine 1400 evaluates the target device 120 based on the information. For example, the routine 1400 can compare the received target device 120 information to a database of prices, such as a lookup table, pricing model, or other data structure containing prices for various target devices on a server that can be remotely located from the evaluator device 110 and/or the target device 120 (e.g., the server computer). The routine 1400 can, for example, use the identifier to determine the make and model of the target device 120, and use the make and model of the target device 120 (along with, e.g., information about the condition of the target device 120) to determine a price to offer for the device based on the data in the database or pricing model. In some embodiments, the routine 1400 can determine an offer price that enables the user to receive the price in exchange for recycling the target device 120 at the kiosk 1200. In some embodiments, the routine 1400 can determine an offer price for the target device 120 that is contingent on an assessment of the visual condition of the target device 120 by the evaluator device 110 or by the kiosk 1200. In some embodiments, the routine 1400 can determine an offer price that includes a range of prices based on the possible outcomes of such an assessment. In some instances, the

target device 120 may have no market value. In various embodiments, the pricing data is updated on a continuous or periodic basis.

[0119] In block 1410, the routine 1400 sends an offer price quote for the target device 120 to the evaluator device 110. In some embodiments, the routine 1400 sends the offer price quote from the server to the app running on the evaluator device 110. In block 1412, the routine 1400 associates the quoted price with the identified target device 120 (and/or the evaluator device 110) and/or the user. For example, the routine 1400 can store information about the price quote, the target device 120, and/or the user in the database and/or in one or more data structures maintained by the app on the evaluator device 110, by the kiosk 1200, and/or by other aspects of the present technology. In some embodiments, the routine 1400 can associate the price with a unique identifier such as a hash value generated based on the user, the device identification, the app, and/or the time and amount of the price itself, etc. For example, the routine 1400 can associate a numeric or alphanumeric identifier code with the offer price for the target device 120 and give that code to the user, informing the user that the user can enter the code at the kiosk 1200 by a certain time to receive the offer price for the device. For example, the routine 1400 can display the code on the screen 115 of the evaluator device 110 and/or send the user an email or text message containing the code. The routine 1400 can store the price and the identifier in a data structure on the evaluator device 110 (e.g., in a table maintained by the app) and/or remotely from the evaluator device 110 (e.g., in a data structure maintained at one or more of the kiosk 1200, the server computer, the cloud storage facility, etc.), and it can transmit them between or among various computing and/or storage facilities. In some embodiments, the routine 1400 transmits the identifier to the server computer so that when the kiosk 1200 receives the identifier, the kiosk 1200 can look up the identifier and retrieve the associated price for the target device 120. After block 1412, the routine 1400 ends.

[0120] Embodiments of the kiosk 1200 and various features thereof can be at least generally similar in structure and function to the systems, methods and corresponding features described in the following patents and patent applications, which are incorporated herein by reference in their entireties: U.S. Patent Nos.: 10,860,990, 10,853,873, 10,572,946, 10,475,002; 10,445,708; 10,438,174; 10,417,615; 10,401,411; 10,269,110; 10,127,647; 10,055,798; 9,885,672; 9,881,284; 8,200,533; 8,195,511; and 7,881,965; U.S. Patent Application Nos.: 17/445,178; 17/445,158;

17/445,083; 17/445,082; 17/125,994; 16/794,009; 16/788,169; 16/788,153; 16/719,699; 16/794,009; 16/534,741; 15/057,707; 14/967,183; 14/966,346; 14/964,963; 14/663,331; 14/660,768; 14/598,469; 14/568,051; 14/498,763; 13/794,816; 13/794,814; 13/753,539; 13/733,984; 13/705,252; 13/693,032; 13/658,828; 13/658,825; 13/492,835; 13/113,497; U.S. Provisional Application Nos. 63/220,890; 63/220,381; 63/127,148; 63/116,020; 63/116,007; 63/088,377; 63/070,207; 63/066,794; 62/950,075; 62/807,165; 62/807,153; 62/804,714; 62/782,947; 62/782,302; 62/332,736; 62/221,510; 62/202,330; 62/169,072; 62/091,426; 62/090,855; 62/076,437; 62/073,847; 62/073,840; 62/059,132; 62/059,129; 61/607,572; 61/607,548; 61/607,001; 61/606,997; 61/595,154; 61/593,358; 61/583,232; 61/570,309; 61/551,410; 61/472,611; 61/347,635; 61/183,510; and 61/102,304. All the patents and patent applications listed in the preceding sentence and any other patents or patent applications identified herein are incorporated herein by reference in their entireties.

[0121] The above Detailed Description of the embodiments disclosed herein is not intended to be exhaustive or to limit the embodiments disclosed to the precise form disclosed above. Although specific examples for the embodiments disclosed herein are described above for illustrative purposes, various equivalent modifications are possible within the scope of the embodiments, as those skilled in the relevant art will recognize.

[0122] References throughout the foregoing description to features, advantages, or similar language do not imply that all of the features and advantages that may be realized with the present technology should be or are in any single embodiment. Rather, language referring to the features and advantages is understood to mean that a specific feature, advantage, or characteristic described in connection with an embodiment is included in at least one embodiment of the present technology. Thus, discussions of the features and advantages, and similar language, throughout this specification may, but do not necessarily, refer to the same embodiment.

[0123] Furthermore, the described features, advantages, and characteristics of the present technology may be combined in any suitable manner in one or more embodiments. One skilled in the relevant art will recognize that the present technology can be practiced without one or more of the specific features or advantages of a particular embodiment. In other instances, additional features and advantages may be

recognized in certain embodiments that may not be present in all embodiments of the present technology.

[0124] Any patents and applications and other references noted above, including any that may be listed in accompanying filing papers, are incorporated herein by reference. Aspects of the embodiments disclosed herein can be modified, if necessary, to employ the systems, functions, and concepts of the various references described above to provide yet further implementations of the embodiments disclosed herein.

[0125] Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise," "comprising," and the like are to be construed in an inclusive sense, as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to." As used herein, the terms "connected," "coupled," or any variant thereof means any connection or coupling, either direct or indirect, between two or more elements; the coupling or connection between the elements can be physical, logical, or a combination thereof. Additionally, the words "herein," "above," "below," and words of similar import, when used in this application, refer to this application as a whole and not to any particular portions of this application. Where the context permits, words in the above Detailed Description using the singular or plural number may also include the plural or singular number respectively. The word "or," in reference to a list of two or more items, covers all of the following interpretations of the word: any of the items in the list, all of the items in the list, and any combination of the items in the list.

[0126] The teachings of the embodiments disclosed herein can be applied to other systems, not necessarily the system described above. The elements and acts of the various examples described above can be combined to provide further implementations of the embodiments disclosed herein. Some alternative implementations of the embodiments disclosed herein may include not only additional elements to those implementations noted above, but also may include fewer elements. Further any specific numbers noted herein are only examples: alternative implementations may employ differing values or ranges.

[0127] Although the above description describes various embodiments and the best mode contemplated, regardless of how detailed the above text, the embodiments disclosed herein can be practiced in many ways. Details of the system may vary

considerably in its specific implementation, while still being encompassed by the present technology. As noted above, particular terminology used when describing certain features or aspects of the embodiments disclosed herein should not be taken to imply that the terminology is being redefined herein to be restricted to any specific characteristics, features, or aspects with which that terminology is associated. In general, the terms used in the following claims should not be construed to limit the embodiments disclosed herein to the specific examples disclosed in the specification, unless the above Detailed Description section explicitly defines such terms. Accordingly, the actual scope of the embodiments disclosed herein encompasses not only the disclosed examples, but also all equivalent ways of practicing or implementing the embodiments disclosed herein under the claims.

[0128] From the foregoing, it will be appreciated that specific embodiments have been described herein for purposes of illustration, but that various modifications may be made without deviating from the spirit and scope of the various embodiments disclosed. Further, while various advantages associated with certain embodiments have been described above in the context of those embodiments, other embodiments may also exhibit such advantages, and not all embodiments need necessarily exhibit such advantages to fall within the scope of the embodiments disclosed herein. Accordingly, the embodiments are not limited, except as by the appended claims.

[0129] Although certain aspects of the embodiments disclosed herein are presented below in certain claim forms, the applicant contemplates the various aspects of the embodiments disclosed herein in any number of claim forms. Accordingly, the applicant reserves the right to pursue additional claims after filing this application to pursue such additional claim forms, in either this application or in a continuing application.

CLAIMS

What is claimed is:

1. A computer-implemented method to generate a price of a target device, the method comprising:

obtaining, by an evaluator device, technical properties associated with the target device, the technical properties comprising a make and a model of the target device;

obtaining, by the evaluator device, physical properties associated with the target device, the physical properties comprising information related to wear and tear of the target device, wherein obtaining the physical properties comprises:

indicating, by a user interface of the evaluator device, to a user that the user should position the target device in one or more predetermined positions;

indicating, by the user interface, to the user that the evaluator device records one or more images of the target device in each of the predetermined positions; and

capturing, by a camera of the evaluator device, the one or more images of the target device while the target device is positioned in the predetermined positions;

evaluating the obtained physical properties to generate a condition metric value of the target device;

based on the generated condition metric value, determining the price of the target device; and

indicating, by the user interface, the price of the target device to the user.

2. The computer-implemented method of claim 1, further comprising:

activating a flashlight of the evaluator device to illuminate the target device, prior to or while the target device is positioned at the predetermined positions; and

detecting highlights appearing on a surface of the target device by analyzing the one or more captured images, the highlights indicating at least one crack on the surface of the target device.

3. The computer-implemented method of claim 1, further comprising:

detecting that a second device has replaced the target device by analyzing the one or more captured images; and

determining that the obtained physical properties are inaccurate responsive to detecting that the second device has replaced the target device.

4. The computer-implemented method of claim 3, wherein detecting that the second device has replaced the target device is performed using a trained machine learning model.

5. The computer-implemented method of claim 1, further comprising:

obtaining a unique identifier of the target device;

determining whether the target device has been evaluated previously based on the unique identifier; and

upon determining that the target device has been evaluated previously, retrieving data describing the target device from a database.

6. The computer-implemented method of claim 5, wherein obtaining the technical properties and the physical properties comprises:

populating the technical properties and the physical properties from the data describing the target device.

7. The computer-implemented method of claim 1, further comprising:

receiving, by the user interface, an acceptance of the price from the user; and

upon receiving the acceptance, presenting, by the user interface, a map to the user indicating one or more locations at which the user can redeem the target device at an associated price.

8. An evaluator device to evaluate a target device, the evaluator device comprising:

one or more processors; and

at least one non-transitory computer-readable medium coupled to the one or more processors, wherein the at least one non-transitory computer-readable medium stores instructions, which, when executed by the one or more processors cause the one or more processors to:

obtain technical properties associated with the target device, the technical properties comprising a make and a model of the target device;

obtain physical properties associated with the target device, the physical properties comprising information related to wear and tear of the target device, wherein obtaining the physical properties comprises:

indicate, by a user interface of the evaluator device, to a user that the user should position the target device in one or more predetermined positions;

indicate, by the user interface, to the user that the evaluator device records one or more images of the target device in each of the predetermined positions; and

record, by a camera of the evaluator device, a video of the target device while the target device is positioned in the predetermined positions;

evaluate the obtained physical properties to generate a condition metric value of the target device;

based on the generated condition metric value, determine the price of the target device; and

indicate, by the user interface, the price of the target device to the user.

9. The evaluator device of claim 8, wherein the instructions further cause the one or more processors to:

activate a flashlight of the evaluator device to illuminate the target device, prior to or while the target device is positioned into the predetermined positions; and

detect highlights appearing on a surface of the target device by analyzing the video, the highlights indicating at least one crack on the surface of the target device.

10. The evaluator device of claim 8, wherein the instructions further cause the one or more processors to:

detect that a second device has replaced the target device by analyzing the video; and

determine that the obtained physical properties are inaccurate responsive to detecting that the second device has replaced the target device.

11. The evaluator device of claim 10, wherein the instructions cause the one or more processors to detect that the second device has replaced the target device using an artificial intelligence module.

12. The evaluator device of claim 8, wherein the instructions further cause the one or more processors to:

obtain a unique identifier of the target device;

determine whether the target device has been evaluated previously based on the unique identifier; and

upon determining that the target device has been evaluated previously, retrieve data describing the target device from a database.

13. The evaluator device of claim 12, wherein the instructions to obtain the technical properties and the physical properties cause the one or more processors to:

populate the technical properties and the physical properties from the data describing the target device.

14. The evaluator device of claim 8, wherein the instructions further cause the one or more processors to:

receive, by the user interface, an acceptance of the price from the user; and

upon receiving the acceptance, present, by the user interface, a map to the user indicating one or more locations at which the user can redeem the target device at an associated a price.

15. A non-transitory computer-readable medium storing instructions, which, when executed by at least one computing device of an evaluator device, cause the at least one computing device to:

obtain technical properties associated with a target device, the technical properties comprising a make and a model of the target device;

obtain physical properties associated with the target device, the physical properties comprising information related to wear and tear of the target device, wherein obtaining the physical properties comprises:

indicate, by a user interface of the evaluator device, to a user that the user should position the target device in one or more predetermined positions;

indicate, by the user interface, to the user that the evaluator device records one or more images of the target device in each of the predetermined positions; and

capture, by a camera of the evaluator device, the one or more images of the target device while the target device is positioned in the one or more predetermined positions;

evaluate the obtained physical properties to generate a condition metric value of the target device;

based on the generated condition metric value, determine the price of the target device; and

indicate, by the user interface, the price of the target device to the user.

16. The non-transitory computer-readable medium of claim 15, wherein the instructions further cause the at least one computing device to:

activate a flashlight of the evaluator device to illuminate the target device, prior to or while the target device is positioned at the predetermined positions; and

detect highlights appearing on a surface of the target device by analyzing the one or more captured images, the highlights indicating at least one crack on the surface of the target device.

17. The non-transitory computer-readable medium of claim 15, wherein the instructions further cause the at least one computing device to:

detect that a second device has replaced the target device by analyzing the video; and

determine that the obtained physical properties are inaccurate responsive to detecting that the second device has replaced the target device.

18. The non-transitory computer-readable medium of claim 17, wherein the instructions cause the at least one computing device to detect that the second device has replaced the target device using a machine learning model.

19. The non-transitory computer-readable medium of claim 15, wherein the instructions further cause the at least one computing device to:

obtain a unique identifier of the target device;

determine whether the target device has been evaluated previously based on the unique identifier; and

upon determining that the target device has been evaluated previously, retrieve data describing the target device from a database.

20. The non-transitory computer-readable medium of claim 19, wherein the instructions to obtain the technical properties and the physical properties cause the at least one computing device to:

populate the technical properties and the physical properties from the data describing the target device.

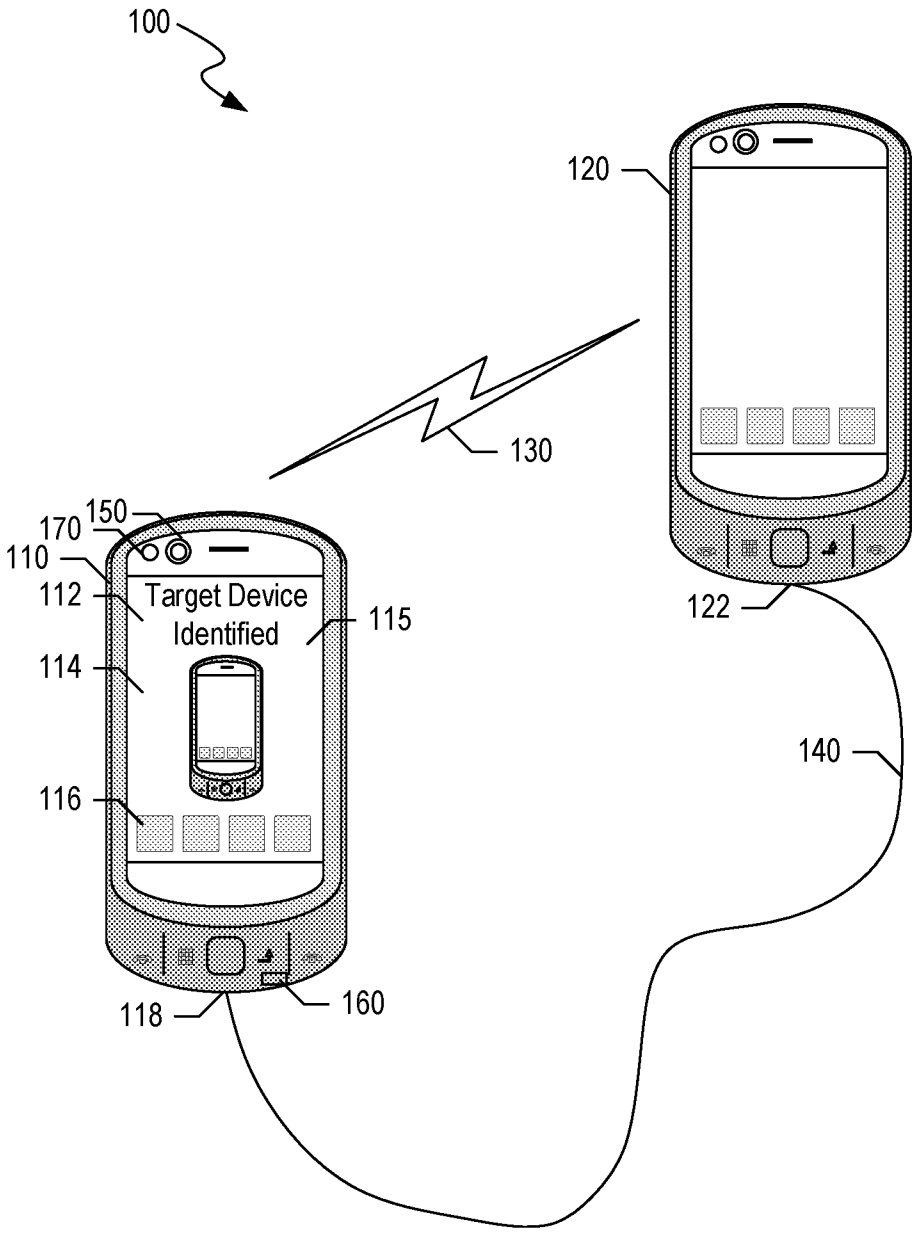

100
120
130
150
170
110
112
Target Device
Identified
115
114
116
122
140
118
160

FIG. 1

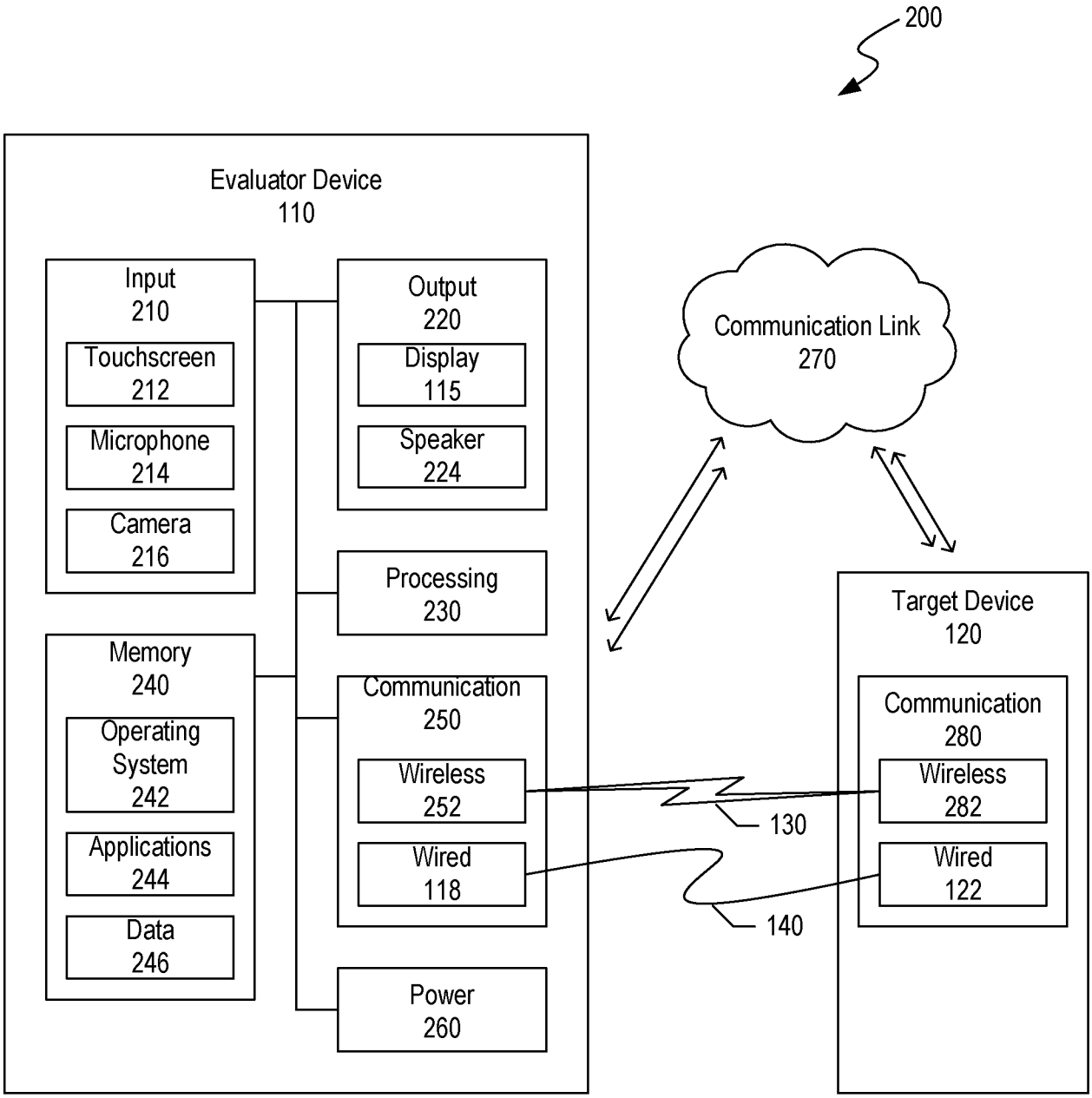

200
Evaluator Device
110
Input
210
Touchscreen
212
Microphone
214
Camera
216
Output
220
Display
115
Speaker
224
Processing
230
Memory
240
Operating System
242
Applications
244
Data
246
Communication
250
Wireless
252
Wired
118
Power
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Communication Link
270
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Wireless
282
Wired
122

FIG. 2

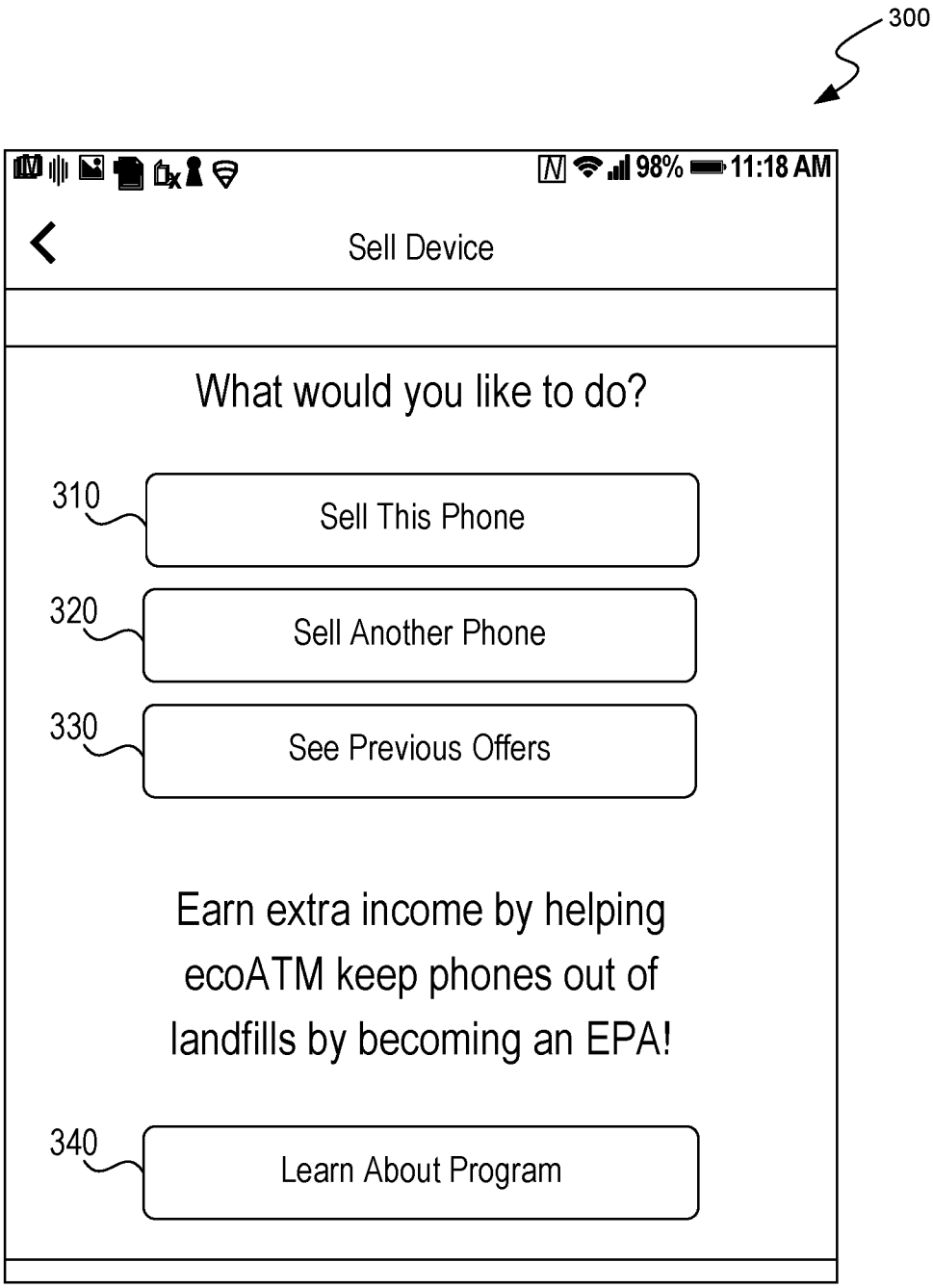

300
98%
11:18 AM
Sell Device
What would you like to do?
310
Sell This Phone
320
Sell Another Phone
330
See Previous Offers
Earn extra income by helping ecoATM keep phones out of landfills by becoming an EPA!
340
Learn About Program

FIG. 3

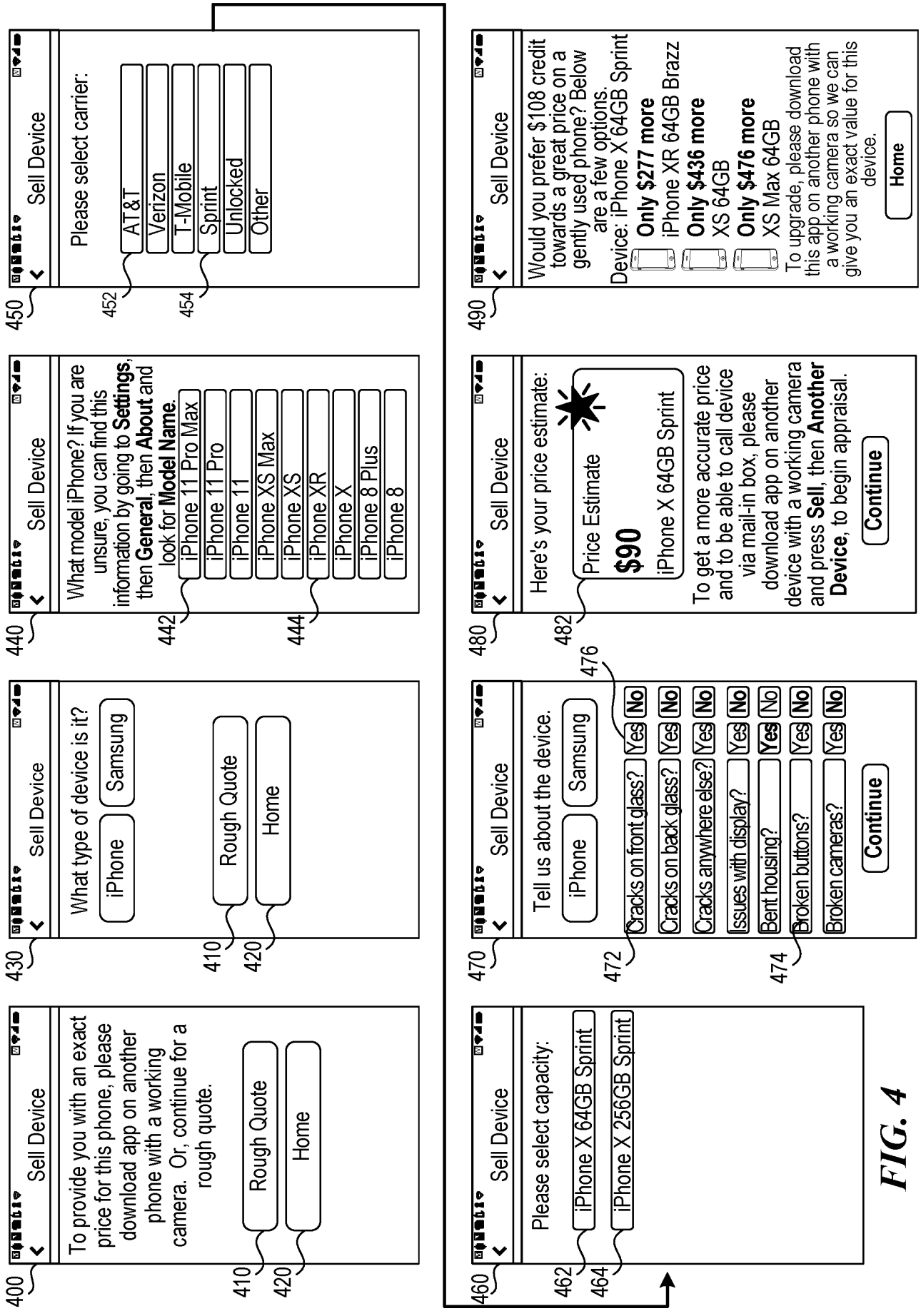

400
Sell Device
To provide you with an exact price for this phone, please download app on another phone with a working camera. Or, continue for a rough quote.
410
Rough Quote
420
Home
430
Sell Device
What type of device is it?
iPhone
Samsung
410
Rough Quote
420
Home
440
Sell Device
What model iPhone? If you are unsure, you can find this information by going to Settings, then General, then About and look for Model Name.
442
iPhone 11 Pro Max
iPhone 11 Pro
iPhone 11
iPhone XS Max
iPhone XS
444
iPhone XR
iPhone X
iPhone 8 Plus
iPhone 8
450
Sell Device
Please select carrier:
452
AT&T
Verizon
T-Mobile
454
Sprint
Unlocked
Other
460
Sell Device
Please select capacity:
462
iPhone X 64GB Sprint
464
iPhone X 256GB Sprint
470
Sell Device
Tell us about the device.
iPhone
Samsung
472
Cracks on front glass? Yes No
Cracks on back glass? Yes No
Cracks anywhere else? Yes No
Issues with display? Yes No
474
Bent housing? Yes No
Broken buttons? Yes No
Broken cameras? Yes No
476
Continue
480
Sell Device
Here's your price estimate:
482
Price Estimate
$90
iPhone X 64GB Sprint
To get a more accurate price and to be able to call device via mail-in box, please download app on another device with a working camera and press Sell, then Another Device, to begin appraisal.
Continue
490
Sell Device
Would you prefer $108 credit towards a great price on a gently used phone? Below are a few options.
Device: iPhone X 64GB Sprint
Only $277 more
iPhone XR 64GB Brazz
Only $436 more
XS 64GB
Only $476 more
XS Max 64GB
To upgrade, please download this app on another phone with a working camera so we can give you an exact value for this device.
Home

FIG. 4

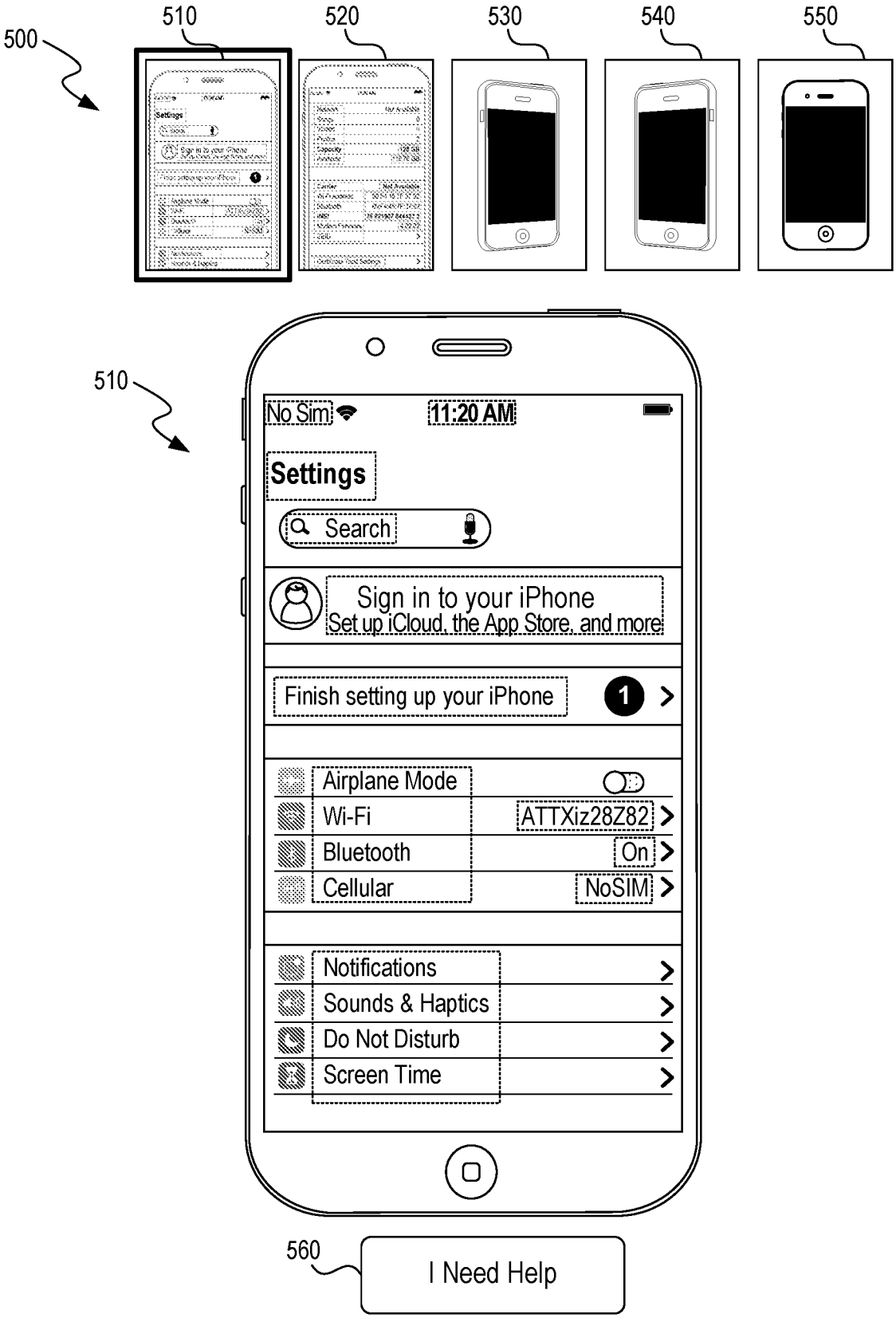

500
510
520
530
540
550
510
No Sim
11:20 AM
Settings
Search
Sign in to your iPhone
Set up iCloud, the App Store, and more
Finish setting up your iPhone
1
Airplane Mode
Wi-Fi
ATTXiz28Z82
Bluetooth
On
Cellular
NoSIM
Notifications
Sounds & Haptics
Do Not Disturb
Screen Time
560
I Need Help

FIG. 5A

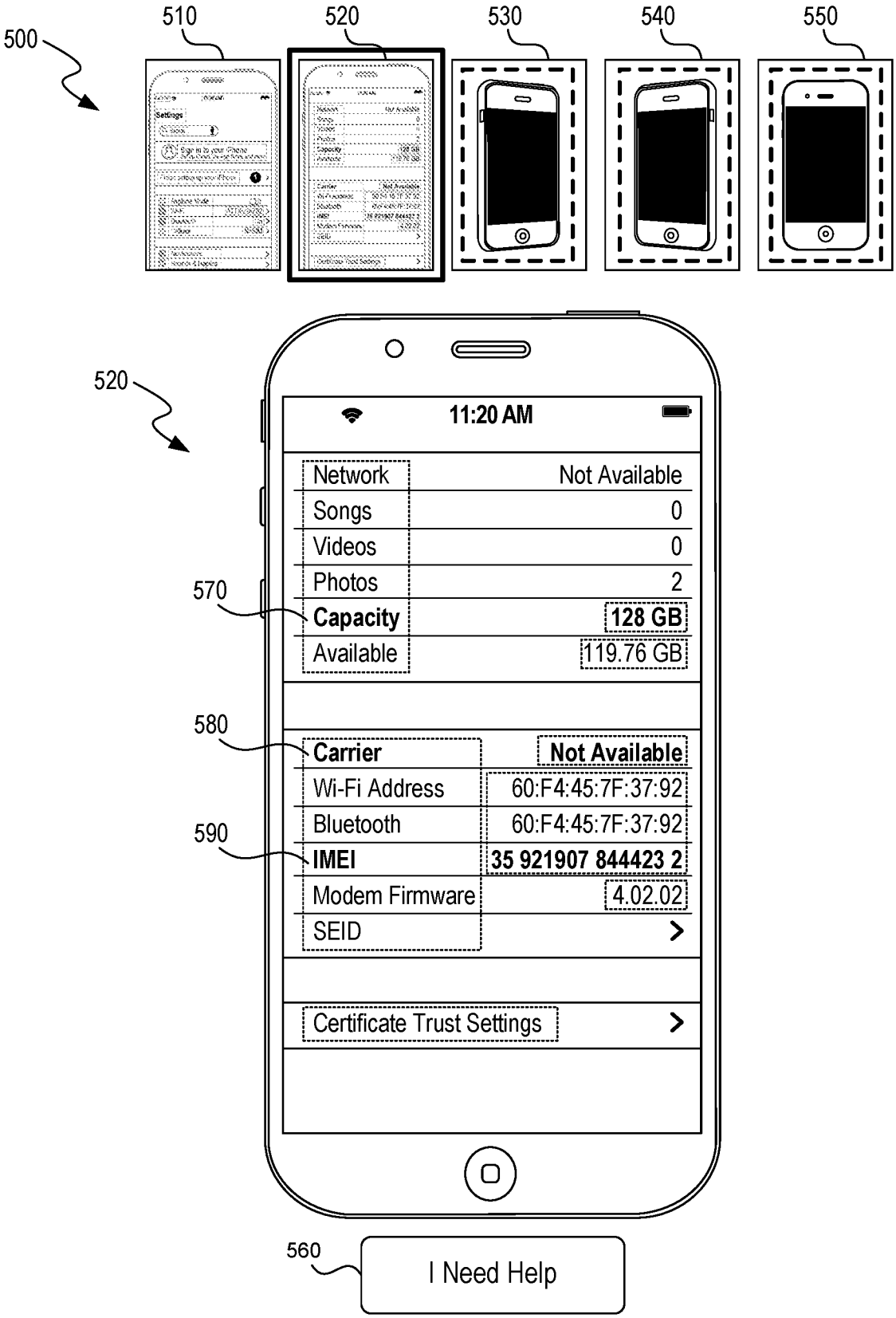

500
510
520
530
540
550
520
11:20 AM
Network
Not Available
Songs
0
Videos
0
Photos
2
570
Capacity
128 GB
Available
119.76 GB
580
Carrier
Not Available
Wi-Fi Address
60:F4:45:7F:37:92
Bluetooth
60:F4:45:7F:37:92
590
IMEI
35 921907 844423 2
Modem Firmware
4.02.02
SEID
Certificate Trust Settings
560
I Need Help

FIG. 5B

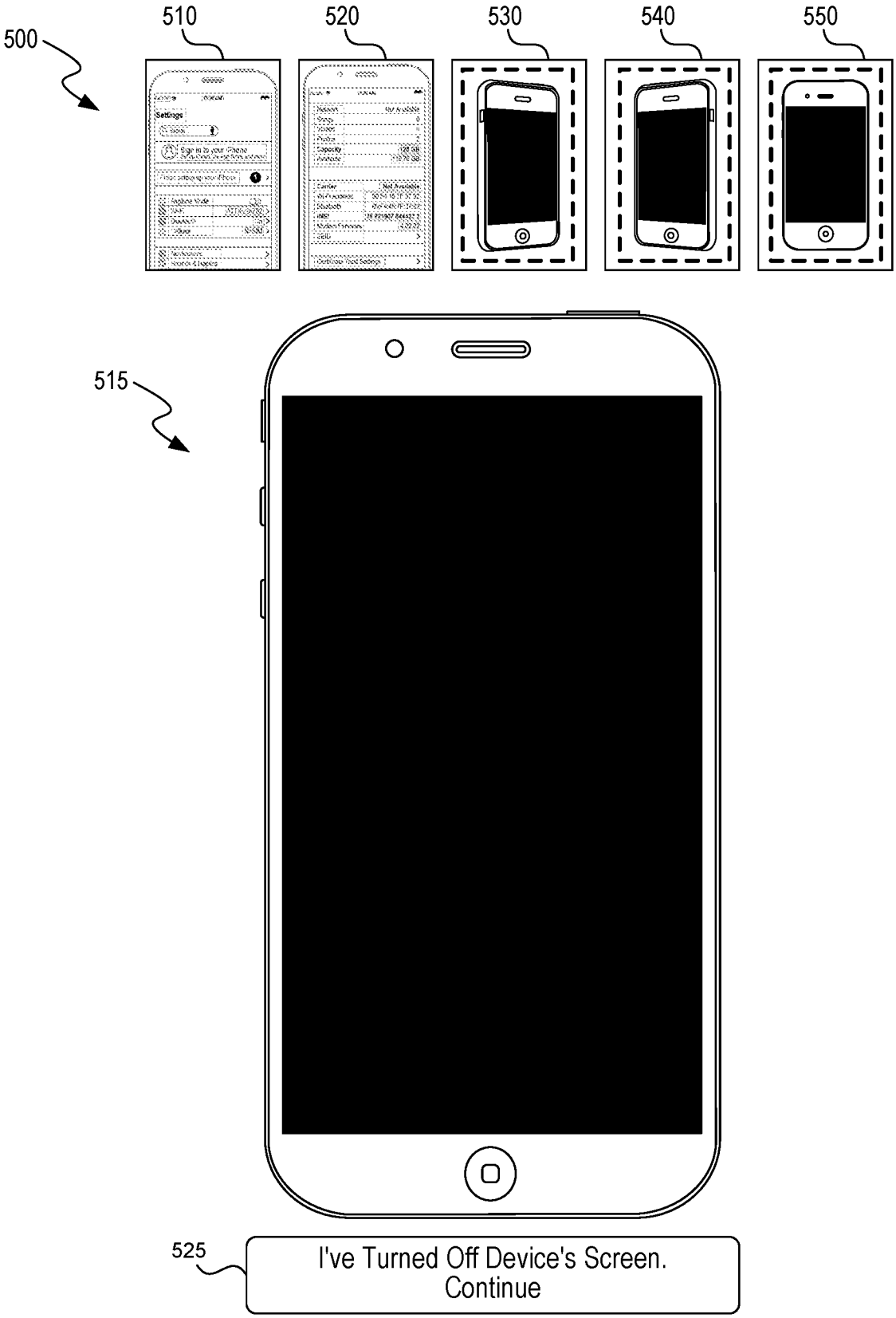

500
510
520
530
540
550
515
525
I've Turned Off Device's Screen.
Continue

FIG. 5C

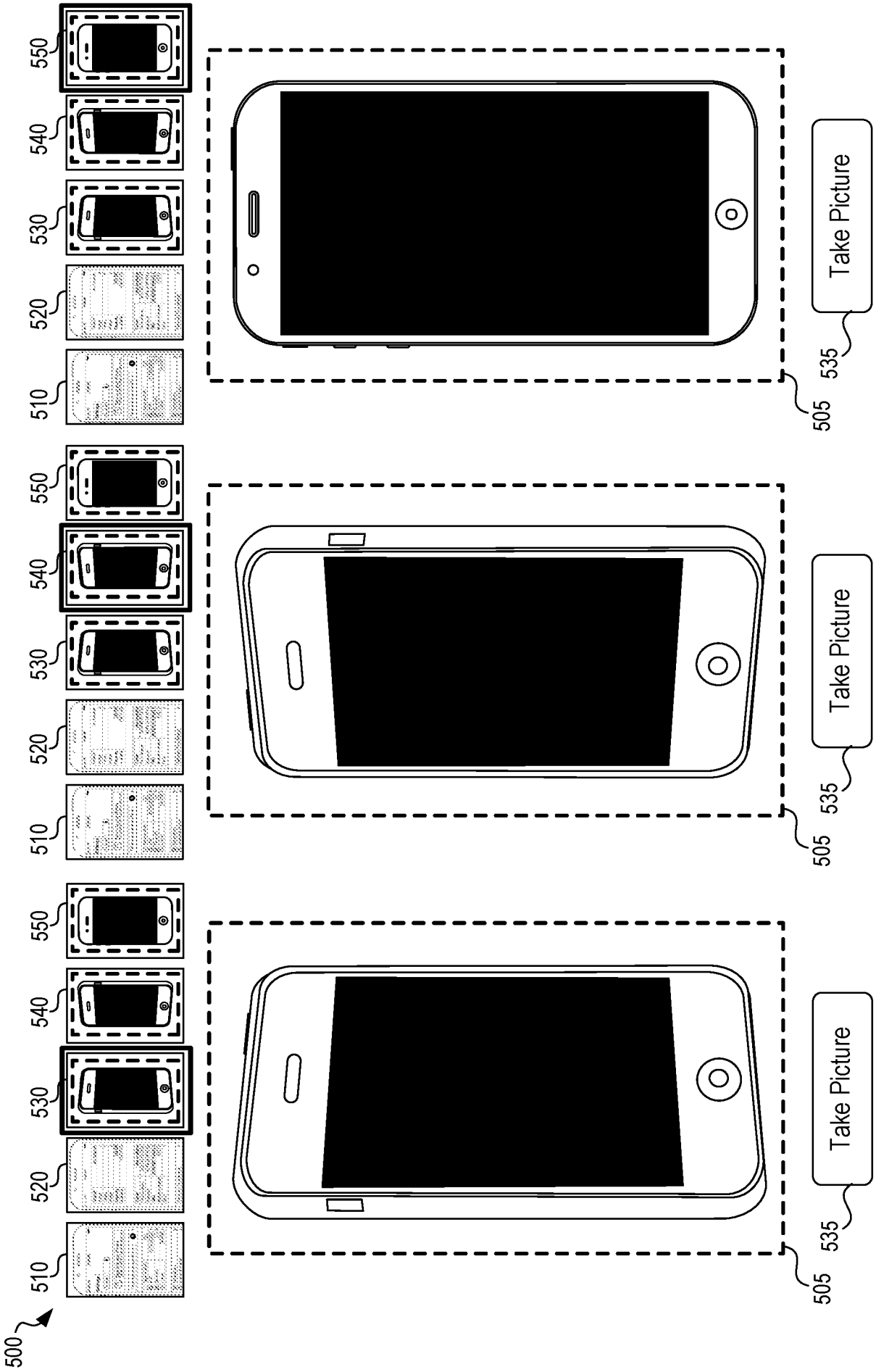


FIG. 5D

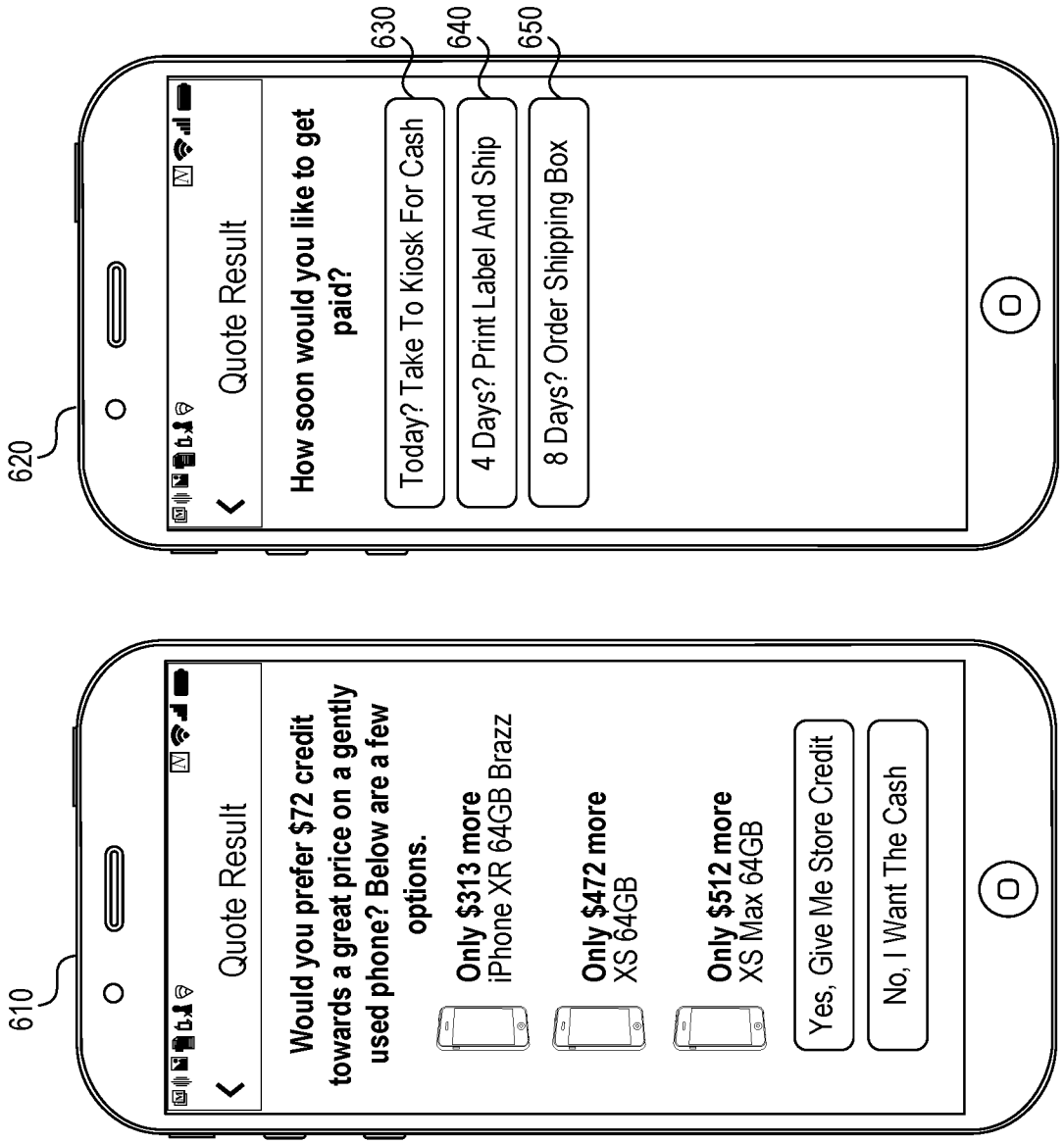

EcoATM 11:22 AM
Uploading
Video has been uploaded
Congratulations!
We'd like to buy this phone.
IMEI: 359219078444232
Device: Apple iPhone 7 Plus
Capacity: 128 GB
Carrier: Not Available
Valid Until: 7 Days, 06/10/2020
Guaranteed Price
$60
Apple iPhone 7 Plus
Accept Offer
Decline Offer
600
Quote Result
Would you prefer $72 credit towards a great price on a gently used phone? Below are a few options.
Only $313 more
iPhone XR 64GB Brazz
Only $472 more
XS 64GB
Only $512 more
XS Max 64GB
Yes, Give Me Store Credit
No, I Want The Cash
610
Quote Result
How soon would you like to get paid?
Today? Take To Kiosk For Cash
4 Days? Print Label And Ship
8 Days? Order Shipping Box
620
630
640
650

FIG. 6

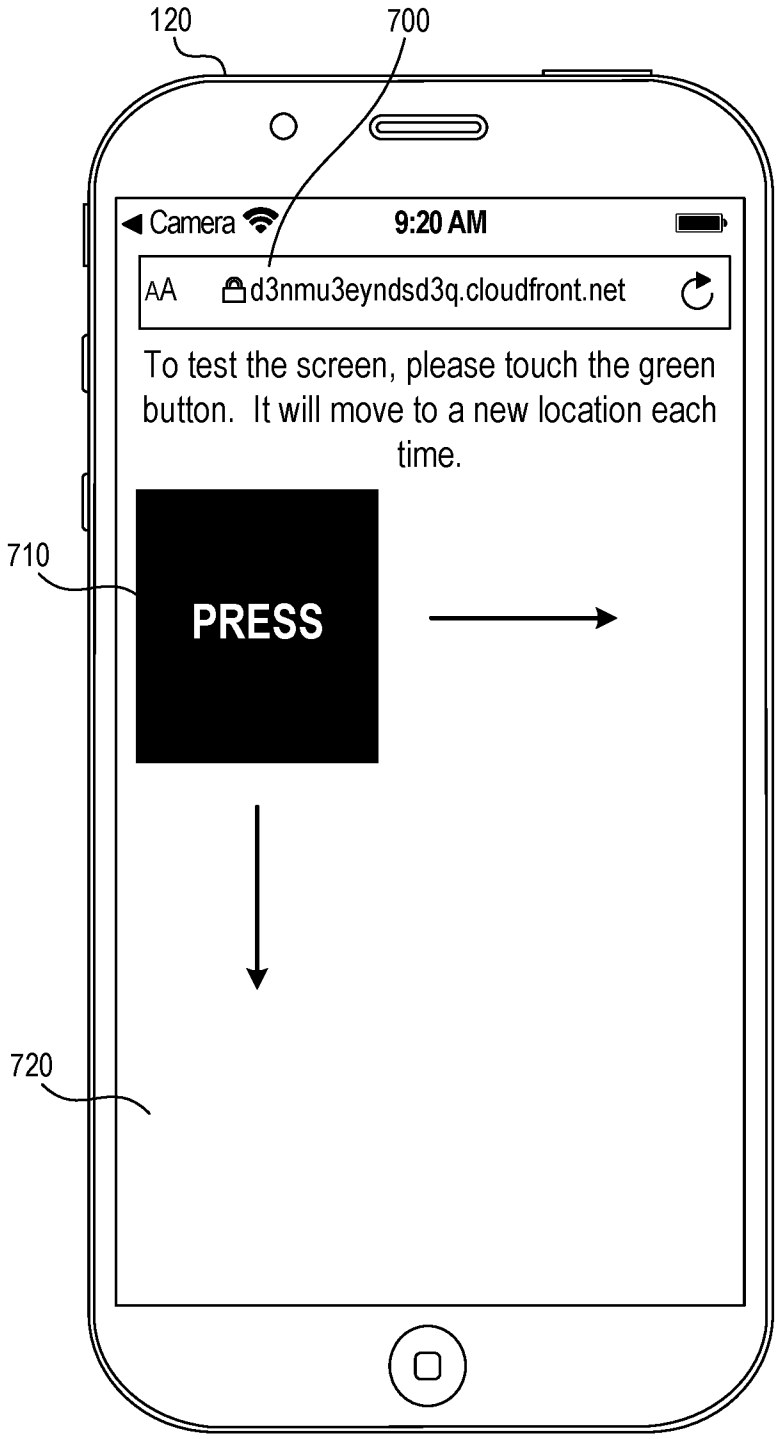

120
700
Camera
9:20 AM
AA
d3nmu3eyndsd3q.cloudfront.net
To test the screen, please touch the green button. It will move to a new location each time.
710
PRESS
720

FIG. 7

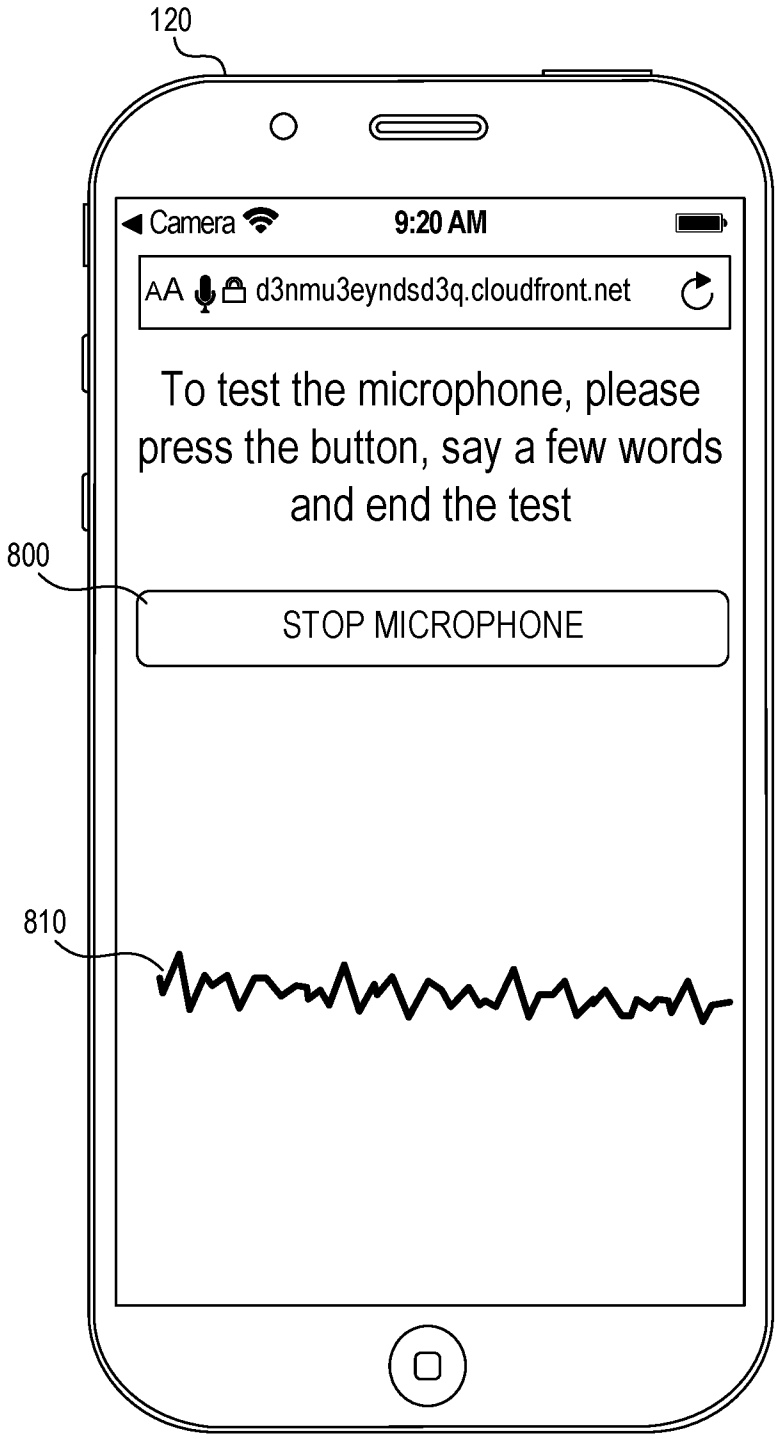

120
Camera
9:20 AM
AA
d3nmu3eyndsd3q.cloudfront.net
To test the microphone, please press the button, say a few words and end the test
800
STOP MICROPHONE
810

FIG. 8

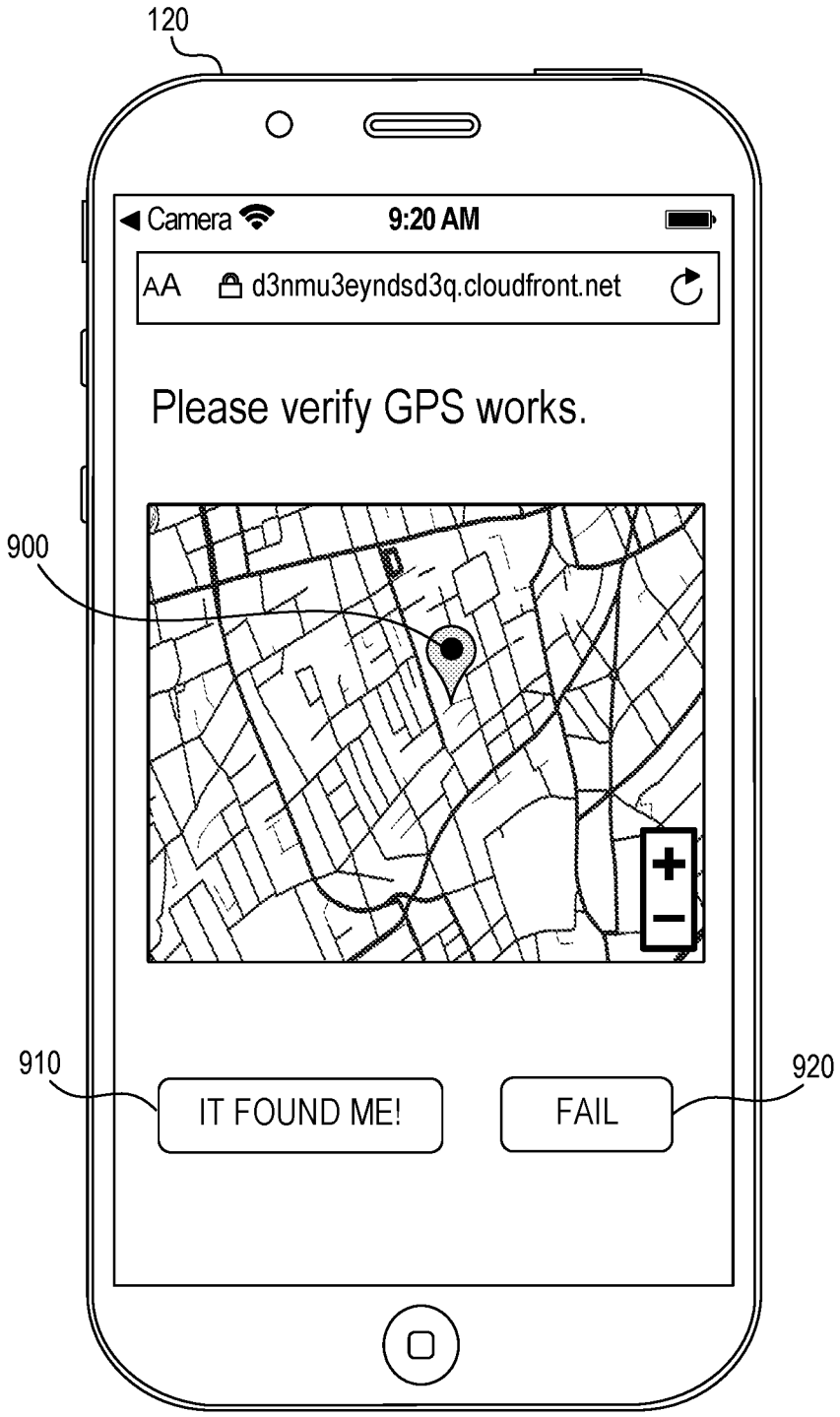

120
Camera
9:20 AM
AA
d3nmu3eyndsd3q.cloudfront.net
Please verify GPS works.
900
910
IT FOUND ME!
FAIL
920

FIG. 9

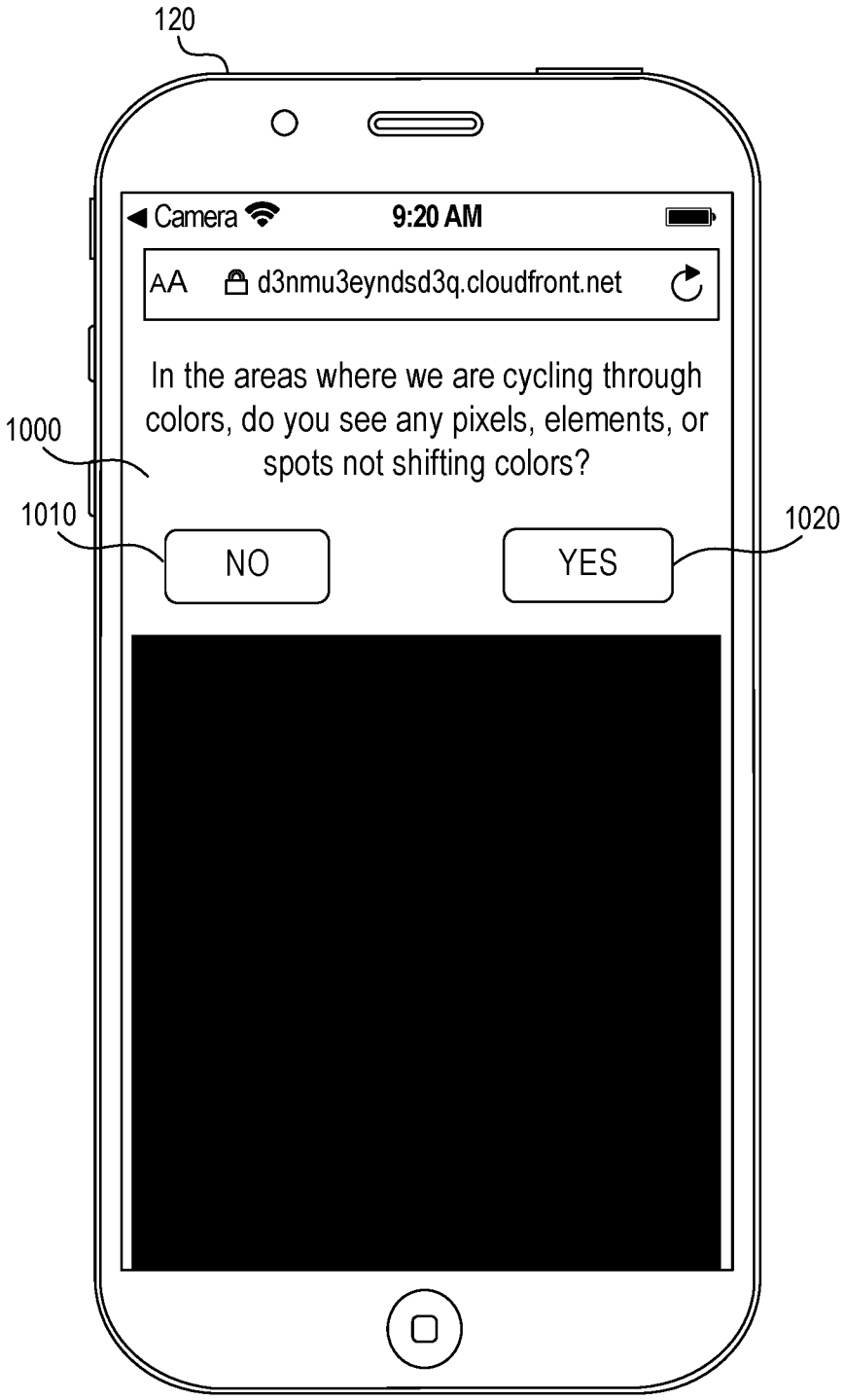

120
Camera
9:20 AM
AA
d3nmu3eyndsd3q.cloudfront.net
In the areas where we are cycling through colors, do you see any pixels, elements, or spots not shifting colors?
1000
1010
1020
NO
YES

FIG. 10

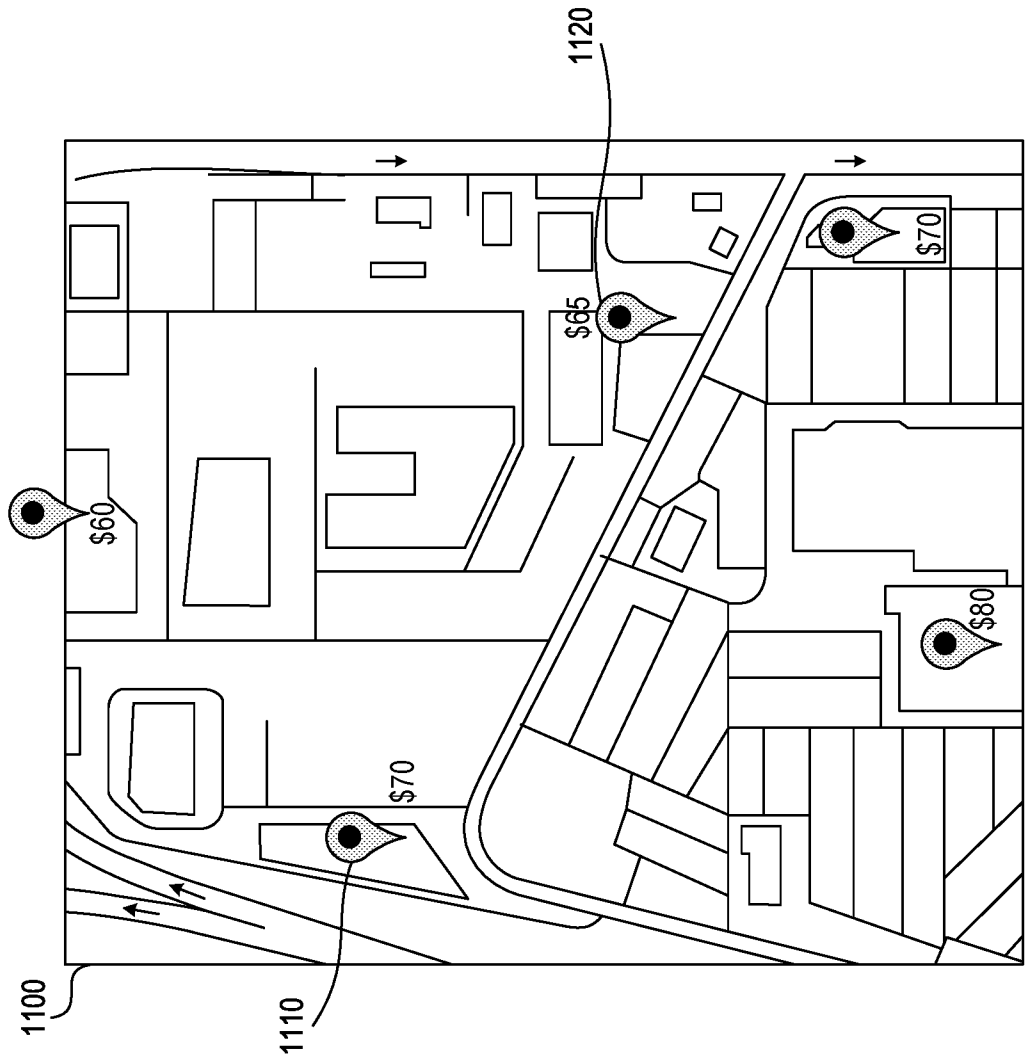


FIG. 11

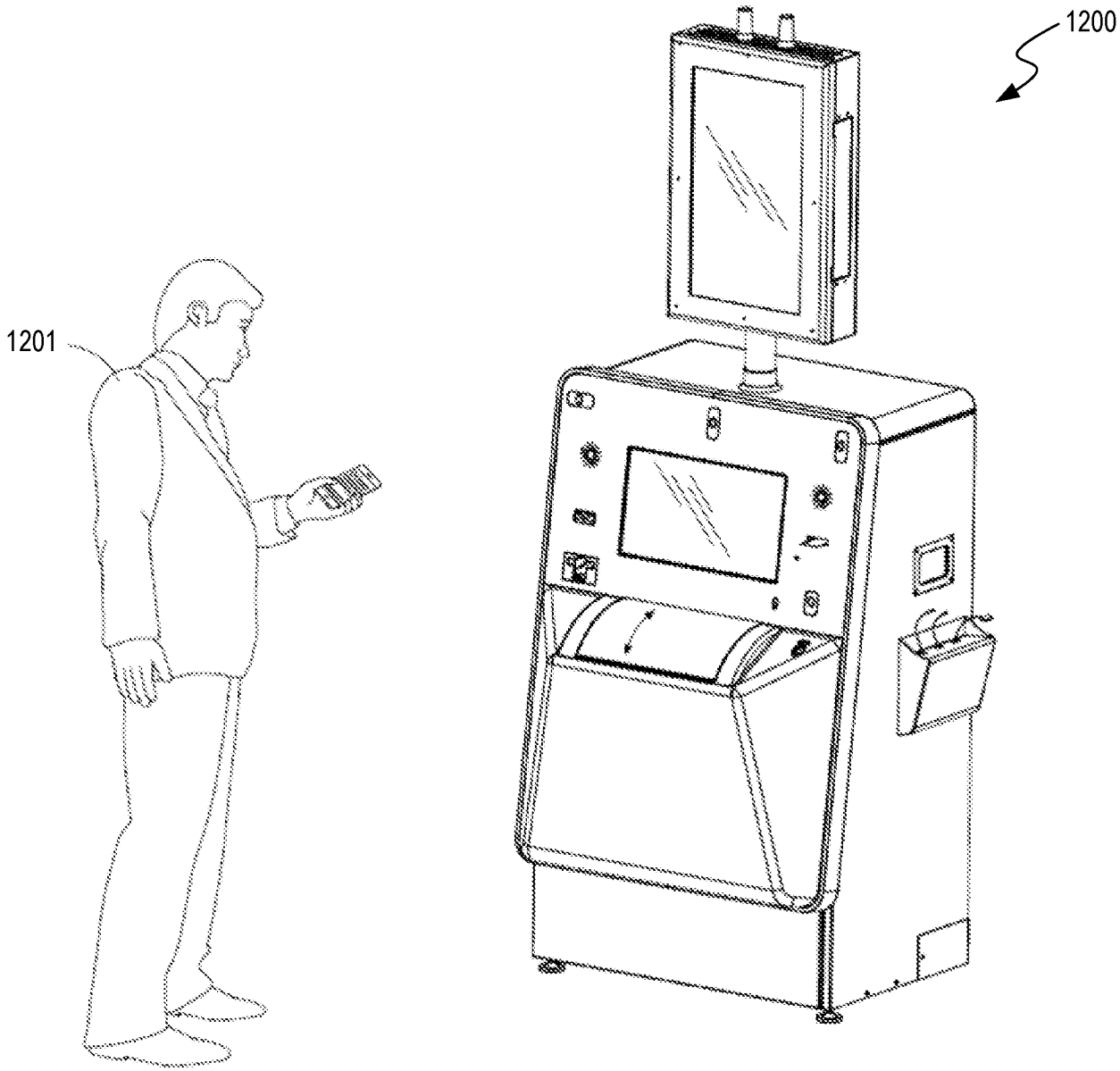


FIG. 12

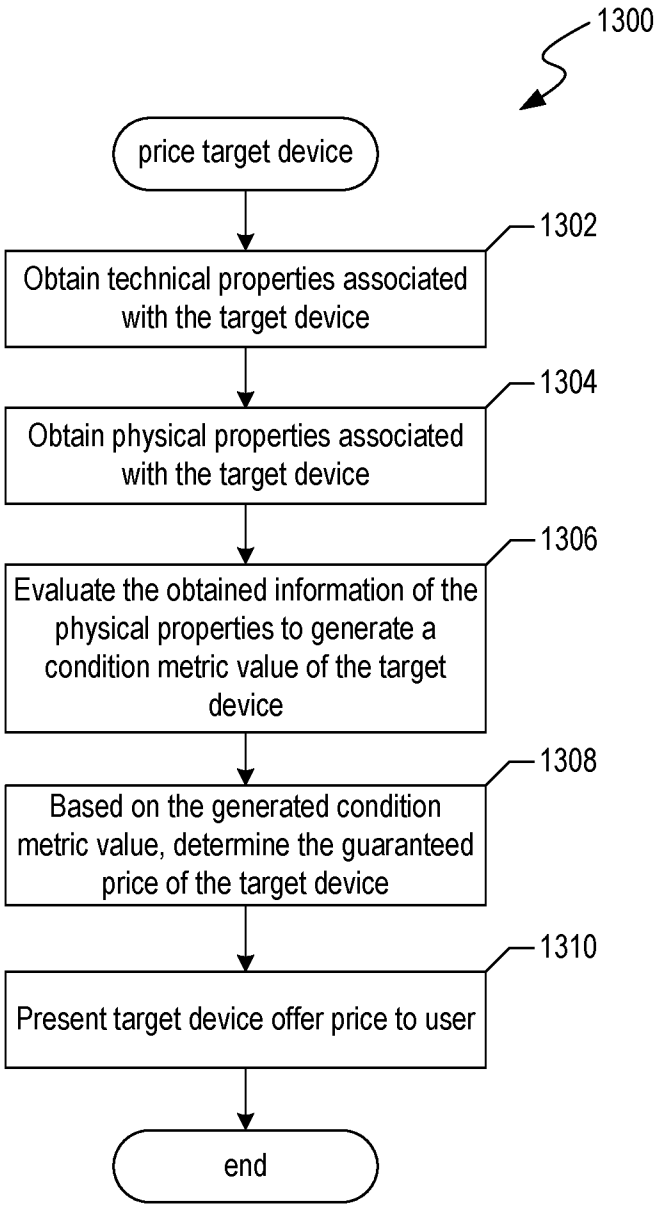

1300
price target device
1302
Obtain technical properties associated with the target device
1304
Obtain physical properties associated with the target device
1306
Evaluate the obtained information of the physical properties to generate a condition metric value of the target device
1308
Based on the generated condition metric value, determine the guaranteed price of the target device
1310
Present target device offer price to user
end

FIG. 13

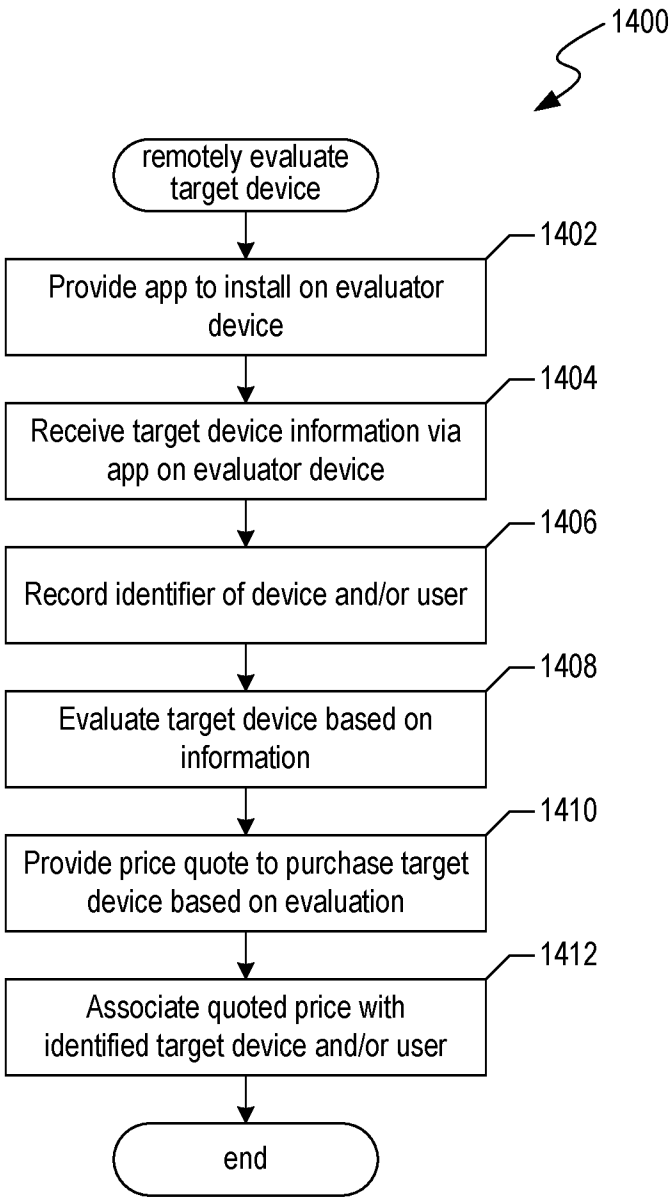

1400
remotely evaluate target device
1402
Provide app to install on evaluator device
1404
Receive target device information via app on evaluator device
1406
Record identifier of device and/or user
1408
Evaluate target device based on information
1410
Provide price quote to purchase target device based on evaluation
1412
Associate quoted price with identified target device and/or user
end

FIG. 14

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2021/071269

A. CLASSIFICATION OF SUBJECT MATTER
INV. G07F7/06 G06Q20/08 G06Q20/32 G06Q20/40 G06T7/00
H04M1/24
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
G07F G06Q G06T H04M

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2016/098689 A1 (BOWLES MARK VINCENT [US] ET AL) 7 April 2016 (2016-04-07) abstract; figures paragraphs [0040], [0060] - [0061], [0080] - [0090], [0126], [0130] - [0137], [0153]	1-20
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[X] Further documents are listed in the continuation of Box C.
[X] See patent family annex.

* Special categories of cited documents :

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"E" earlier application or patent but published on or after the international filing date
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
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"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 November 2021	20/12/2021

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Schöndienst, Thilo

1

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2021/071269

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 2017/301078 A1 (FORUTANPOUR BABAK [US] ET AL) 19 October 2017 (2017-10-19) abstract; figures paragraph [0035]	1-20

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Information on patent family members

International application No
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