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## Infinite Storage of Expendable Goods for Consumer Access

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## INFINITE STORAGE OF EXPENDABLE GOODS FOR CONSUMER ACCESS

### **Introduction**

An increasing percentage of consumers are turning to the convenience of online stores and internet-based distributors to purchase an expanding variety of goods ranging from groceries to household appliances to everyday necessities. Consumers can pay to have shipped to their doorstep goods that would otherwise be unavailable for practical purposes, such as is the case with products sold exclusively in a geographical region for instance. However, problems typically arise when consumers use online stores or internet-based distributors to purchase expendable goods, such as consumable foods, as such goods require recurrent ordering at varying rates that are dependent upon numerous factors including the manner in which the consumer uses the expendable good, the frequency with which the expendable good was used by the consumer in the most recent timeframe relative to earlier timeframes, and the degree to which the expendable good is essential to or needed by the consumer. Providing consumers with a reliable and convenient means of obtaining expendable goods will ensure that consumers have access to the products that are most essential to them, particularly expendable goods.

### **Summary**

Computer-implemented systems and methods for providing infinite storage with the disclosed technology can be accomplished with storage pods configured to improve consumer access to expendable goods by using various techniques for managing inventory data, restricting storage pod access, and using data-driven models to ensure the availability of expendable goods.

In some instances, a consumer may own or be associated with a storage pod configured for the delivery and accessibility of expendable goods. A consumer may use a user computing

device to enter a search input related to the purchase or resupply of expendable goods, and the search input may be communicated over a network to a server computing system. The server computing system may be configured to provide search results relating to the purchase or resupply of the consumable good. In some embodiments, the search input is generated on the user computing device and a machine learned model stored within the user computing device and/or at a server is utilized to detect a type of expendable good, such as paper towels, by analyzing keywords from the search input. The machine learned model may use the search input to drive a consumer profile, which can be adjusted to determine minimum threshold data associated with the quantity of consumable goods to be stored in a storage pod designed for the consumer. An infinite storage interface can be accessed by the consumer and/or a distributor. The interface can be used to obtain data indicating when certain products, such as expendable goods, have been or will be resupplied to a storage pod. The infinite storage interface can include a display table containing information associated with the storage pod and types of expendable goods stored therein. Any combination or order of the methods described herein can be executed on a user computing device, remote computing device, or similar device. For example, all steps of providing an infinite storage of expendable goods for consumer access can be performed on a remote computing system or parts of the process can be performed on a user computing device and others on a remote computing system as previously described.

In some instances, an infinite storage system may include a storage pod provided for use by a consumer. The storage pod may be associated with a designated location for allowing convenient access to the consumer. For instance, the storage pod may be a home-based storage pod that is located at least partially inside of the dwelling or residence of the consumer. In some examples, the home-based storage pod may have a first door and a second door. The first door

may be accessible from outside of the home, such that the first door may be accessible from a street or outside walkway. The second door of the home-based storage pod may be accessible from inside of the home, such as a door into a pantry, storage, or garage of the dwelling or residence. In such designated locations, the first door may be configured to allow access to the consumer and the distributor, whereas the second door may be configured to allow access to only the consumer. In this way, the distributor is unable to access the inside of the dwelling or residence of the consumer through the second door. In addition, the storage pod may be located separate from the dwelling or residence of the consumer, such as at the end of a driveway leading to the consumer's home or across the street from where the consumer resides.

The storage pod may be designated for the delivery and availability of goods, particularly expendable goods including consumable foods, perishable and non-perishable items, and other products. For example, the storage pod may be used solely in connection with one user account, such as a single consumer or a group of consumers under one user account. The user account may be associated a consumer profile based at least on the purchase history or consumption patterns of the consumer. The infinite storage system may be configured to adjust the consumer profile based on a variety of factors or retrospective data, such as the time of year, the schedule of the consumer, and other consumption statistics unique to a geographical region in which the storage pod is located. The infinite storage system may be configured to collect inventory data associated with the storage pod. The inventory data may be based on the quantity of one or more types of expendable goods being stored. The inventory data can be used to maintain the quantity of each type of expendable good at or above a minimum threshold determined based at least in part on the adjusted consumer profile.

In example embodiments, the storage pod may include at least one entry point. The entry point may include a first door configured for dual access to allow the consumer and a distributor to access the storage pod. The consumer may require access to the storage pod to purchase or obtain one or more expendable goods. The distributor may require access to the storage pod to determine a current amount of each type of expendable good. Also, the distributor, such as a delivery service, may require access to the storage pod to deliver one or more expendable goods based at least in part on inventory data and minimum threshold data. In some instances, the entry point may include a second door configured for single access to allow the consumer to access the storage pod such that the second door blocks access to the distributor.

In one particular embodiment, the entry point of the storage pod has a locking mechanism for securing or locking the entry point to block access. Additionally or alternatively, the storage pod may include a signal system (e.g., light) to indicate that someone is in the storage pod. The locking mechanism may be disengaged by using a corresponding unlocking mechanism, which allows access to the storage pod. The locking mechanism may be a key-based lock with the corresponding unlocking mechanism being a door key. In some examples, the locking mechanism may be a smart lock configured to restrict access when the storage pod is in use. The smart lock may be configured to make an in-use determination as to whether the storage pod is in use by the distributor or the consumer and allow or prevent access to the storage pod based at least in part on the in-use determination. For instance, the smart lock may determine that the storage pod is in use by the distributor via various identification techniques, such as image recognition, geolocation information, or other recognition means. The smart lock may be configured to block access to either a first door and/or a second door. The first door may be configured to allow access to both the consumer and the distributor, whereas the second door

may allow access only to the consumer, particularly in embodiments where the second door provides direct access between the residence of the consumer and the storage pod. When it is determined that the storage pod is in use by the distributor, for example, the smart lock may block access to the second door by the distributor until it is determined that the distributor is no longer using the storage pod. Likewise, the smart lock may block access to the first door by the distributor upon determining that the storage pod is in use by the consumer. The distributor may regain access to the first door once the smart lock determines that the storage pod is no longer in use by the consumer.

### **Detailed Description**

Figure 1 depicts an example computing system 100 in which systems and methods in accordance with the present disclosure can be executed. The computing system comprises a user computing device 102 including one or more processors 112, memory 114 including data 116 and instructions 118 configured to carry out the methods disclosed herein, and a user input component 122. The user input component can be, for example, a touch display or physical buttons within the user computing device 102. The computing system 100 further comprises a network 180 and a server computing system 130. The server computing system 130 including one or more processors 132, and memory 134 including data 136 and instructions 138 configured to carry out the methods disclosed herein. It should be appreciated that any combination or order of systems and methods disclosed herein can be performed on the user computing device, server computing system, or similar. For example, all processes can be performed on the user computing device 102 or the server computing system 130.

Figure 2 depicts an example embodiment of an infinite storage interface 200 with which systems and methods in accordance with the present disclosure can be executed. The infinite storage interface 200 can include a timeline 202 indicating when certain products, such as expendable goods, have been or will be resupplied to a storage pod. The storage pod may be owned by a consumer such that the infinite storage interface is representative of the storage pod owned by the consumer. The infinite storage interface 200 can include a display table 210 containing information associated with the storage pod. For instance, the storage table may include product data 212, such as inventory data, associated with the storage pod. The product data 212 may be based at least in part on a quantity of one or more types of expendable goods. The one or more types of expendable goods represented on the interface 200 may include the types of expendable goods being stored or otherwise associated with the storage pod of the consumer, such as product (A) 204, product (B) 206, and product (C) 208. With respect to the display table 210, included are product columns 214 associated with each type of expendable good being stored in the storage pod of the consumer. Under each product column 214, product data 212 may be included. Product data 212 associated with product (A) 204, for instance, may include a quantity of product (A) 204 that is presently stored in the storage pod. Product data 212 may also include minimum threshold data indicative of the minimum amount or quantity of product (A) 204 to be stored in the storage pod. The minimum threshold of a product may be determined in accordance with the process outlined with respect to FIG. 3. The interface 200 can be configured to indicate whether the quantity of a type of expendable good is above, at, or below the minimum threshold. In some examples, the display table 210 can be updated manually by the consumer or by a distributor who is responsible for delivering expendable goods to the storage pod and tracking its inventory. In other embodiments, the infinite storage system may be

configured to determine the information associated with display table 210 by using sensors and populate the product data 212 and types of expendable goods accordingly.

Referring now to Figure 3, an example inventory management process 300 for an infinite storage system in accordance with aspects of the present disclosure is provided. At step 302, the process includes identifying inventory thresholds of a storage unit (i.e., storage pod). The infinite storage system disclosed herein may be configured to determine inventory thresholds, such as a minimum threshold as discussed with respect to FIG. 2. The threshold may be associated with the user account of the consumer that owns or is otherwise associated with a corresponding storage pod. The user account may be associated with a consumer profile determined based at least on the purchase history or consumption patterns of the consumer. The infinite storage system may be configured to adjust the consumer profile based on a variety of factors or retrospective data, such as the time of year, the schedule of the consumer, and other preferences unique to a geographical region in which the storage pod is located. In this way, the infinite storage system may be configured to determine the minimum quantities of each type of expendable good that should be stored in the storage pod at all times. At step 304, the method 300 includes collecting inventory data of the storage unit. Inventory data can be collected manually such that the consumer or the distributor manually enters the quantity of each type of expendable good stored in the storage pod. In other instances, the infinite storage system may include sensors disposed inside of the storage pod for detecting when an expendable good is removed from the storage pod by the consumer. At step 306, the method 300 includes determining whether inventory of each type of expendable good must be resupplied. For instance, step 306 may include comparing the minimum threshold at 302 with the inventory data at 304 to determine whether the inventory data 304 of one type of expendable good is above, at,



or below the minimum threshold. At step 308, the method 300 includes communicating to the distributor whether resupplying of at least one of the types of expendable goods is required. The distributor may receive such communication via the interface depicted with respect to FIG. 2. At step 310, the method 300 may include confirming that the inventory thresholds of each type of expendable good of the storage pod are satisfied. For instance, step 310 may comprise repeating step 306 to determine whether the quantity of a type of expendable good must be resupplied.

Figure 4 depicts an example embodiment of an infinite storage system 400 according to the present disclosure. The infinite storage system 400 includes a storage pod 410 connected to or disposed proximate a consumer location 480, such as the residence of the consumer who owns or is associated with the storage pod. The system 400 may include a server computing system 430 for communicating information, such as inventory data, over a network. The storage pod 410 may be used to store one or more types of expendable goods, such as product 404, product 406, and product 408. The placement of each type of expendable good within the storage pod 410 may be determined by the consumer. The storage pod 410 may include one or more entry points, such as first door 462 and second door 482. The first door 462 may be configured to allow the consumer and a distributor 460 to access the storage pod 410. The second door 482 may be configured to allow only the consumer to access the storage pod 410, such that the second door 482 blocks the distributor 460 from entry. In some examples, the storage pod 410 may be a home-based storage pod that is connected to or located inside of the consumer location 480, such as the residence of the consumer. The first door 462 may be accessible from outside of the home, such as from a street or outside walkway, to allow the distributor 460 to access for making a delivery. The second door 482 of the home-based storage pod may be accessible from inside of the residence of the consumer, such as a pantry space or attached garage, to allow the consumer

convenient access. In a home-based storage pod, the first door may be configured to allow access to the consumer and the distributor, whereas the second door may be configured to allow access to only the consumer, which can be accomplished using the smart lock described above.

The entry points 462, 482 may be configured with mechanical locks and may be configured as a smart lock system. The storage pod 410 may have sensors 492 configured to obtain sensor data indicative of whether the storage pod 410 is in use and whether it is being used by the distributor 460 or the consumer. In some examples, the sensor data can be used for security monitoring. The sensor data may be used in association with the smart lock system to limit access to the storage pod 410 when it is in use by either the distributor 460 or the consumer.

Figures

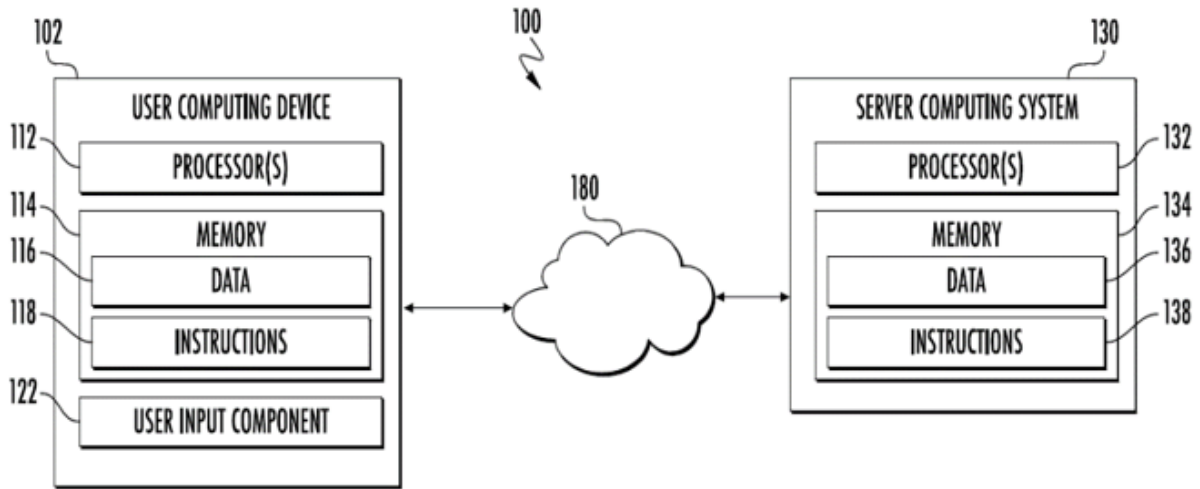


FIG. 1

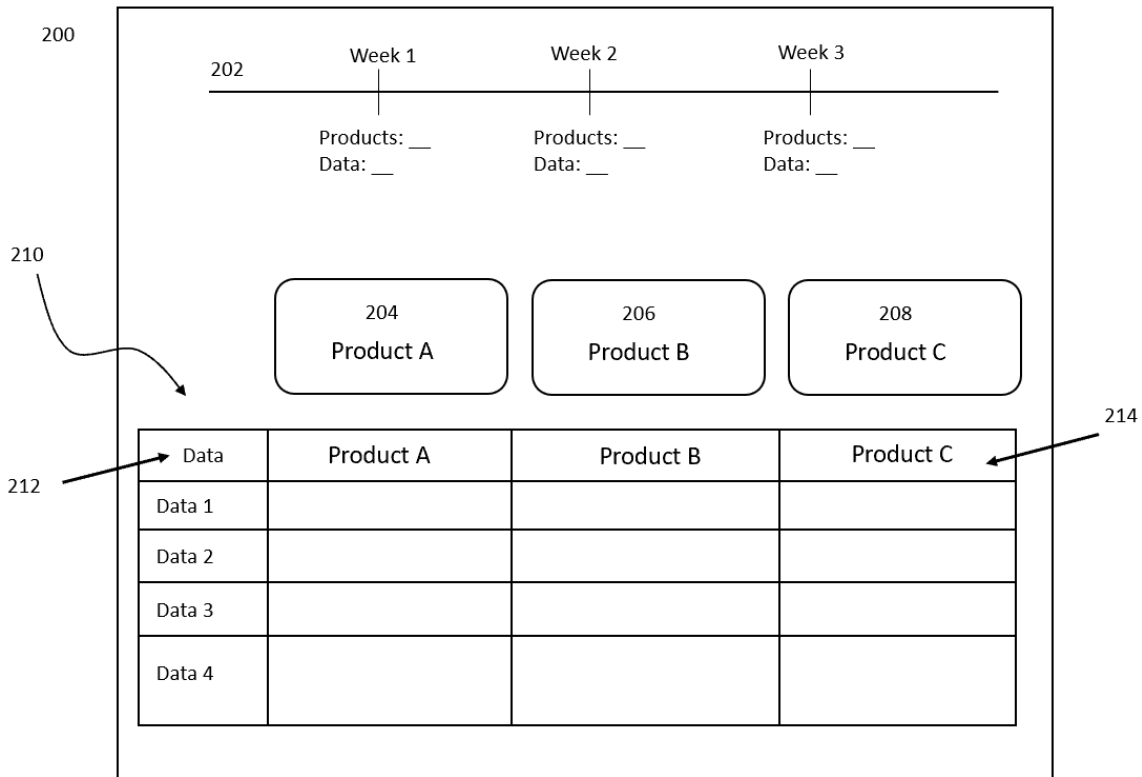


FIG. 2

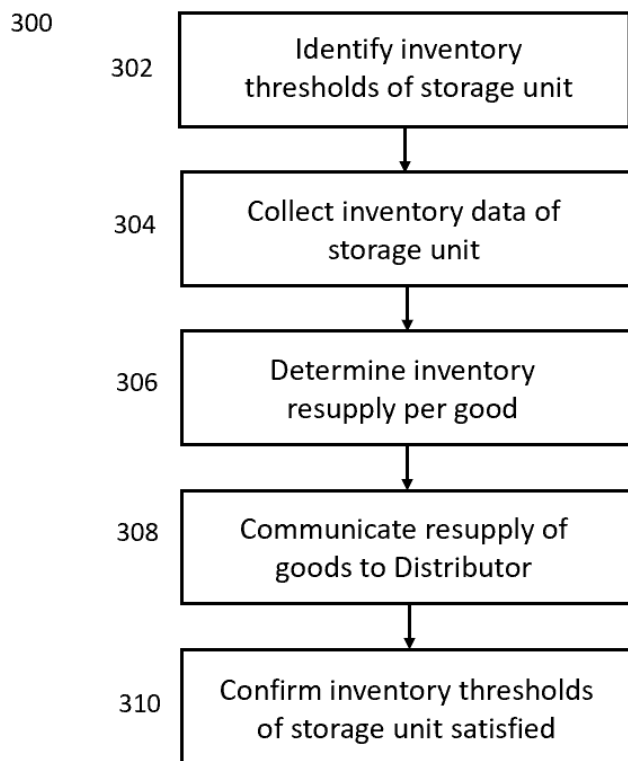


FIG. 3

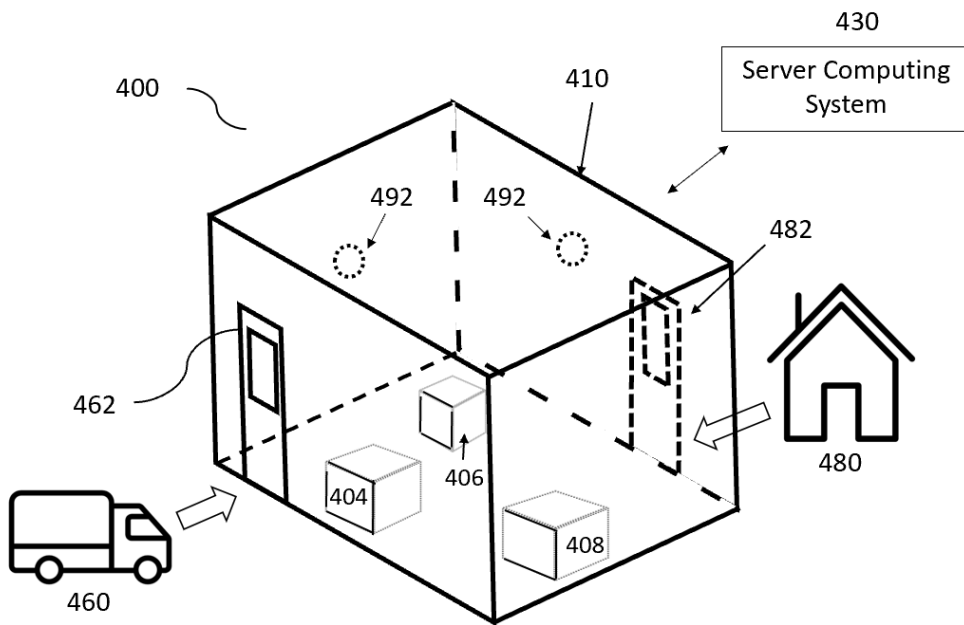


FIG. 4

## **Abstract**

The present disclosure describes computer-implemented systems and methods for maintaining a reliable and sufficient supply of expendable goods in a storage pod designated for consumer access. The storage pod may be configured for the delivery of expendable goods to improve the accessibility of expendable goods to consumers by implementing techniques for managing inventory data, securing access to the storage pod, and using data-driven models to coordinate the resupply of expendable goods.