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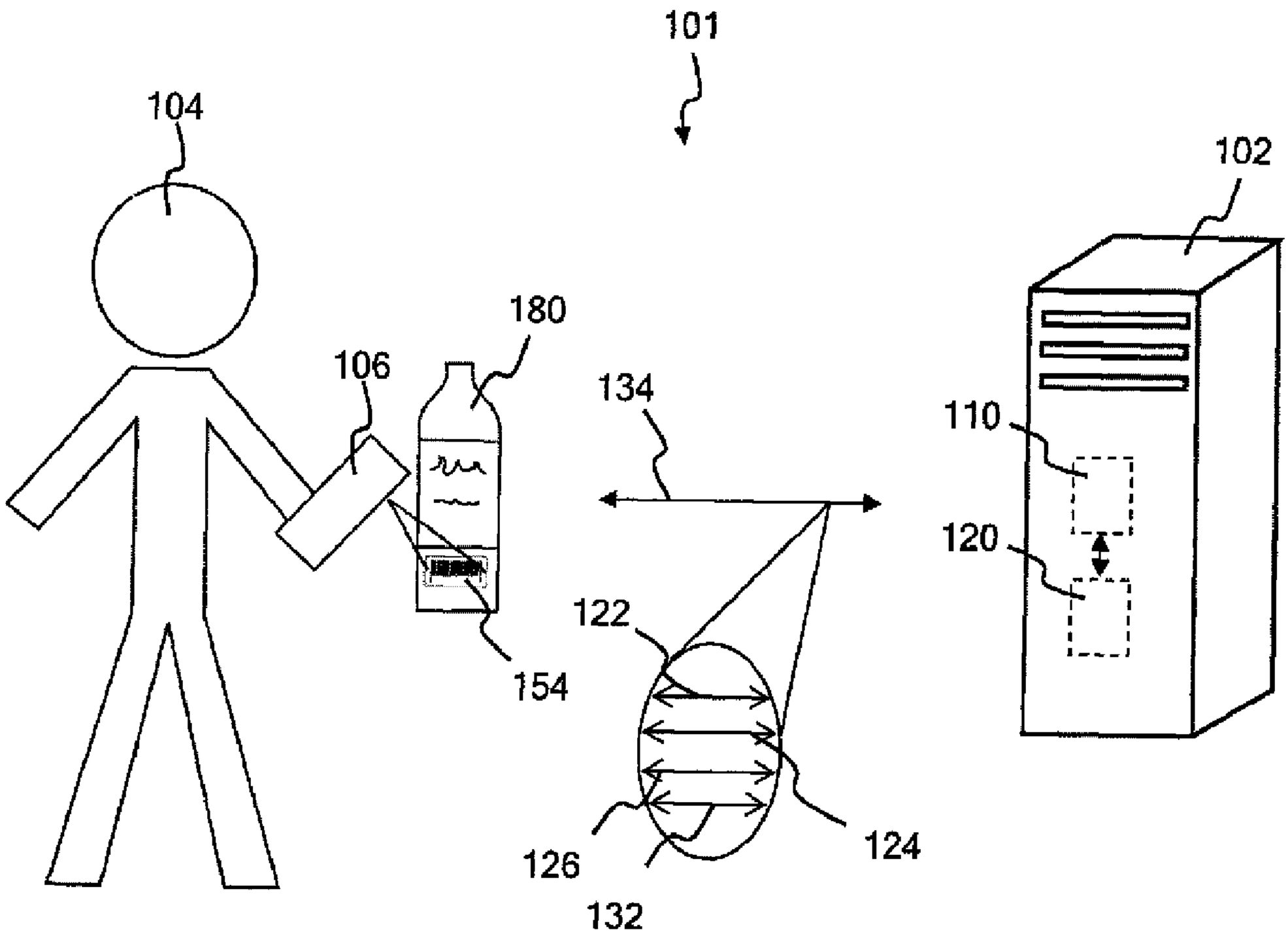
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(54) **Title: SYSTEM FOR INVENTORY MANAGEMENT**



(57) **Abrégé/Abstract:**
Disclosed is a system and method for inventory management of a retail store. The system includes a means to communicate with mobile computing devices of customers. When the system for managing inventory receives a data capture, such as a product

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(57) **Abrégé(suite)/Abstract(continued):**
barcode scan, from a customer's mobile computing device, a request for an informational data capture is formulated and sent to the mobile computing device. The request for informational data capture will use the product barcode scan already received, and an inventory database, to formulate a request for informational data capture from the customer that will provide the system of inventory management useful inventory information. The request can ask for a barcode scan of another product for example, or other types of data capture. The inventory management system updates an inventory database once a response from the customer that includes the informational data capture is received.

SYSTEM FOR INVENTORY MANAGEMENT

ABSTRACT OF THE DISCLOSURE

Disclosed is a system and method for inventory management of a retail store. The system includes a means to communicate with mobile computing devices of customers. When the system for managing inventory receives a data capture, such as a product barcode scan, from a customer's mobile computing device, a request for an informational data capture is formulated and sent to the mobile computing device. The request for informational data capture will use the product barcode scan already received, and an inventory database, to formulate a request for informational data capture from the customer that will provide the system of inventory management useful inventory information. The request can ask for a barcode scan of another product for example, or other types of data capture. The inventory management system updates an inventory database once a response from the customer that includes the informational data capture is received.

SYSTEM FOR INVENTORY MANAGEMENT

FIELD OF THE INVENTION

[0001] The invention relates generally to inventory management of retail establishments, and specifically to a system and method for managing inventory for a retail store.

BACKGROUND

[0002] Within a retail store, much employee time and effort is expended to determine the relative location of products and their quantity. Some inventory data is captured automatically, such as the inventory information that is received as products are scanned for check out. However, most inventory information is gathered by an employee visually inspecting available inventory and recording the results. The result is that retail store employees spend a considerable amount of time conducting physical inventories. It is desirable to be able to request, and receive, specific inventory information from a customer. Every piece of inventory information that can be obtained from a customer means an employee does not have to spend time gathering that piece of information. Customers who provide requested inventory information can be provided with a reward such as a coupon, a product information guide, or a recipe, for example.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0003] The above and further advantages of this invention may be better understood by referring to the following description in conjunction with the accompanying drawings, in which like numerals indicate like structural elements and features in various figures. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention.

[0004] FIG. 1 is an illustrative view of an embodiment of an inventory system for a retail store.

[0005] FIG. 2 illustrates the inventory system of FIG. 1, with an inventory management system gathering a product barcode scan.

[0006] FIG. 3 illustrates a block diagram of an embodiment of an inventory management system.

[0007] FIG. 4 illustrates a block diagram of a further embodiment of an inventory management system.

[0008] FIG. 5 illustrates a method of updating an inventory database.

DETAILED DESCRIPTION

[0009] Disclosed herein is a system and method for managing inventory for a retail store or other similar establishment, including a method of updating an inventory database. The system includes a means to communicate with the mobile computing devices of customers. Customers often use their mobile computing devices to obtain data from store products and store features. For example, some customers use a mobile computing device to scan product barcodes as they place the products in their shopping cart. This allows the mobile computing device to keep track of products and prices for the customer. When the disclosed system for managing inventory receives a data capture from a mobile computing device of a customer, a request for an informational data capture is formulated and sent to the mobile computing device. The request for informational data capture will be formulated based on the original data capture received, and the type of inventory information that may be needed to update the inventory database. The request for informational data capture can include a request for the customer to perform one of many different forms of data capture, such as an additional product barcode scan, a scan of a location identifier, a quick response (QR) code scan, a scan of a store feature barcode, an image capture, a near field communication (NFC) tag data capture, a Microsoft™ tag data capture, or any other type of informational data capture that can provide useful inventory information to the system for managing inventory. The inventory management system analyzes the informational data capture received, and extracts inventory information from the informational data capture. The inventory management system uses the inventory information from the informational data

capture to update an inventory database. Inventory information obtained from a customer relieves employees from having to spend time and energy to gather the inventory information.

[0010] Inventory management is a perpetual task for establishments that sell products. It is a constant struggle to know what items exist in a store, which items are selling, which items are not selling, and where the items are. Automated checkout systems have helped by keeping track of items that are sold. However, store employees are still needed to gather missing inventory data by monitoring and recording the status of inventory on store shelves. Having store employees gather inventory data costs the retail establishment in employee salaries. Additionally, the employee is not available to perform tasks other than gathering inventory data. It is desirable to obtain as much inventory information as possible from customers. Customers are often more prevalent in stores than employees, and the store does not have to pay customers a salary for providing inventory data. Every bit of inventory data that can be obtained from a customer frees up an employee to complete a different task rather than gathering the inventory data.

[0011] Mobile computing devices such as tablets, cell phones, and portable scanners are often used by customers as they move about a store. Customers are often provided with mobile computing devices to use while they are in a store for the purpose of scanning products for information or remote check-out, for example. Retail stores also provide applications to reside on the personal mobile computing devices of customers for use in remote check out, obtaining coupons, or tracking products. These mobile computing devices are capable of, or already are, providing wireless data pertaining to what products are around them at any particular point in time. Thus, customers may already interact wirelessly with one or more store servers using their portable scanners or tablets. Organizing the means to collect scanned barcode and other captured data from customers and employees as they move about the store, requesting specific data captures from customers, and using the specific data captures obtained from customers can result in an enhanced understanding of the inventory status of a retail store. The disclosed system and method of inventory management collects data captures from mobile computing devices, sends requests for additional data captures in response to receiving an initial data capture, and collects

and analyzes the customer responses. The customer responses are used to obtain inventory data and to update the inventory database.

[0012] The disclosed inventory management system includes a means for obtaining an information data capture from a customer of a retail store, and an inventory module that updates an inventory database in response to receiving the informational data capture from the customer.

[0013] FIG. 1 illustrates a system 101 for managing inventory of a retail store. System 101 in this embodiment includes a server 102 that includes an inventory management system 110, and an inventory database 120. System 101 in this embodiment also includes a mobile computing device 106 that is carried by a customer 104. Server 102 receives communication 134 from mobile computing device 106. Customer 104 can be any customer or other individual within or around the retail store.

[0014] Server 102, in the embodiment shown in FIG. 1, is a retail store server resident in the retail store, but this is not meant to be limiting. Server 102 may be available via the internet, cloud computing services, or other local or remote, hardwired or wireless server services. Server 102 can be any type of electronic or computing equipment capable of containing system 110 and inventory database 120.

[0015] In this embodiment, inventory management system 110 is a computer program, but it is to be understood that inventory management system 110 can take many forms and implementations, including hardware, software, or both. Inventory management system 110 is resident on server 102 in this embodiment, but it is to be understood that system 110 can be a part of any computational equipment. In a particular embodiment, system 110 is implemented in hardware processors. The hardware processors can be application specific integrated circuits (ASICs) or hardware accelerators, for example. The hardware processors can be part of one or more special purpose computers that execute computer program instructions which implement one or more functions and operations of inventory management system 110. In a specific embodiment, system 110 comprises a set of hardware accelerators that each perform inventory management tasks and computations.

[0016] Inventory database 120 is any type of database useful for the purpose of storing inventory data. Database 120 can be electronic and/or computerized. In this embodiment database 120 is a database stored on memory on server 102, in electrical communication with inventory management system 110. In some embodiments, inventory database 120 can be on paper or other storage medium.

[0017] Communication 134 in the embodiment shown in FIG. 1 is wireless communication 134 between mobile computing device 106 and inventory management system 110 of server 102, but this is not meant to be limiting. Wireless communication 134 can be a Bluetooth communication, a wireless local area network communication, wireless cellular telephone communication, or any other form or type of wireless communication. In some embodiments, communication 134 is wired or optical communication. Communication 134 can be implemented by any type of transmitter/receiver elements known in the art now or in the future for data transfer between a mobile computing device and an electronic or computer system.

[0018] Communication 134 can include many different types of communication between mobile computing device 106 and server 102. In this embodiment, communication 134 includes a data capture 122, an informational data capture request 124, a customer response 126 to the informational data capture request 124, and a reward 132, as shown in FIG. 2 and FIG. 3. FIG. 2 shows a simplified illustration of system 101 of FIG. 1, with mobile computing device 106 sending communication 134 to inventory management system 110 on server 102, with the individual elements included in communication 134 illustrated in the figure. In some embodiments, communication 134 includes additional types of communication between mobile computing device 106 and inventory management system 110. The different elements of communication 134 are discussed in more detail below. FIG. 3 shows a simplified block diagram of an embodiment of inventory management system 110.

[0019] Data capture 122 can be any type of data captured by mobile computing device 106 and provided to inventory management system 110. Customer 104 can capture many different types of data in a retail store using mobile computing device 106. Mobile computing device 106 can be used to scan product barcodes, quick response (QR) codes, or Microsoft™ Tags as

customer 104 is putting a product in their cart to purchase the product, for example. Customer 104 can capture data from NFC tags to obtain information on a product or a location, for example. Customer 104 can scan a location barcode to determine information about where they are in the retail store or where certain products are located. In some embodiments, customer 104 will enter data manually into mobile computing device 106, such as entering a barcode number manually when the barcode has been damaged. Customer 104 can use a camera or mobile computing device 106 to capture an image of a barcode, a QR code, a product, or a location in the store, for example. Each time mobile computing device 106 captures data from a store product , location, or other apparatus, mobile computing device 106 sends this data to system 110 of server 102 as data capture 122. In some embodiments, data capture 122 is a product barcode scan. In some embodiments, data capture 122 is a QR code scan. In some embodiments, data capture 122 is a Microsoft™ Tag scan. In some embodiments, data capture 122 is a data capture from a near field communication (NFC) tag. An NFC tag can be any type of tag that can receive or provide data to a nearby mobile computing device. In some embodiments, data capture 122 is an image capture. In some embodiments, data capture 122 can be a different type of data capture from a store product or device. Thus, data capture 122 can be any type of communication where data is captured by mobile computing device 106 from a product, location, device, structure, or other apparatus in the retail store, and the information is transmitted to system 110.

[0020] Mobile computing device 106 can be one of many different types of devices suited for customer 104 to communicate with server 102 and inventory management system 110. In this embodiment, mobile computing device 106 is a smartphone device, but this is not meant to be limiting. Mobile computing device 106 can be a mobile phone, a tablet, a handheld computer, a portable scanner, or any other mobile computing device with the ability to capture data from barcodes or other data devices in a retail store, and communicate with server 102 and/or inventory management system 110.

[0021] Mobile computing device 106 is carried by customer 104 while shopping in or around the retail store. Communication 134 between mobile computing device 106 and system 110 is

initiated by mobile computing device 106 capturing data in the retail store, and transmitting this data capture 122 to system 110. For example, mobile computing device 106 can be used by customer 104 to scan a product barcode 154 on a product 180, as shown in FIG. 2. In this example, mobile computing device 106 sends data capture 122 to inventory management system 110 as shown in FIG. 2 and FIG. 3, where data capture 122 is a barcode scan of barcode 154 on product 180. FIG. 2 shows system 101 with mobile computing device 106 sending communication 134 to inventory management system 110 on server 102, where communication 134 includes data capture 122, and data capture 122 is a scan of barcode 154 on product 180. FIG. 3 shows a block diagram of an embodiment of inventory management system 110 receiving communication 134 as shown in FIG. 2.

[0022] Mobile computing device 106 can be used by customer 104 to scan barcode 154 as shown in FIG. 2 for many different reasons. For example, customer 104 can scan product barcode 154 as they put product 180 with barcode 154 in their cart. In this example, mobile computing device 106 can keep track of the products and the total cost of the products in the shopping cart of customer 104. In some embodiments, mobile computing device 106 can execute remote checkout of customer 104. In another example, customer 104 may scan product barcode 154 to get information or a price of product 180 with barcode 154. Customer 104 has many different reasons for scanning barcode 154 with mobile computing device 106. Inventory management system 110 does not take note of why customer 104 scans barcode 154. Inventory management system takes note that customer 104 has scanned barcode 154, and begins the process of obtaining additional inventory information from customer 104, as explained below.

[0023] Inventory management system 110 includes a reward module 112, a communication module 114, a customer information request module 116, and an inventory module 118, as shown in FIG. 3. A "module", as used in this document, can be a circuit, a software program, a hardware apparatus, an application specific integrated circuit, a special purpose computer, or a combination of hardware and software circuits, systems, or implementations. A module can be any element, thing, or program that accepts one or more input and provides one or more output. Inventory management system 110 in this embodiment is a computer implemented system, but this is not meant to be limiting. System 110 can be implemented in hardware, firmware,

software, or any combination of these. In a particular embodiment, reward module 112, communication module 114, customer information request module 116, and inventory module 118 are each implemented as an application specific integrated circuit. In another specific embodiment, reward module 112, communication module 114, customer information request module 116, and inventory module 118 are each implemented as a hardware processor. In some embodiments, each hardware processor is a hardware accelerator that interfaces with a computer program. In some embodiments, each hardware processor is a part of one or more special purpose computer that executes computer program instructions. In some embodiments, each hardware processor is a hardware accelerator that performs specific inventory related tasks and executes inventory related instructions.

[0024] Communication module 114 accepts as input communication 134 from mobile computing device 106. Communication module 114 in this embodiment is the means to obtain an informational data capture from customer 104. Communication 134 includes data capture 122. Customer information request module 116 is coupled to communication module 114, and receives data capture 122 from communication module 114. Customer information request module 116 sends an informational data capture request 124 to communication module 114 in response to receiving data capture 122 from communication module 114. Customer information request module 116 formulates informational data capture request 124 based on data capture 122. Customer information request module 116 uses data capture 122 and inventory module 118 to determine what other products or apparatus may be around customer 104, and what inventory or location information would be helpful to inventory management system 110. Informational data capture request 124 is formulated to request an additional data capture from customer 104 that will provide useful inventory information to inventory management system 110. In the embodiment shown in FIG. 2 and FIG. 3, data capture 122 is a barcode scan of barcode 154 of product 180. Informational data capture request 124, in an example embodiment, is a request for a barcode scan of a second store product that inventory management system 110 thinks should be nearby product 180.

[0025] Communication module 114 transmits informational data capture request 124 to mobile computing device 106 in response to receiving informational data capture request 124

from customer information request module 116. Communication module 114 transmits informational data capture request 124 to mobile computing device 106, and waits for a customer response 126. Customer response 126 can take a number of forms, including a null response, the requested informational data capture 128, or a response that informational data capture request 124 cannot be fulfilled. Customer response 126 is a null response if no further data is received from mobile computing device 106. In other words, a null response is when customer 104 does not respond to informational data capture request 124. Communication module 114 will consider customer response 126 to be a null response after a predetermined period of time passes without receiving customer response 126.

[0026] Customer response 126 can include an informational data capture 128. Customer response 126 will include informational data capture 128 when customer 104 responds to informational data capture request 124 by capturing the requested data. In the example embodiment shown in FIG. 2 and FIG. 3, customer response 126 includes informational data capture 128, where informational data capture 128 is a barcode scan of the requested second store product that was nearby product 180. Customer 104 received informational data capture request 124 with mobile computing device 106, looked for, and found, the second store product that a barcode scan was requested for in informational data capture request 124, and scanned the second store product barcode with mobile computing device 106. Mobile computing device 106 transmits customer response 126 to communication module 114, where customer response 126 is or includes informational data capture 128. Informational data capture 128 in this example embodiment is the barcode scan of the second store product.

[0027] Communication module 114 sends customer response 126 to customer information request module 116. Customer information request module 116 receives customer response 126 and determines, in this example, that customer response 126 comprises informational data capture 128. Customer information request module 116 performs at least two actions in response to receiving customer response 126 that comprises informational data capture 128. First of all, customer information request module 116 transmits informational data capture 128 to inventory module 118 in response to customer information request module 116 receiving customer

response 126 that comprises informational data capture 128. And, customer information request module 116 transmits a reward request 130 to reward module 112.

[0028] Inventory module 118 is coupled to customer information request module 116, and receives informational data capture 128 from customer information request module 116. Inventory module 118 uses informational data capture 128 to update an inventory database 120. There are many different actions that inventory module 118 can take in response to receiving informational data capture 128. Inventory module 118 will save informational data capture 128, and analyze and take appropriate inventory actions according to the information received in informational data capture 128. For example, when inventory module 118 receives informational data capture 128 that is the scan of the second store product barcode, inventory module 118 will, in some embodiments, update inventory database 120 knowing that first product 180 and the second product are still both present and near each other on the shelves.

[0029] It is to be understood that informational data capture 128 can take many different forms. Informational data capture 128 can take different forms depending on the specific informational data capture request 124 that was transmitted, which depends on the information received from data capture 122. And, informational data capture request 124 depends on the specific type of inventory information needed by inventory module 118. Informational data capture 128 can be a scan of a store product barcode, a scan of a store feature barcode, a scan of a location identifier barcode, a picture of the interior of the store, a scan of a QR code or a Microsoft™ Tag, data captured by a bump of an NFC tag, or any other type of data that can be captured by mobile computing device 106 and transmitted to inventory management system 110.

[0030] Updating inventory database 120 can take many forms, depending on the information received in informational data capture 128 of customer response 126. In some embodiments, updating inventory database 120 in response to receiving customer response 126 from customer 104 includes flagging a product as being on feature in response to receiving an informational data capture 128 that includes a scan of a location identifier barcode. By way of another example, once receiving data capture 122 that is the scan of barcode 154 of product 180, communication module 114 transmits an informational data capture request 124 that requests a scan of a location barcode near product 180. Customer 104 transmits a customer response 126

that includes a scan of a location barcode. Inventory module 118 is able to tell that product 180 is on feature by the location barcode scan. Inventory module 118 will flag product 180 as being on feature in response to receiving customer response 126 that includes informational data capture 128 of the location barcode scan.

[0031] In some embodiments, updating inventory database 120 in response to receiving customer response 126 from customer 104 includes flagging a product as mis-placed in response to receiving an informational data capture 128 that includes a scan of a location identifier barcode. In some embodiments, updating inventory database 120 in response to receiving customer response 126 from customer 104 includes flagging a product as in stock in response to receiving a scan of a second store product barcode. In some embodiments, inventory module 118 checks a first item and a second item against a planogram in response to receiving informational data capture 128. In some embodiments, inventory module 118 verifies the street date of a product in response to receiving informational data capture 128. In some embodiments, inventory module 118 checks whether a product shelf location matches a product location indicator in response to receiving informational data capture 128. In some embodiments, inventory module 118 updates a product location indicator in response to determining from informational data capture 128 that a product location indicator does not match the product shelf location for that product in inventory. In some embodiments, inventory module 118 generates an inventory action request 150 to move a product to a new product shelf location in response to determining from informational data capture 128 that a product location indicator does not match the product shelf location in inventory for that product. Inventory action request 150 is transmitted by inventory module 118, and is a request that an inventory action be performed, often by a store employee. An inventory action request can be a request for products to be moved or re-stocked, for example. Updating inventory database 120 can take these or many other forms, depending on the particular inventory information received from informational data capture 128 of customer response 126.

[0032] In some embodiments, customer response 126 includes a response that the request cannot be fulfilled. This type of customer response 126 can be received, for example, when informational data capture request 124 requests a scan of a second product barcode, and the

second product is out of stock, so customer 104 cannot make the required barcode scan. In this example, updating inventory database 120 takes the form of flagging a product as out of stock. In another example, informational data capture request 124 requests that a location identifier be scanned by customer 104. Customer response 126 is that the request cannot be fulfilled, because customer 104 cannot find the location identifier. This suggests a product may be out of place, and inventory module 118 may transmit an inventory action request 150 that the location of a product be established, changed in database 120, or moved on the shelves.

[0033] As can be understood from the above examples, informational data capture request 124 and customer response 126 can take many forms, depending on the type of inventory information determined to be needed by inventory module 118 and customer information request module 116, and the ability of customer 104 to supply inventory information using mobile computing device 106. Inventory management system 110 is designed to gather as much inventory information as possible from customer 104, which maximizes the accuracy of inventory database 120 and minimizes the amount of employee time and effort spent on gathering inventory data.

[0034] When customer information request module 116 receives customer response 126 from communication module 114 that includes informational data capture 128 from customer 104, customer information request module 116 transmits a reward request 130 to reward module 112. Providing customer 104 with a reward for providing informational data capture 128 incentivizes customer 104 to participate in gathering inventory data. Reward module 112 is coupled to customer information request module 116 and communication module 114. Reward module 112 receives reward request 130 from customer information request module 116, and transmits a customer reward 132 to communication module 114 in response. Communication module 114 transmits customer reward 132 to mobile computing device 106 in response to receiving customer reward 132 from reward module 112.

[0035] Reward 132 can take many forms. Reward 132 can be a coupon, a product information guide, a website, a recipe, for example, but not by way of limitation. In some embodiments, customer 104 gets a choice of what reward they would like. In some embodiments, reward 132 is related to data capture 122 initially provided by customer 104 via

mobile computing device 106. For example, when mobile computing device 106 sends barcode scan of barcode 154 on product 180, customer reward 132 might be a recipe that uses product 180. Or reward 132 might be a coupon for product 180, or an information guide on product 180. Customer reward 132 can be any type of reward that works to obtain inventory information from customer 104 and mobile computing device 106.

[0036] Reward module 112 sends customer reward 132 to communication module 114. Communication module 114 transmits customer reward 132 to mobile computing device 106 of customer 104 for customer 104's use. Inventory management system 110 then waits for another data capture 122 to arrive, and the inventory data gathering process begins again.

[0037] FIG. 4 illustrates an embodiment of an inventory management system 210. Inventory management system 210 is similar to inventory management system 110, with like numbers indicating like elements as explained above. Inventory management system 210 has an additional feature in that inventory management system 210 can handle receiving and processing photos from mobile computing device 106. Inventory management system 210 can be used in place of inventory management system 110 of system 101 as shown in FIG. 1 and FIG. 2, with communication 234 replacing communication 134 in this embodiment.

[0038] Inventory management system 210 is a computer program in this embodiment, but it is to be understood that inventory management system 210 can take many forms and implementations, including hardware, software, or both. Inventory management system 210 is resident on server 102 in the embodiment where system 210 replaces system 110 as shown in FIG. 1 and FIG. 2, but it is to be understood that system 210 can be a part of any computational or electronic equipment. In a particular embodiment, system 210 is implemented in hardware processors. The hardware processors can be application specific integrated circuits (ASICs) or hardware accelerators, for example. The hardware processors can be part of one or more special purpose computers that execute computer program instructions which implement one or more functions and operations of computer system for inventory management system 210.

[0039] Communication 234 in the embodiment shown in FIG. 4 is wireless communication 234 between mobile computing device 106 and computer system 210, but this is not meant to be

limiting. Wireless communication 234 can be Bluetooth communication, wireless local area network communication, wireless cellular telephone communication, or any other form or type of wireless communication. In some embodiments, communication 234 is wired or optical communication.

[0040] Communication 234 includes data capture 122, an informational data capture request 224, a customer response 226 to the informational data capture request 224, and reward 132, as shown in FIG. 4. In some embodiments, communication 234 includes additional types of communication between mobile computing device 106 and inventory management system 210. Informational data capture request 224 is similar to informational data capture request 124 as explained above, except that informational data capture request 224 includes a request that customer 104 capture a photo of the inside of the retail store using mobile computing device 106. Similarly, customer response 226 is similar to customer response 126 explained above, except that customer response 226 in this embodiment includes a photo 140 of the inside of the retail store, which is the photo capture requested by informational data capture request 224. Photo 140 of the inside of the retail store can contain useful photo inventory information 148. Inventory management system 210 will extract and use photo inventory information 148 from photo 140 to update inventory database 120 as explained below.

[0041] Inventory management system 210 includes reward module 112, communication module 114, a customer information request module 216, and inventory module 118. Inventory management system 210 also includes a photo analysis module 136 and a photo gather module 138, which are explained below.

[0042] Communication module 114 transmits informational data capture request 224 to mobile computing device 106, and waits for customer response 226. In this embodiment, informational data capture request 224 includes a request for a photo 140 of the inside of the retail store, and customer response 226 includes photo 140 of the inside of the retail store. Informational data capture request 224 and customer response 226 in some embodiments can include any of the other forms discussed above for informational data capture request 124 and

customer response 126, but this example description will explain the request, receipt, and use of photo 140.

[0043] Communication module 114 sends customer response 226 to customer information request module 216. Customer information request module 216 receives customer response 226 and determines that customer response 226 comprises photo 140. Customer information request module 216 performs at least two actions in response to receiving customer response 226 that comprises photo 140. First of all, customer information request module 216 transmits photo 140 to photo analysis module 136 in response to customer information request module 216 receiving customer response 226 that comprises photo 140. And, customer information request module 216 transmits a reward request 130 to reward module 112 as discussed above for inventory management system 110. In some embodiments, customer response 226 also includes an informational data capture 128 as described above, in which case customer information request module 216 sends photo 140 to photo analysis module 136, and customer information request module 216 sends informational data capture 128 to inventory module 118. Processing and response to informational data capture 128 will proceed as described above regarding inventory management system 110.

[0044] Photo analysis module 136 is coupled to customer information request module 216 and inventory module 118. Photo analysis module receives photo 140 from customer information request module 216, and send photo inventory information 148 to inventory module 118 in response. Photo analysis module 136 is designed and configured to recognize photo 140, analyze photo 140, and extract photo inventory information 148 from photo 140. Photo inventory information 148 can be any type of information that is useful to inventory module 118 and can be identified from photo 140, such as products that are recognizable in photo 140, where products are located, how many products are present, empty shelves where products should be, etc. In some embodiments, photo analysis module 136 identifies a product location in photo 140. In some embodiments, photo analysis module 136 identifies a product missing from photo 140. In some embodiments, photo analysis module 136 identifies one of an aisle, a section, or a category in photo 140. In some embodiments, photo analysis module 136 identifies one or more product barcode in photo 140. In some embodiments, photo analysis module 136 identifies a QR

code in photo 140. If a location identifier barcode is readable in photo 140, the information in the location identifier barcode can be included in photo inventory data 148. In some embodiments, photo analysis module 136 can identify a location in photo 140 by recognizing features other than location barcodes, such as aisle signs or other identifying features in photo 140.

[0045] It should be evident that photo analysis module 136 can obtain a large amount of photo inventory information 148 from any particular photo 140, limited only by the amount of the interior of the retail store that is visible in photo 140, and the information extraction and analysis capabilities of photo analysis module 136.

[0046] Inventory module 118 is coupled to photo analysis module 136, and receives photo inventory information 148 from photo analysis module 136. Inventory module 118 uses photo inventory information 148 to update inventory database 120. There are many different actions that inventory module 118 can take in response to receiving photo inventory information 148. Inventory module 118 will save photo inventory information 148, and analyze and take appropriate inventory actions according to the information received in photo inventory information 148. For example, when inventory module 118 receives photo inventory information 148 that is a photo of two products on a store shelf, inventory module 118 will, in some embodiments, update inventory database 120 knowing that the first and the second product are still both present on the shelf and near each other as shown in photo 140.

[0047] Updating inventory database 120 can take many forms, depending on the information received in photo inventory information 148 of customer response 226. In some embodiments, updating inventory database 120 104 includes flagging a product or products as being on feature For example, once receiving data capture 122 that is the scan of barcode 154 of product 180, communication module 114 may transmit an informational data capture request 224 that requests a photo of the location of product 180. Customer 104 transmits a customer response 226 that includes photo 140 of the location of product 180. Inventory module 118 is able to tell that product 180 is on feature by photo 140. Inventory module 118 will flag product 180 as being on feature in response to receiving customer response 226 that includes photo 140.

[0048] In some embodiments, updating inventory database 120 in response to receiving photo 140 from customer 104 includes flagging a product as mis-placed in response to receiving a photo 140 that shows a product out of place on the store shelves. In some embodiments, updating inventory database 120 in response to receiving photo 140 from customer 104 includes flagging a product as in stock in response to receiving a photo of the product on the shelves. In some embodiments, inventory module 118 checks one or more items against a planogram in response to receiving photo 140. In some embodiments, inventory module 118 checks whether a product shelf location matches a product location indicator in response to receiving photo 140. In some embodiments, inventory module 118 updates a product location indicator in response to determining from photo 140 that a product location indicator does not match the product shelf location for that product in inventory. In some embodiments, inventory module 118 generates an inventory action request 150 to move a product to a new product shelf location in response to determining from photo 140 and/or photo inventory information 148 that a product location indicator does not match the product shelf location in inventory for that product.

[0049] It is to be understood that updating inventory database 120 can take many different forms, depending on the particular inventory information received from photo 140 and photo inventory information 148.

[0050] As can be understood from the above examples, informational data capture request 224 and customer response 226 can take many forms, depending on the type of inventory information determined to be needed by inventory module 118 and customer information request module 116, and the ability of customer 104 to supply inventory information using mobile computing device 106. Inventory management system 210 is designed to gather as much inventory information as possible from customer 104. Photos 140 captured by customer 104 maximize the accuracy of inventory database 120 and minimizes the amount of employee time and effort spent on gathering inventory data.

[0051] Inventory management system 210 in the embodiment shown in FIG. 4 also includes photo gather module 138. Photo gather module 138 is coupled to photo analysis module 136, and internet 146. Photo gather module 138 is configured to find photos 140 of the interior of the retail store from internet 146, and use the photos 140 from the internet the same as photos 140

captured by customer 104. If photo gather module 138 can find photos that it can identify as the interior of the retail store, and can identify the time they were taken, these photos 140 can be analyzed and used just as if the photos 140 were captured by a customer. In some embodiments, photo gather module 138 is coupled to other possible sources of photos 140, such as security cameras, for example. Inventory management system 210 is designed to glean and use information from any number of sources to obtain inventory data.

[0052] When customer information request module 216 receives customer response 226 from communication module 114 that includes photo 140 from customer 104, customer information request module 216 transmits a reward request 130 to reward module 112. Providing customer 104 with a reward for providing photo 140 incentivizes customer 104 to participate in gathering inventory data. Reward module 112 is coupled to customer information request module 216 and communication module 114. Reward module 112 receives reward request 130 from customer information request module 216, and outputs a customer reward 132 in response.

[0053] Reward module 112 sends customer reward 132 to communication module 114. Communication module 114 transmits customer reward 132 to mobile computing device 106 of customer 104 for customer 104's use. Inventory management system 210 then waits for another data capture 122 to arrive, and the inventory data gathering process begins again.

[0054] FIG. 5 illustrates a method 300 of updating an inventory database. Method 300 of updating an inventory database 300 includes element 310 of receiving a store product barcode scan from a mobile computing device of a customer. Method 300 also includes element 320 of sending the mobile computing device an informational data capture request. Method 300 of inventory management also includes element 330 of updating an inventory database in response to receiving an informational data capture from the mobile computing device.

[0055] Method 300 can include many other elements. In some embodiments, method 300 of updating an inventory database includes sending the mobile computing device a customer reward in response to receiving the informational data capture from the mobile computing device. In

some embodiments, the customer reward is one of a coupon; a product information guide; a website; or a recipe.

[0056] In some embodiments, method 300 of updating an inventory database includes saving the response from the customer. In some embodiments, the response from the customer is one of a null response; the informational data capture; or a response that the request cannot be fulfilled. In some embodiments, the informational data capture includes a photo of the interior of a store. In some embodiments, method 300 also includes extracting inventory data from the photo. In some embodiments, the informational data capture is one of a scan of a location identifier barcode; a scan of a second store product barcode; or a scan of a store feature barcode.

[0057] Step 330 of updating an inventory database in response to receiving an informational data capture from the mobile computing device can contain many additional elements. In some embodiments, updating an inventory database includes flagging a product as being on feature in response to receiving the scan of the location identifier barcode. In some embodiments, updating an inventory database includes flagging a product as out of stock in response to receiving the response that the request cannot be fulfilled. In some embodiments, updating an inventory database includes flagging a product as mis-placed in response to receiving the scan of the location identifier barcode. In some embodiments, updating an inventory database in response to receiving the response from the customer includes flagging a product as in stock in response to receiving the scan of the second store product barcode. In some embodiments, updating an inventory database includes checking a first item and a second item against a planogram in response to receiving the informational data capture. In some embodiments, updating an inventory database includes verifying the street date of a product in response to receiving the informational data capture. In some embodiments, updating an inventory database includes checking whether a product shelf location matches a product location indicator in response to receiving the informational data capture. In some embodiments, updating an inventory database includes updating a product location indicator in response to determining from the informational data capture that the product location indicator does not match the product shelf location. In some embodiments, updating an inventory database includes generating an inventory action request to move a product to a new product shelf location in response to determining from the

informational data capture that the product location indicator does not match the product shelf location.

[0058] As will be appreciated by one skilled in the art, aspects of the disclosed inventory management system in a retail store may be embodied as an electronic system, a method, or a computer program product. Accordingly, aspects may take the form of an entirely hardware embodiment, an entirely software embodiment (including firmware, resident software, micro-code, etc.) or an embodiment combining software and hardware aspects that may all generally be referred to herein as a "circuit," "module" or "system." Furthermore, aspects may take the form of a computer program product embodied in one or more computer readable medium(s) having computer readable program code embodied thereon.

[0059] Any combination of one or more computer readable medium(s) may be utilized. The computer readable medium may be a computer readable signal medium or a computer readable storage medium. A computer readable storage medium may be, for example, but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, or device, or any suitable combination of the foregoing. More specific examples (a non-exhaustive list) of the computer readable storage medium would include the following: an electrical connection having one or more wires, a portable computer diskette, a hard disk, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or Flash memory), an optical fiber, a portable compact disc read-only memory (CD-ROM), an optical storage device, a magnetic storage device, or any suitable combination of the foregoing. In the context of this document, a computer readable storage medium may be any tangible medium that can contain, or store a program for use by or in connection with an instruction execution system, apparatus, or device.

[0060] Aspects of the present invention are described herein with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems) and computer program products according to embodiments of the invention. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart

illustrations and/or block diagrams, can be implemented by computer program instructions or by special purpose processors, or by hardware accelerators or application specific circuits.

[0061] While the invention has been shown and described with reference to specific preferred embodiments, it should be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention as defined by the following claims.

What is claimed is:

1. An inventory management system for a retail store comprising:

a communication module, wherein the communication module receives a data capture from a mobile computing device of a customer of the retail store;

a customer information request module coupled to the communication module, wherein the customer information request module sends an informational data capture request to the communication module in response to receiving the data capture from the communication module; and

an inventory module coupled to the customer information request module, wherein the inventory module updates an inventory database in response to receiving an informational data capture from the customer information request module.

2. The inventory management system of claim 1, wherein the communication module transmits the informational data capture request to the mobile computing device in response to receiving the informational data capture request from the customer information request module.

3. The inventory management system of claim 2, wherein the communication module sends a customer response to the customer information request module in response to receiving the customer response from the mobile computing device.

4. The inventory management system of claim 3, further comprising a reward module coupled to the communication module and the customer information request module, wherein the reward module sends a customer reward to the communication module in response to receiving a reward request from the customer information request module.

5. The inventory management system of claim 4, wherein the inventory module transmits an inventory action request in response to receiving the informational data capture from the customer information request module.

6. The inventory management system of claim 1, further comprising a photo analysis module coupled to the customer information request module and the inventory module, wherein the photo analysis module provides photo inventory information to the inventory module in response to receiving a photo of the interior of the retail store from the customer information request module.

7. The inventory management system of claim 6, further comprising a photo gather module coupled to the photo analysis module, wherein the photo gather module obtains photos of the interior of the retail store from the internet.

8. The inventory management system of claim 3, wherein the customer response comprises the photo of the interior of the retail store.

9. An inventory management system comprising:
means for obtaining an informational data capture from a customer of a store;
and
an inventory module, wherein the inventory module updates an inventory database in response to receiving the informational data capture.

10. The inventory management system of claim 9, wherein the inventory module checks a first item and a second item against a planogram in response to receiving the informational data capture.

11. The inventory management system of claim 9, wherein the inventory module verifies the street date of a product in response to receiving the informational data capture.

12. The inventory management system of claim 9, wherein the inventory module checks whether a product shelf location matches a product location indicator in response to receiving the informational data capture.

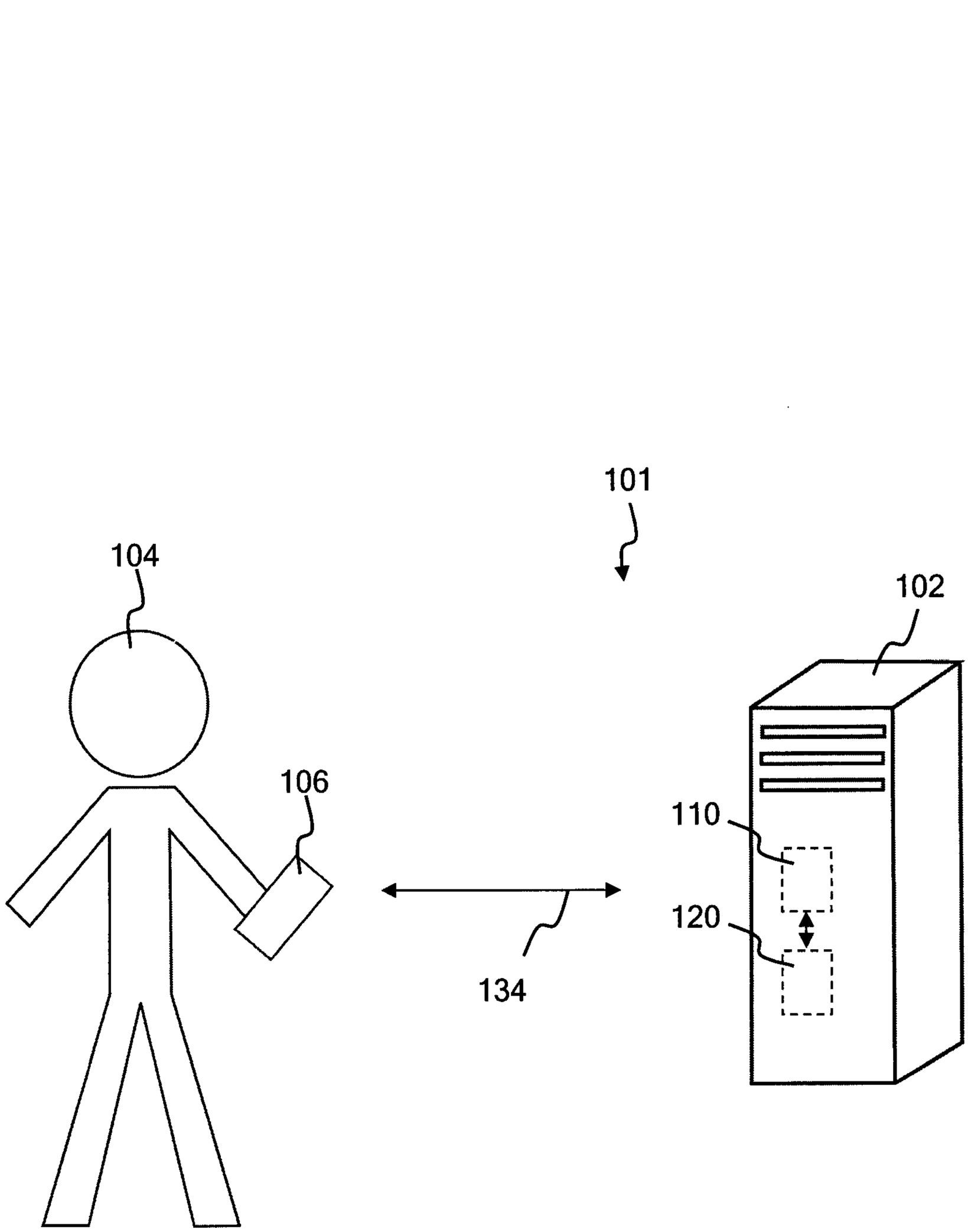


FIG. 1

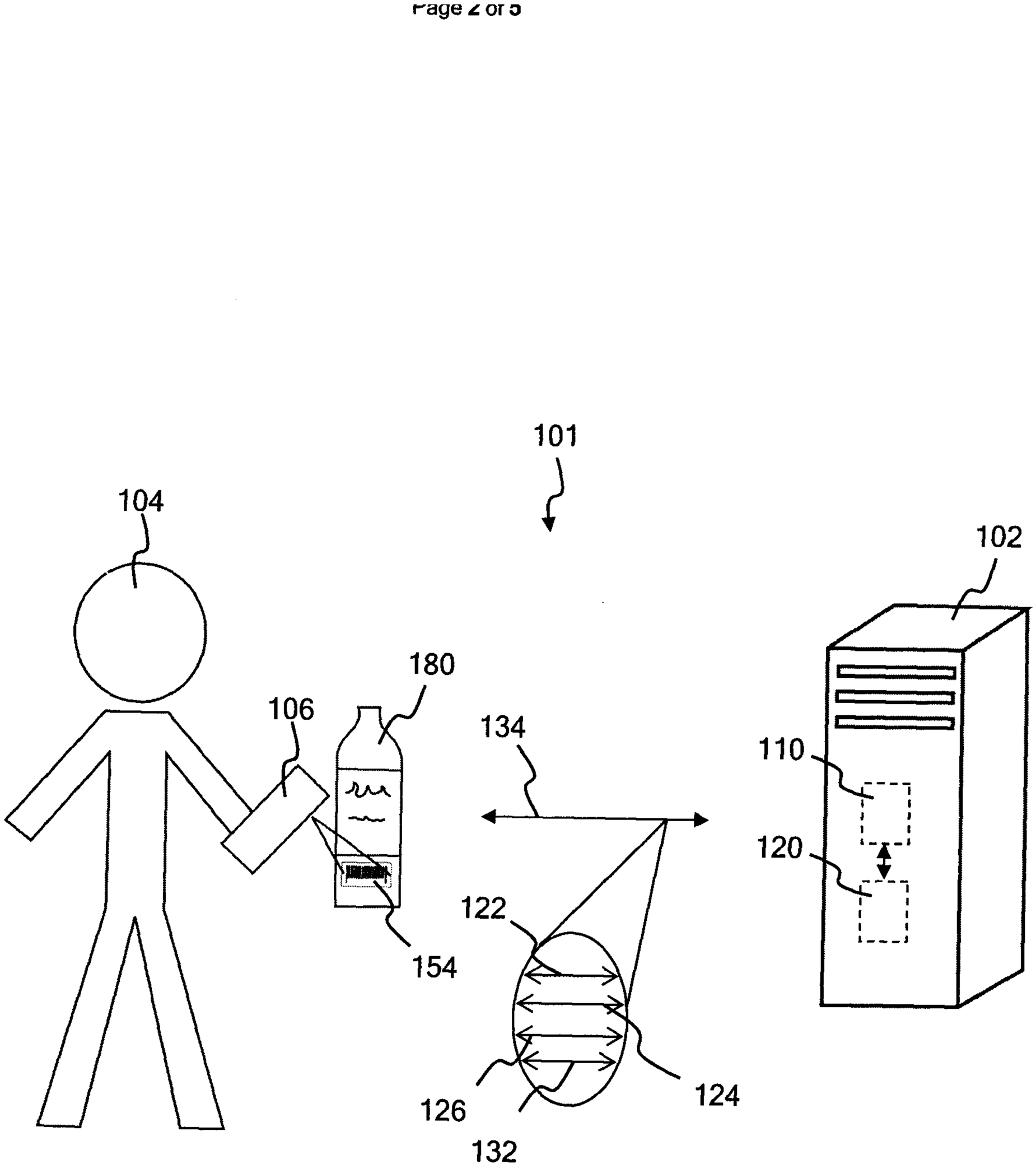


FIG. 2

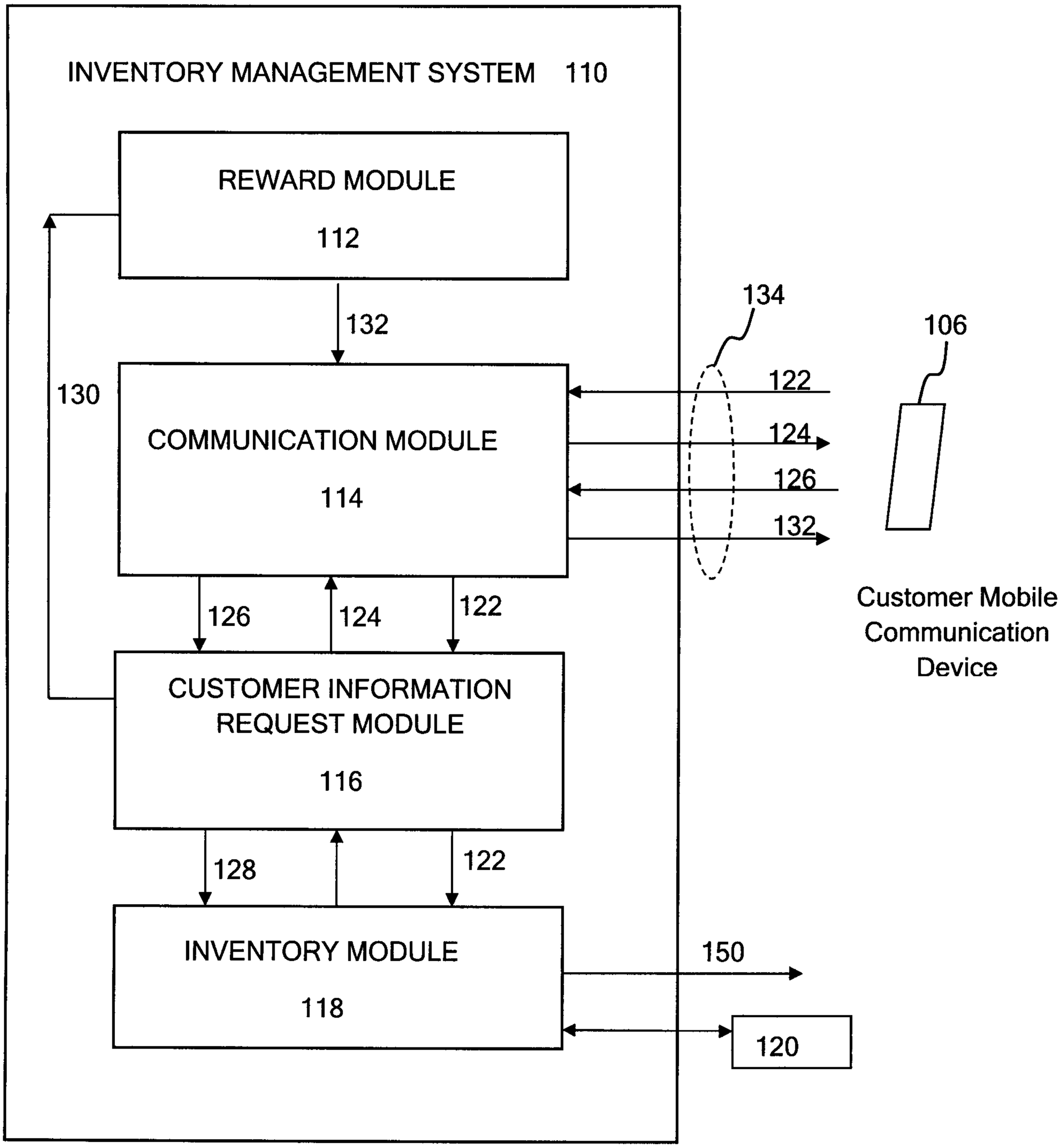

INVENTORY MANAGEMENT SYSTEM 110
REWARD MODULE
112
132
130
COMMUNICATION MODULE
114
134
106
122
124
126
132
Customer Mobile Communication Device
126
124
122
CUSTOMER INFORMATION REQUEST MODULE
116
128
122
INVENTORY MODULE
118
150
120

FIG. 3

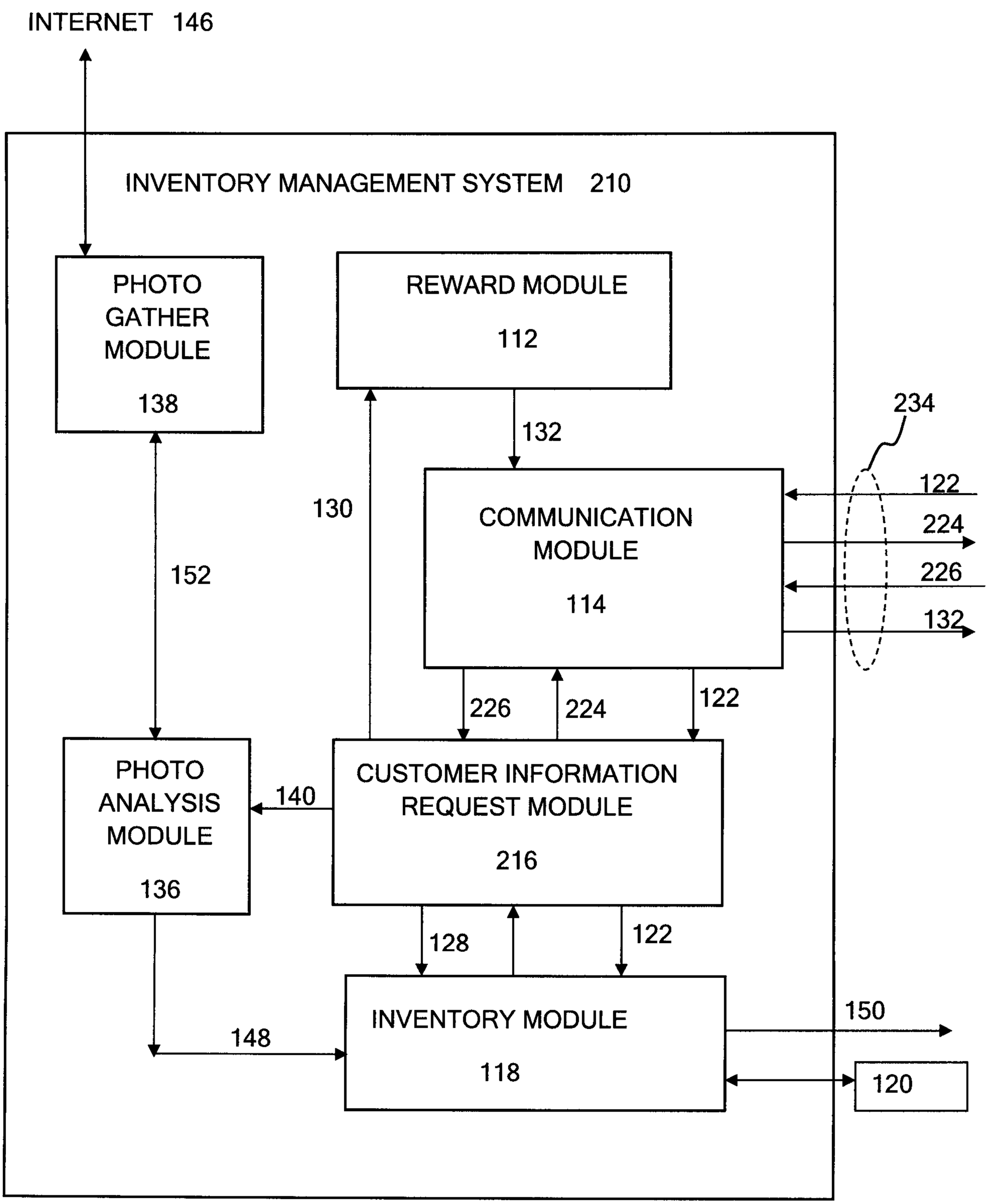

INTERNET 146
INVENTORY MANAGEMENT SYSTEM 210
PHOTO GATHER MODULE 138
REWARD MODULE 112
132
130
152
COMMUNICATION MODULE 114
234
122
224
226
132
226
224
122
PHOTO ANALYSIS MODULE 136
140
CUSTOMER INFORMATION REQUEST MODULE 216
128
122
148
INVENTORY MODULE 118
150
120

FIG. 4

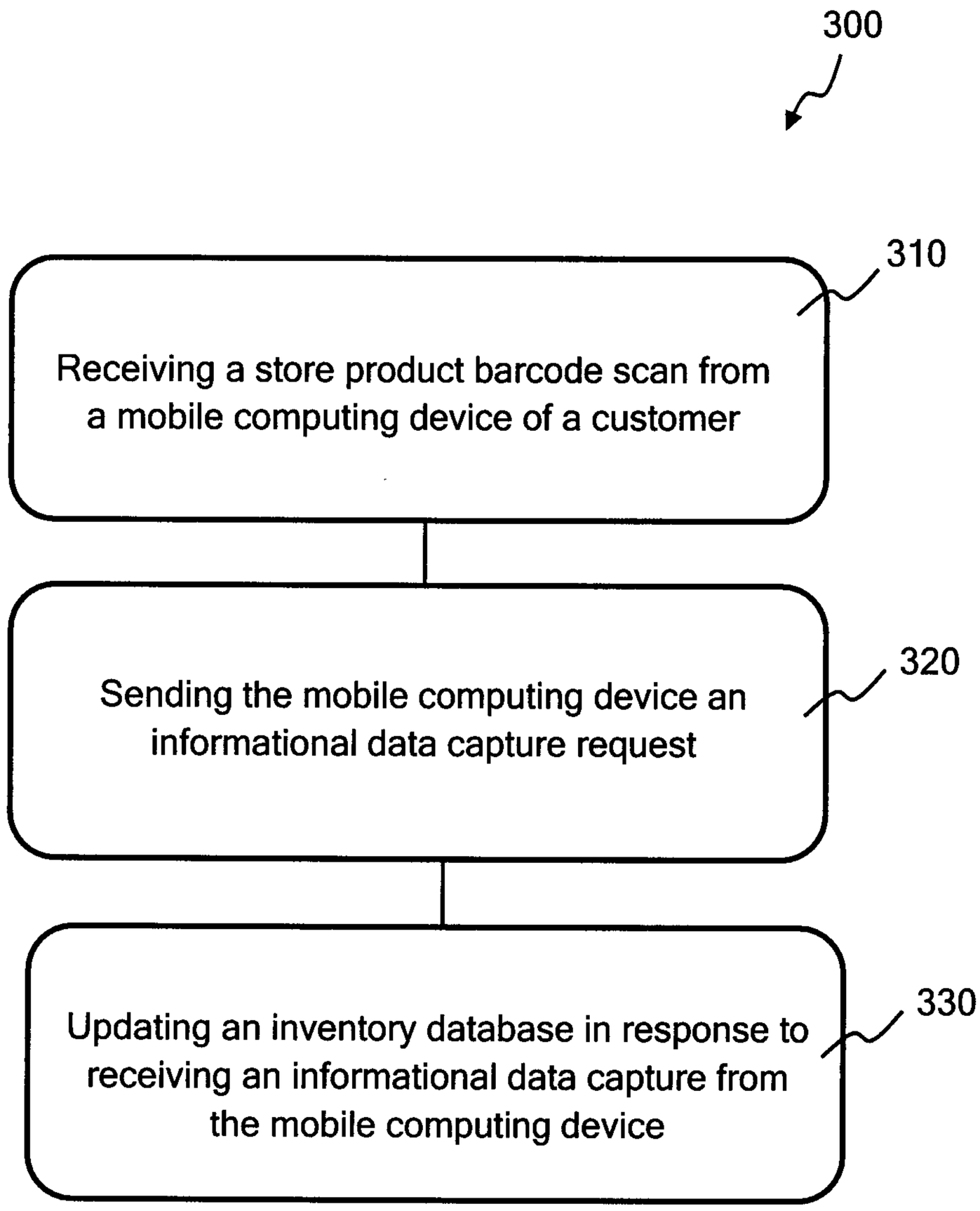
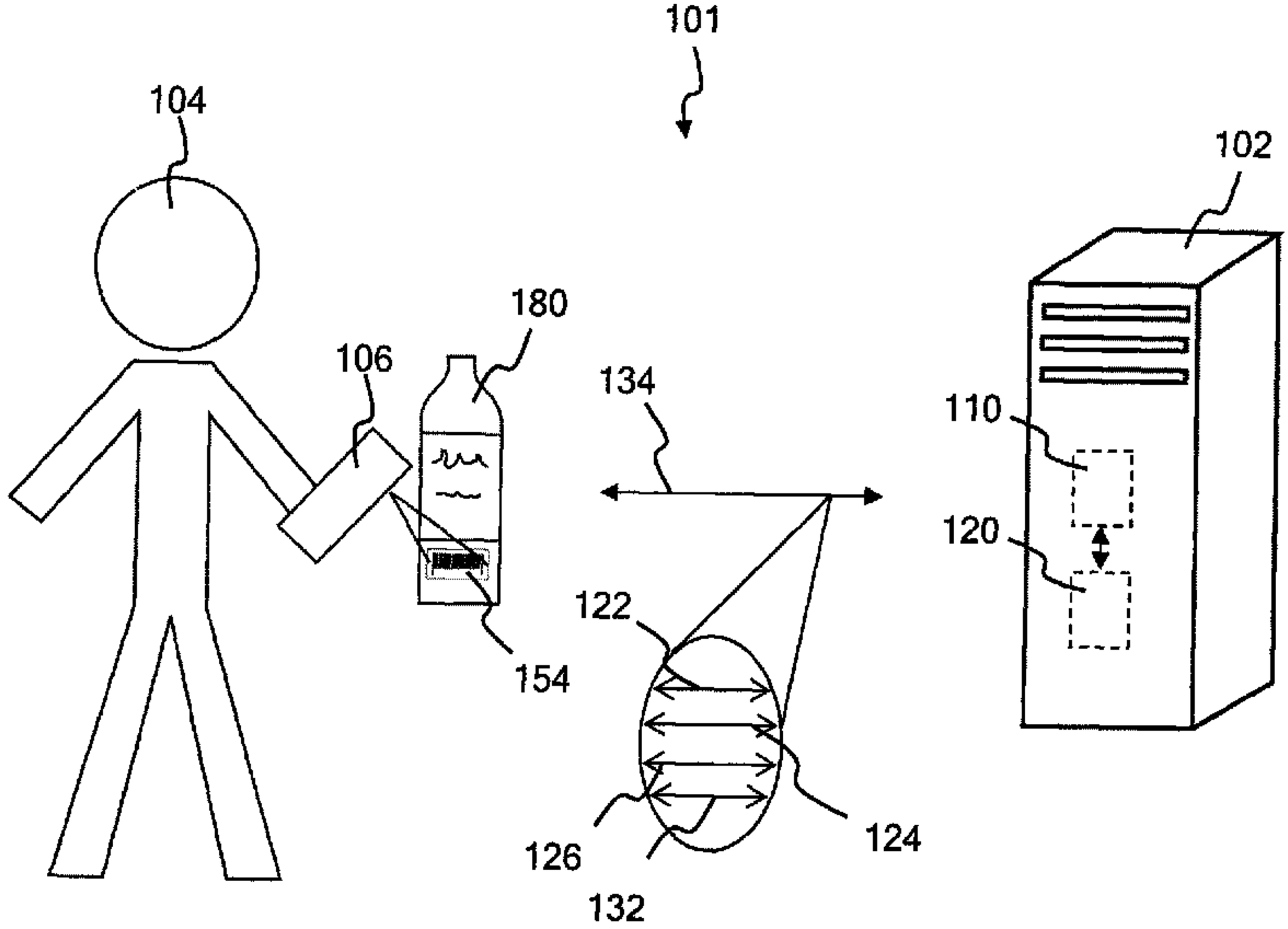

300
310
Receiving a store product barcode scan from a mobile computing device of a customer
320
Sending the mobile computing device an informational data capture request
330
Updating an inventory database in response to receiving an informational data capture from the mobile computing device

FIG. 5


101
104
102
180
106
134
110
120
122
154
124
126
132