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Morris

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(54) **SYSTEMS AND METHODS FOR FACILITATING IN-GARAGE DELIVERY**

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G06Q 10/083 (2024.01)

(52) **U.S. Cl.**
CPC ***G06Q 10/083*** (2013.01)

(58) **Field of Classification Search**
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USPC 705/330
See application file for complete search history.

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Primary Examiner — Jeff Zimmerman
Assistant Examiner — Hunter Molnar
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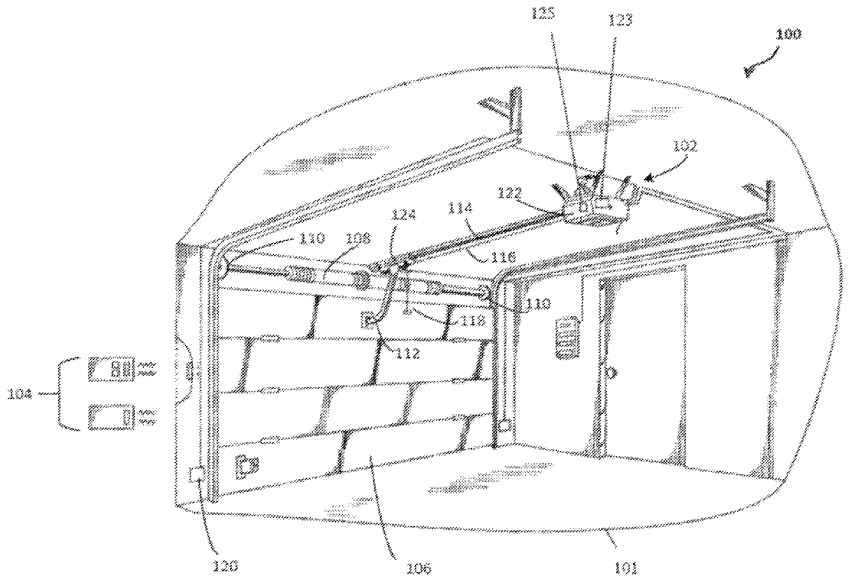
(57) **ABSTRACT**

Apparatuses and methods are provided herein for facilitating in-garage delivery. In some embodiments, there is provided a system for facilitating in-garage delivery including a memory configured to store computer-readable instructions; communication circuitry configured to receive image data representative of an interior of a garage captured by an imaging device; and a processor operably coupled to the memory and the communication circuitry, the processor configured to execute the computer-readable instructions to: process the image data to determine a characteristic of the interior of the garage; select a packaging for an item to be delivered to the garage based at least in part on the characteristic of the interior of the garage; and effect delivery to the garage of the item with the selected packaging.

19 Claims, 5 Drawing Sheets



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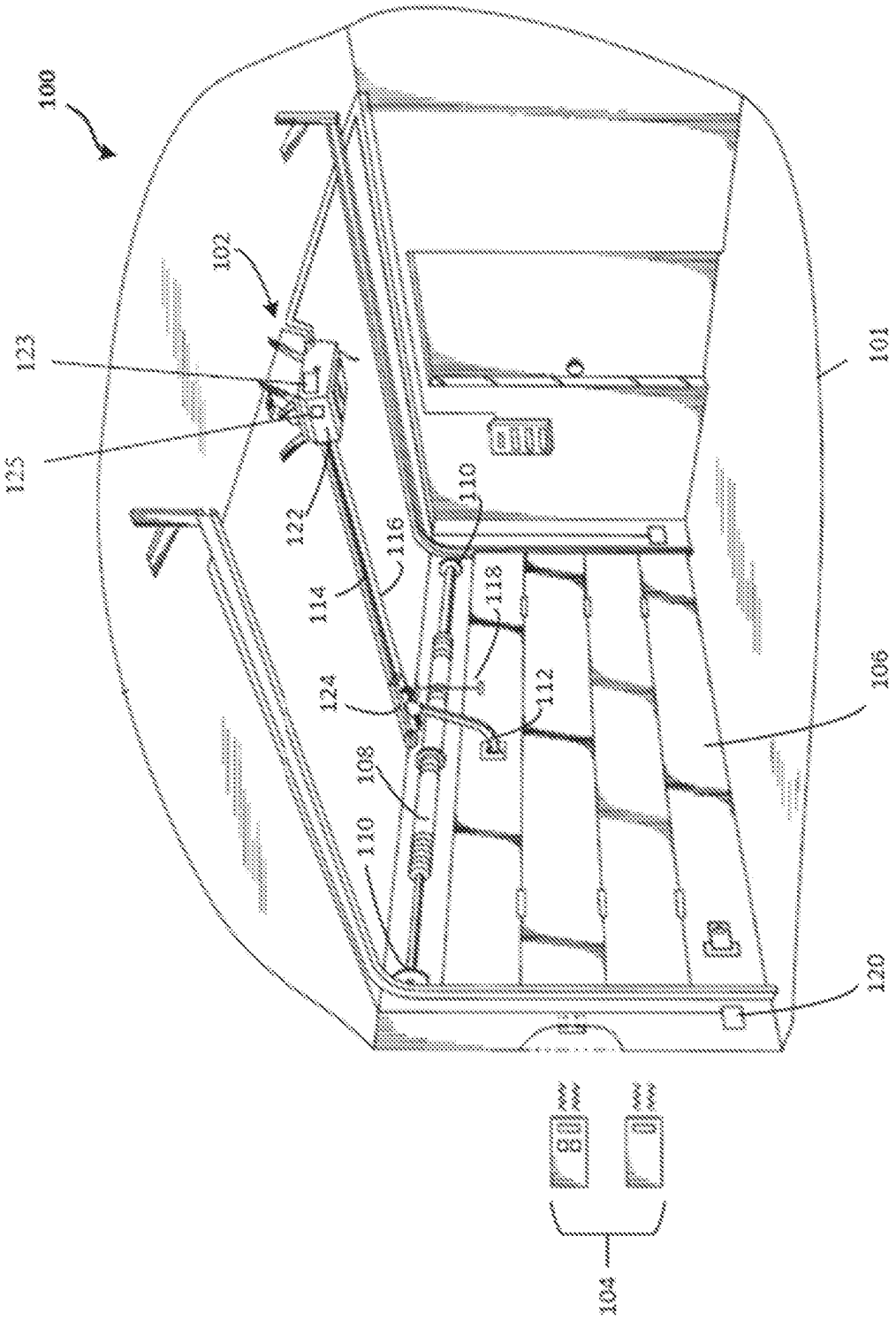
100
102
123
125
122
116
114
110
118
112
124
108
110
101
106
120
104

FIG. 1

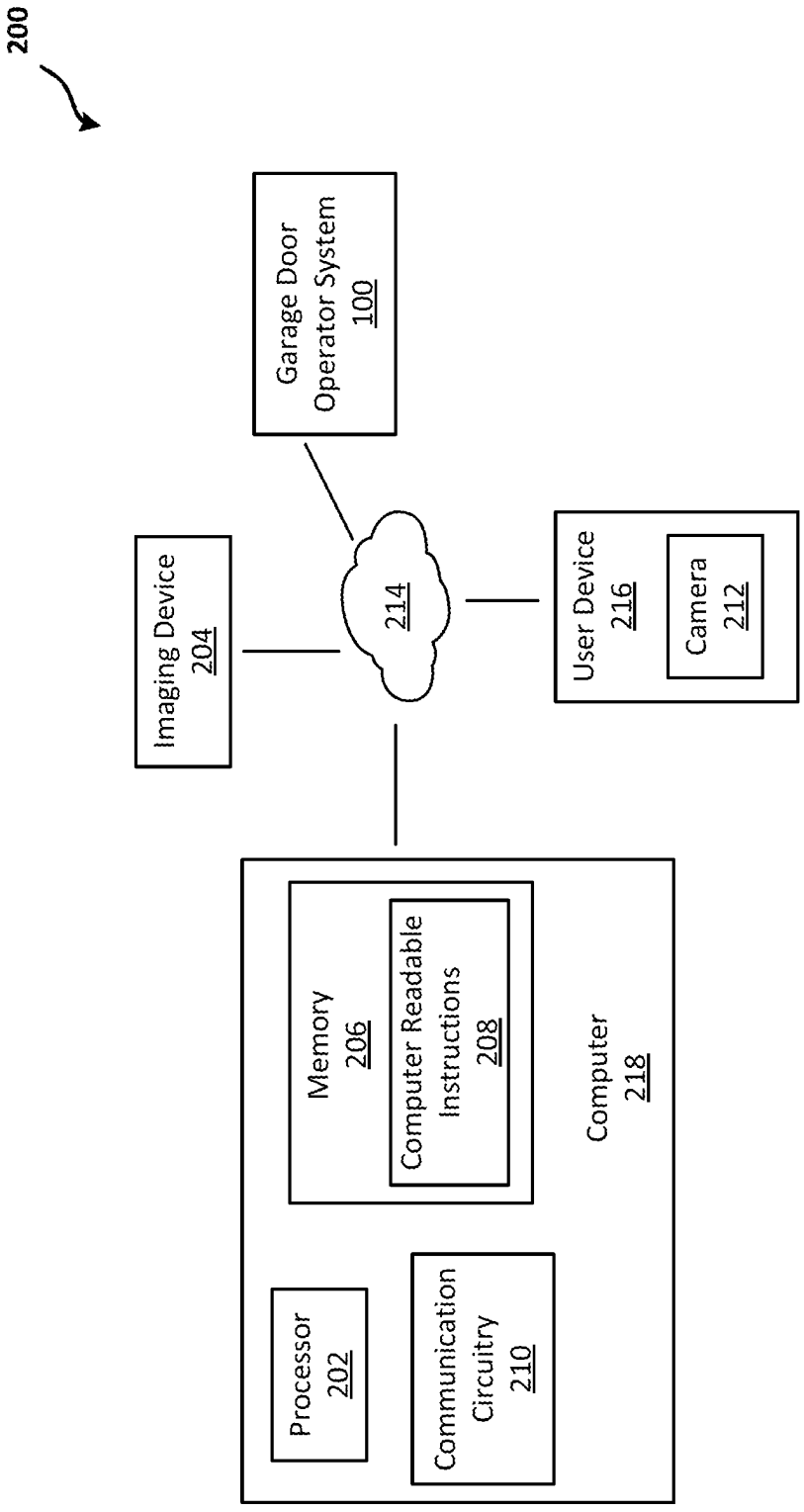
200
Garage Door Operator System 100
Imaging Device 204
214
User Device 216
Camera 212
Memory 206
Computer Readable Instructions 208
Computer 218
Processor 202
Communication Circuitry 210

FIG. 2

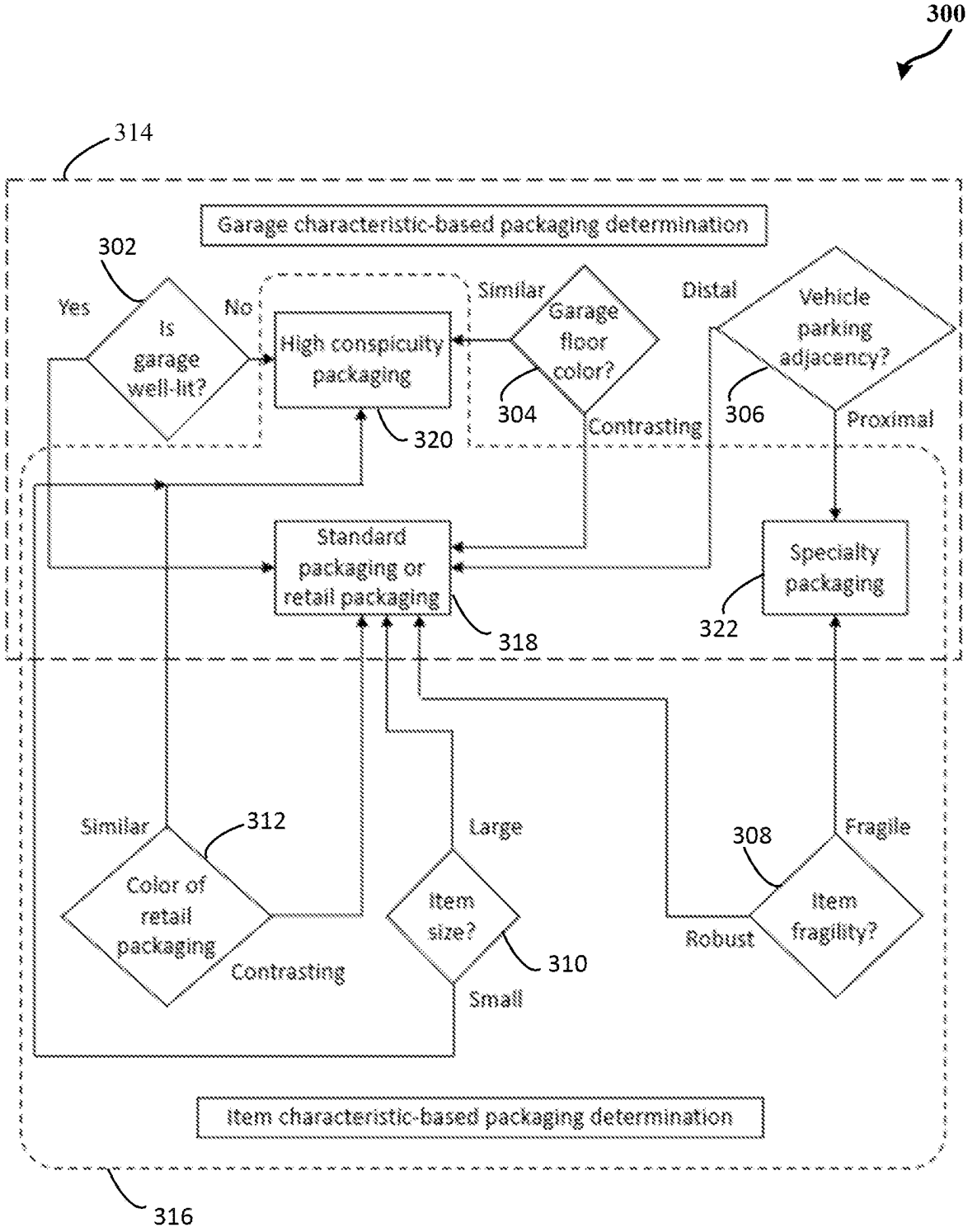
300
314
Garage characteristic-based packaging determination
302
Is garage well-lit?
Yes
No
High conspicuity packaging
320
Similar
Garage floor color?
304
Contrasting
Distal
Vehicle parking adjacency?
306
Proximal
Standard packaging or retail packaging
318
Specialty packaging
322
Similar
312
Color of retail packaging
Contrasting
Large
Item size?
310
Small
308
Fragile
Item fragility?
Robust
Item characteristic-based packaging determination
316

FIG. 3

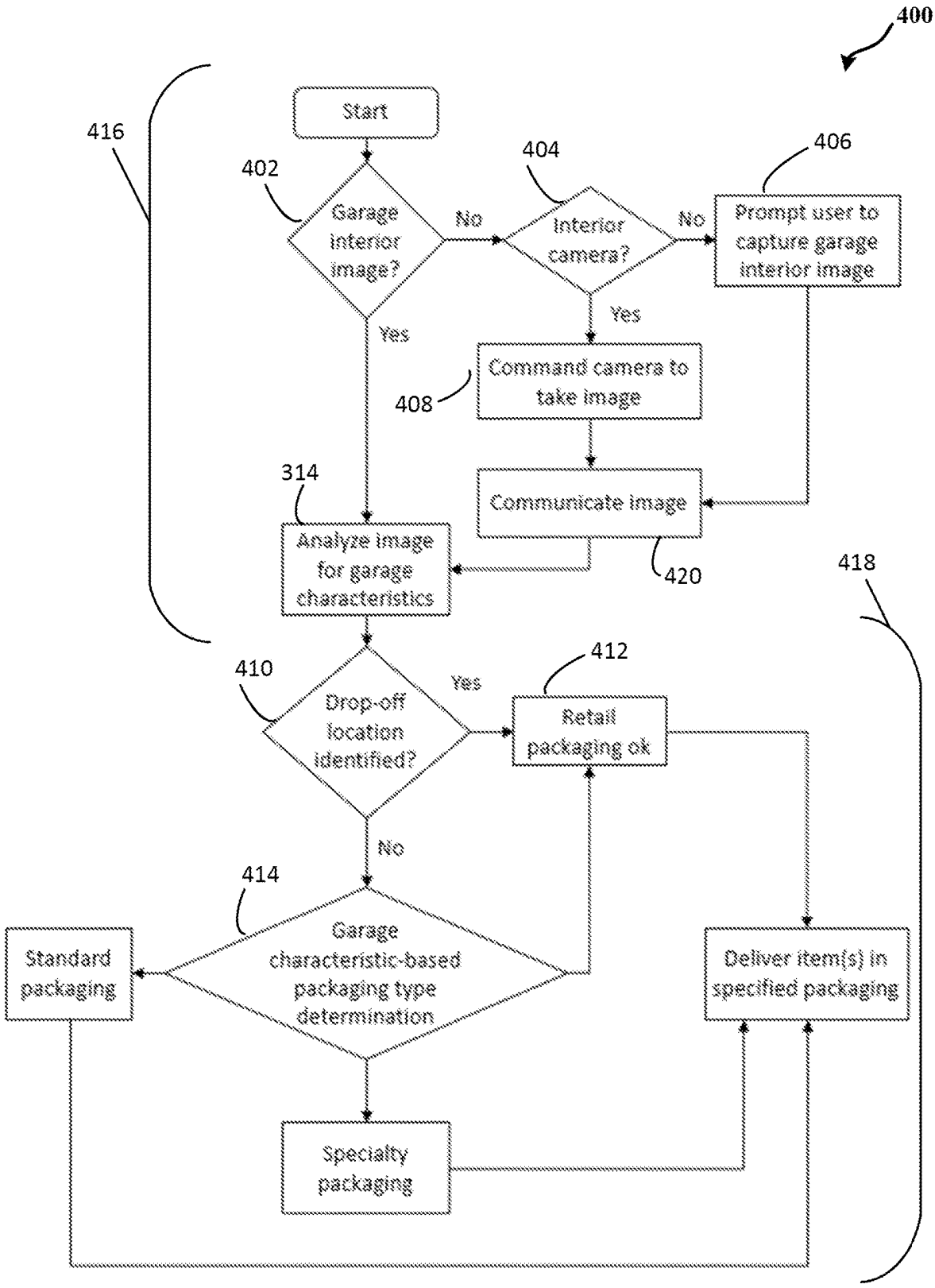
400
Start
402
Garage interior image?
No
404
Interior camera?
No
406
Prompt user to capture garage interior image
Yes
Yes
408
Command camera to take image
314
Communicate image
Analyze image for garage characteristics
420
416
418
410
Drop-off location identified?
Yes
412
Retail packaging ok
No
414
Garage characteristic-based packaging type determination
Standard packaging
Deliver item(s) in specified packaging
Specialty packaging

FIG. 4

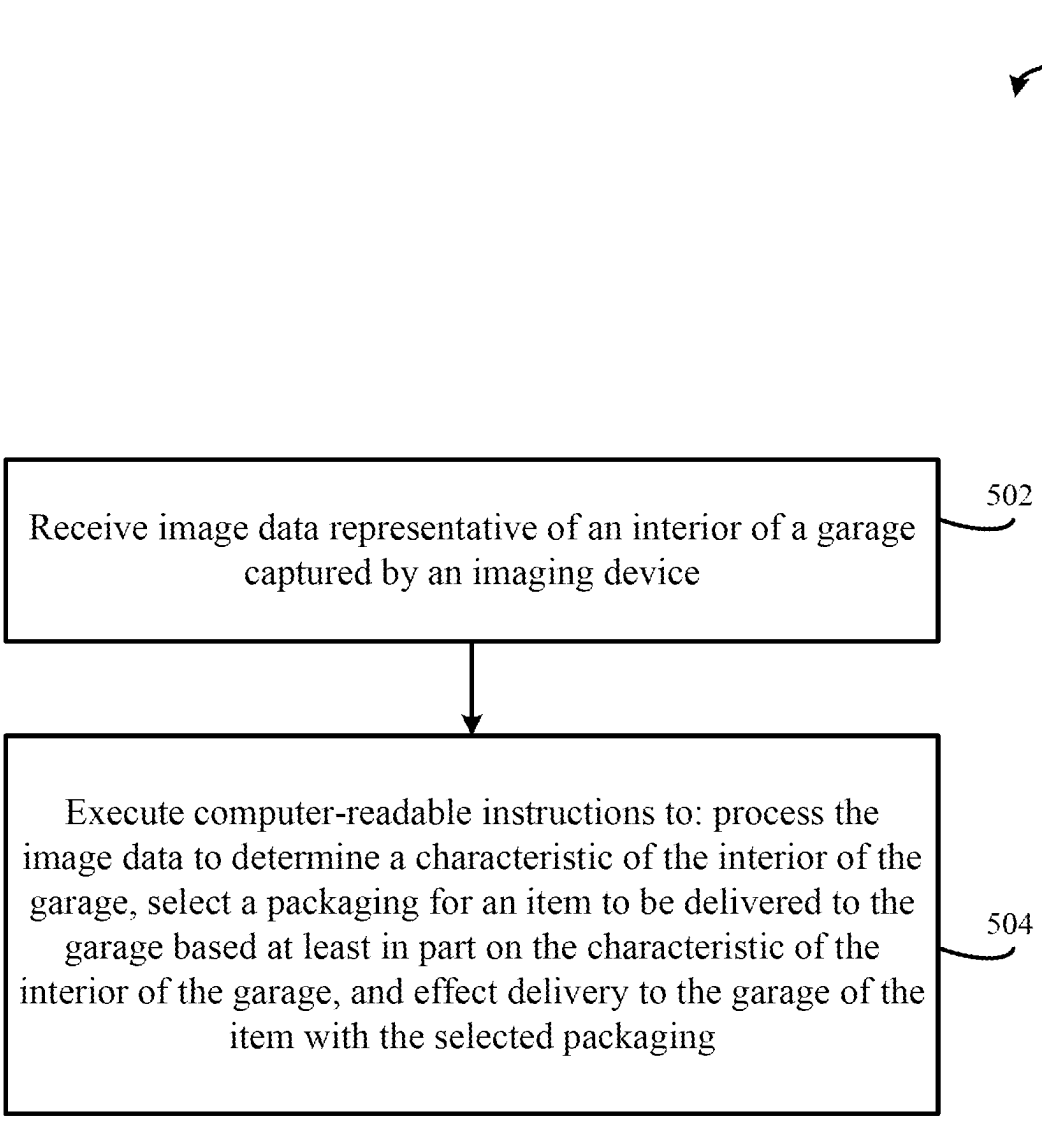
500
Receive image data representative of an interior of a garage captured by an imaging device
502
Execute computer-readable instructions to: process the image data to determine a characteristic of the interior of the garage, select a packaging for an item to be delivered to the garage based at least in part on the characteristic of the interior of the garage, and effect delivery to the garage of the item with the selected packaging
504

FIG. 5

SYSTEMS AND METHODS FOR FACILITATING IN-GARAGE DELIVERY

RELATED APPLICATION

The present application is Continuation of patent application Ser. No. 17/490,500 having a filing date of Sep. 30, 2021, the entire contents of which is incorporated herein by reference.

TECHNICAL FIELD

This disclosure relates generally to facilitating in-garage delivery.

BACKGROUND

Generally, when a product is delivered to a residence, such as a house, the product is either left by a door, at the mailbox, or a person at the residence receives the delivery upon providing a release such as a signature to a delivery person/agent/associate. As such, the delivery of the product may be visible to a thief, exposed to the outside environment, and/or inconvenient to the recipient. To address the foregoing issues, some merchants offer unattended delivery of ordered/purchased items to a secure (d) area such as a residential garage. Such unattended in-garage delivery, however, continues to be performed by packaging the item in a delivery carton such as a corrugated paper (e.g. cardboard) box. Use of a delivery carton, in certain instances, may excessively consume resources, for example, extra time and materials are expended to package an item for delivery although such item may be suitably delivered substantially as-is.

BRIEF DESCRIPTION OF THE DRAWINGS

Disclosed herein are embodiments of systems, apparatuses and methods pertaining to facilitating in-garage delivery. This description includes drawings, wherein:

FIG. **1** is a view of an example garage door operator system for operating a garage door of a garage;

FIG. **2** is a block diagram of an example in-garage delivery system for facilitating delivery of an item to the garage of FIG. **1**;

FIG. **3** shows a flow diagram of an example method of facilitating in-garage delivery in accordance with some embodiments;

FIG. **4** shows a flow diagram of an example method of facilitating in-garage delivery in accordance with some embodiments; and

FIG. **5** shows a flow diagram of an example method of facilitating in-garage delivery in accordance with some embodiments.

Elements in the figures are illustrated for simplicity and clarity and have not necessarily been drawn to scale. For example, the dimensions and/or relative positioning of some of the elements in the figures may be exaggerated relative to other elements to help to improve understanding of various embodiments of the present disclosure. Also, common but well-understood elements that may be useful or implemented in a commercially available embodiment are often not depicted in order to facilitate a less obstructed view of these various embodiments of the present disclosure. Certain actions and/or steps may be described or depicted in a particular order of occurrence while those skilled in the art will understand that such specificity with respect to sequence is not actually required. The terms and expressions used herein have the ordinary technical meaning as is accorded to such terms and expressions by persons skilled in the technical field as set forth above except where different specific meanings have otherwise been set forth herein.

DETAILED DESCRIPTION

Generally speaking, pursuant to various embodiments, provided herein are systems, apparatuses and methods for facilitating in-garage delivery. In some embodiments, the system for facilitating in-garage delivery includes a processor operably coupled to a memory and a communication circuitry. The memory stores computer-readable instructions. The communication circuitry may receive image data representative of an interior of a garage captured by an imaging device. The processor may execute the computer-readable instructions to process the image data to determine a characteristic of the interior of the garage. In some embodiments, the processor executes the computer-readable instructions to select a packaging for an item to be delivered to the garage based at least in part on the characteristic of the interior of the garage. The processor may execute the computer-readable instructions to effect delivery to the garage of the item with the selected packaging.

In some embodiments, a method for facilitating in-garage delivery includes storing, by a memory, computer-readable instructions. The method includes receiving, via communication circuitry, image data representative of an interior of a garage captured by an imaging device. The method includes executing, by a processor operably coupled to the memory and the communication circuitry, the computer-readable instructions to: process the image data to determine a characteristic of the interior of the garage; select a packaging for an item to be delivered to the garage based at least in part on the characteristic of the interior of the garage; and effect delivery to the garage of the item with the selected packaging.

In some embodiments, a non-transitory computer-readable medium storing instructions which, when executed, cause performance of a method for facilitating in-garage delivery. Performance of the method includes: storing, by a memory, computer-readable instructions; receiving, via communication circuitry, image data representative of an interior of a garage captured by an imaging device; and executing, by a processor operably coupled to the memory and the communication circuitry the computer-readable instructions to: process the image data to determine a characteristic of the interior of the garage; select a packaging for an item to be delivered to the garage based at least in part on the characteristic of the interior of the garage; and effect delivery to the garage of the item with the selected packaging.

Referring now to FIG. **1**, an example garage door operator system **100** for operating a garage door **106** is provided. In one embodiment, the garage door operator system **100** includes a garage door operator **102** and one or more remote controls such as a transmitter **104**. The one or more remote controls may include, for example, a user device such as a smartphone, an in-vehicle device such as a head unit or infotainment system coupled to an in-vehicle transmitter, a keypad, a wall control, a visor-mounted remote control, and/or a handheld transmitter such as a key fob. The garage door operator **102** includes an electric motor **122**, communication circuitry **123**, and a control circuit (including a processor **125**). In some embodiments, the garage door operator includes a rail **116** and transmission member **114**

such as a chain, belt, or screw driven by the electric motor **122** relative to the rail **116**. The electric motor **122** is operable to move the garage door **106** between open and closed positions. For example, a trolley **124** is coupled to the transmission member **114** as well as an arm **112** that is attached to the garage door **106**. The electric motor **122** shifts the trolley **124** back-and-forth along the rail **116** to lift and lower the garage door **106**. A release mechanism **118** is coupled to the trolley **124** to allow the garage door **106** to be disconnected from the garage door operator **102** for manual operation, such as during a power failure.

The garage door operator system **100** includes a cable mechanism **110** that is attached to the garage door **106**. The cable mechanism **110** includes a drum and a corresponding cable on opposing sides of the garage door **106**, with the drums coupled with a rotating shaft (known as a "jackshaft") above the garage door **106** for taking up and paying out respective cables as the garage door operator **102** lifts and lowers the garage door **106**. The drum of the cable mechanism **110** couples to a counterbalance such as a torsion spring **108** that assists in lifting the weight of the garage door **106** and enables the garage door operator **102** to open or close the garage door **106** via movement of the trolley **124**. In some embodiments, an optical sensor such as a photo eye system **120** senses an object and/or a human who may be in the way of the garage door **106** as the garage door **106** closes.

Referring now to FIGS. **2** and **5**, FIG. **2** is a block diagram showing an example in-garage delivery system **200** for facilitating delivery of an item to a garage, such as a garage **101** of FIG. **1**. The item to be delivered to the garage may have been an item ordered from an online marketplace, an online retailer, or a scheduled delivery from a brick-and-mortar store, for example. The in-garage delivery system **200** includes a processor **202** operably coupled to a memory **206**, which stores computer-readable instructions **208**, and a communication circuitry **210**. In some embodiments, the processor **202**, the memory **206**, and the communication circuitry **210** are components of one or more computers **218**, such as one or more server computers, a cloud computing system, etc. FIG. **5** shows a flow diagram of an example method **500** of facilitating in-garage delivery utilizing the in-garage delivery system **200**. In some embodiments, the computer-readable instructions **208** and one or more characteristics of an item to be delivered to the garage are stored in the memory **206**. Uses of singular terms such as "a character" and "an item" are intended to cover both the singular and the plural. In some embodiments, at block **502**, the communication circuitry **210** receives image data representative of an interior of a garage captured by an imaging device **204**. In some embodiments, the in-garage delivery system **200** includes an imaging device **204**.

In some embodiments, the processor **202** causes the imaging device **204** to capture a plurality of images. The processor **202** may select one or more images of the plurality of images based at least in part on the one or more images being captured proximate the projected time of delivery of the item to the garage. In some embodiments, the imaging device **204** includes a video camera (e.g., a digital camera), a camera/imaging module which is an element of a still or video camera, a constituent part thereof such as a CMOS or CCD-type image sensor, and/or a visible light-based camera. In some embodiments, the imaging device **204** includes a laser scanner that can be used to generate or otherwise output one or more models of the garage interior in three dimensions. In some embodiments, the imaging device **204** may include a camera integrated with the system **100** (e.g. a garage door operator with a unitary or built-in camera module), a stand-alone camera, and/or a camera **212** associated with a user device **216**. In some embodiments, the user device **216** includes a smartphone, a tablet computer, a smartwatch, and/or various other portable electronic devices capable of commutatively coupling with another electronic device (e.g., the processor **202** and the garage door operator system **100**). Regardless of its type and form, the imaging device **204** captures an image of a scene of an interior portion (or substantial entirety) of the garage, and outputs image data representative of the scene. Such image data may be captured and/or output in one or more formats such as a raw image, bitmap, or using compression or encoding technique(s). When the imaging device **204** is embodied as a laser scanner or the like, the image data output therefrom may be a three-dimensional model in one or more formats such as STL, OBJ, PLY and others.

In some embodiments, the processor **202** may effectuate, via the communication circuitry **210**, a user device **216** prompting a user to capture at least one image of the interior of a garage using a camera **212** of the user device **216** upon a determination that the imaging device **204** is unable to provide the image of the interior of the garage. For example, the processor **202** transmits a control data to the user device **216** via an application programming interface causing the user device **216** to display a message banner prompting the user to capture at least one image of the interior using the camera **212** of the user device **216**. The processor **202** may receive, via the communication circuitry **210**, the at least one image captured by the user device **216** and/or processes the at least one image captured by user device **216** to determine the characteristic of the interior of the garage. Alternatively or additionally, one or more of the user device **216**, the imaging device **204**, or the garage door operator system **100** (or the garage door operator **102** thereof) may process the at least one image and/or receive image data for processing/analyzing in order to determine the characteristic of the interior of the garage.

In some embodiments, the communication circuitry **210** receives a communication from the garage door operator system **100** of the garage that indicates a change of state of the garage door. For example, the garage door operator may be operable to move the garage door between open and closed positions. In some embodiments, the imaging device **204** captures an image relative to the change of state of the garage door. That is, the change of state acts as a trigger for the computer **218** to effect capture, by the imaging device, of an image of the garage interior. For example, the imaging device **204** captures the image immediately before, immediately after, or while the garage door moves up and/or down.

The processor **202** may utilize the computer-readable instructions **208** to analyze the image data. In some embodiments, at block **504**, the processor **202** executes the computer-readable instructions **208** to process the image data to determine a characteristic of the interior of the garage; select or identify or recommend a packaging for an item to be delivered to the garage based at least in part on the characteristic of the interior of the garage; and effect delivery to the garage of the item with the selected packaging.

In some embodiments, the processor **202** selects the packaging for the item based at least in part on the characteristic(s) of the interior of the garage and the characteristic(s) of the item to be delivered to the garage as described below in connection with FIGS. **3** and **4**. For example, a characteristic of an item to be delivered may include at least one of: dimensions of the item, a color of the

item or of the retail packaging of the item, and fragility of the item. In some embodiments, the processor **202**, the memory **206**, the imaging device **204**, the communication circuitry **210**, the garage door operator system **100**, and/or the user device **216** may be communicatively coupled via a communication network **214**. In some embodiments, the communication network **214** may include one or more wide-area and short-range wireless and wired approaches such as the Internet, Bluetooth, WLAN/Wi-Fi, cellular network (e.g., 3G, 4G, 5G, etc.) and/or various communication paths. In some embodiments, the processor **202** selects the packaging for the item to be delivered to the garage from a group consisting of: retail packaging(s) of the item, a high-conspicuity packaging, a protective packaging, and/or a delivery carton. In some embodiments, the delivery carton includes corrugated material, non-corrugated (e.g., paperboard) material, and/or a paper-based product, such as a bag or envelope, to name a few. Furthermore, the high-conspicuity (or highly conspicuous) packaging may be a brightly colored (e.g. yellow, red, orange, etc.) paper or biodegradable material that attaches to, wraps about or encloses the item to improve visibility and/or detectability of the item.

In some embodiments, the computer-readable instructions **208** may include a machine learning model trained to process one or more captured images of the garage and determine characteristics of the interior of the garage. A packaging of an item to be delivered to the garage is customized based at least in part on the determined characteristics of the interior of the garage. In some embodiments, the machine learning model may utilize one or more machine learning algorithms, such as supervised learning, unsupervised learning, reinforcement learning, binary classification, Support Vector Machine (SVM), artificial neural networks, convolutional neural networks, You Only Look Once (YOLO), RetinaNet, Regional based CNN (RCNN), Fast-RCNN, Faster-RCNN, and Mask RCNN. In some embodiments, the machine learning algorithm may iteratively input a plurality of images of the garage captured at various times to train the machine learning model to determine one or more characteristics of the interior of the garage within a predetermined accuracy. The computer-readable instructions **208**, when executed, may alternatively or additionally cause performance of one or more imaging and/or image-processing techniques relative to the image data including, for example, computer vision, object recognition, edge detection (e.g. to distinguish a garage floor from a garage door or wall), etc.

Illustrative non-limiting examples of methods **300**, **400** of facilitating in-garage delivery in accordance with some embodiments are shown in FIGS. **3** and **4**. For example, the method **300** of FIG. **3** includes the processor **202** executing the computer-readable instructions **208** to process image data to select packaging for an item based on a characteristic of the garage as shown in block **314** and/or characteristic(s) associated with one or more items to be delivered to the garage as shown in block **316**. In some embodiments, at step **302**, the processor **202** in executing the computer-readable instructions **208** determines whether the garage is well-lit. By one approach, at step **318**, if the garage is well-lit, the processor **202** selects no packaging other than the retail packaging of the item. By another approach, at step **320**, if the garage is not well-lit, the processor **202** selects the packaging that is highly conspicuous or visible such that the packaging can be seen readily even at substandard lighting and/or no lighting at all. By selecting a highly conspicuous packaging, attention can be called to the delivered item such that the item is not struck or driven over by a vehicle, and such that the item can be readily seen and located inside the garage, for example. In some instances the high conspicuity packaging may include a non-visual portion to call attention to the item. Such a non-visual portion may be configured to output an odorant, a haptic/vibration signal, a sound, or a combination thereof. For example a non-visual portion may include a device included in or otherwise coupled to the packaging such as a speaker for outputting an audible warning or alert such as beeping.

In some embodiments, at step **304**, the processor **202** in executing the computer-readable instructions **208** determines a color of the garage floor as a garage interior characteristic of interest. Additionally it may be determined whether the color of the garage floor is substantially similar to the color or colors of the item to be delivered. By one approach, at step **318**, if the color of the item (or the color of the retail packaging of the item) is contrasting to the color of the garage floor, the processor **202** selects standard packaging or no packaging other than the retail packaging of the item. By another approach, at step **320**, if the color of the garage floor (e.g. cement gray) is similar to the color of the item or to the color of the item's packaging (e.g. a gray box), the processor **202** selects packaging that is highly conspicuous such that the packaging can be seen readily even at substandard lighting and/or no lighting at all.

In some embodiments, at step **306**, the processor **202** in executing the computer-readable instructions **208** determines whether the area in which the delivery item is to be placed is adjacent to where a vehicle is typically parked in the garage. By one approach, at step **318**, if the delivery area is distant from the vehicle, the processor **202** selects standard packaging or no packaging other than the retail packaging of the item. By another approach, at step **322**, if the area is proximate the vehicle, the packaging used is a specialty packaging (e.g., hardshell, well padded, and/or any type of packaging that can withstand a bump and/or contact from a vehicle that is being parked). In an example, a substantially spherical encapsulation or enclosure (e.g., of rigid foam or other material) about an item may roll away from a vehicle wheel upon contact such that damage to the item inside is obviated. In some embodiments, the specialty packaging may include a packaging having a bright color, a blinking/strobing light, and/or a reflector to enable the customer to see the item despite the headlights of the vehicle.

Turning now to block **316**, in some embodiments execution of the computer-readable instructions **208** additionally or alternatively include determining a characteristic of the item to be delivered. As previously mentioned with respect to steps **302** and **304**, a characteristic of the garage interior may be reconciled with a characteristic of the item to be delivered in order to select a particular packaging. That is, both of the item characteristic and the garage interior characteristic are used. However, in certain instances the item characteristic may be weighted higher or lower relative to the garage interior characteristic when determining whether a particular packaging is to be selected. As shown at step **308**, the processor **202** in executing the computer-readable instructions **208** determines whether the item to be delivered is fragile. By one approach, at step **322**, if the item is fragile, the processor **202** selects a packaging specialty packaging (e.g., hardshell, well padded, and/or any type of packaging that can withstand rough handling/transportation and/or delivery (e.g. a drop from a predetermined height), a bump and/or contact from a vehicle that is being parked). By another approach, at step **318**, if the item is not fragile, the

processor **202** selects standard packaging or no packaging other than the retail packaging of the item.

In some embodiments, at step **310**, the processor **202** in executing the computer-readable instructions **208** determines whether the size and/or overall dimensions of the item to be delivered is considered large or small relative to a threshold overall dimensions or size. By one approach, at step **318**, if the size and/or overall dimensions is large, the processor **202** selects standard packaging or no packaging other than the retail packaging of the item. By another approach, at step **320**, if the size and/or overall dimensions is small, the processor **202** selects highly conspicuous packaging such that the packaging can be seen readily even at substandard lighting and/or no lighting at all.

In some embodiments, at step **312**, the processor **202** in executing the computer-readable instructions **208** determines whether the color(s) of the retail packaging of the item is/are similar or contrasting relative to the color of the garage floor. By one approach, at step **318**, if the color(s) of the retail packaging of the item is/are contrasting to the color of the garage floor, the processor **202** selects standard packaging or no packaging other than the retail packaging of the item. By another approach, at step **320**, if the color(s) of the retail packaging of the item(s) is/are similar to the color of the garage floor, the processor **202** selects packaging that is highly conspicuous such that the packaging can be seen readily even at substandard lighting and/or no lighting at all. In some embodiments, the processor **202** may select between the standard packaging (e.g. a corrugated/cardboard carton) and the retail packaging based on one or more factors that may be dependent or independent from the determined characteristic(s) (e.g., item characteristic and/or garage interior characteristic). In one example a known user may have a predetermined/default preference stored or indicated in a profile, such preference relating to being an environmentally conscious consumer and/or whether a recycling service is available to the user (e.g. the user lives in a building or community that does not recycle). For example, the retail packaging may be used to eliminate unnecessary materials such as plastic bags or styrofoam peanuts or inserts that are difficult to recycle or cannot be recycled and will instead be disposed of after use. In another example, the user may select a packaging preference or indicate a particular packaging request upon placing or submitting their order for purchasing the item. In yet another example, a manufacturer of the item or the vendor/merchant may suggest or mandate a particular packaging type and/or discourage delivery in retail packaging in order to prevent damage such that returns are minimized.

Turning now to FIG. **4**, the example method **400** of FIG. **4** includes an analysis portion **416** and a delivery portion **418**. In some embodiments, the processor **202** determines whether one or more images of the interior of the garage are available for processing, at step **402**. For example, the processor **202** may access the memory **206** to determine whether images are available that were captured on a different day or days proximate a projected time of delivery of the item to the garage. In some embodiments, the processor **202** effects a capture of additional image data of the interior of the garage by the imaging device **204** proximate a projected time of delivery of the item to the garage. By one approach, the additional image data of the interior of the garage may be captured before the projected time of delivery and/or one or more days or hours prior to the day of the projected time delivery, for example. In some embodiments, at step **404**, the processor **202** determines whether a camera is operable inside the garage, such as by receiving an operable status communication from the camera. By one approach, at step **406**, if a camera is not operable inside the garage, the processor **202** prompts a user during installation of the garage door operator system **100** or during a user setup of an in-garage delivery, for example, to capture an image of the interior of the garage. The user may be given an option by the processor **202** as to when to capture the image. For example, the user may use the camera **212** of the user device **216** to capture the image at the installation or setup time and/or at a time convenient to the user. By another approach, at step **408**, if a camera is operable inside the garage, the processor **202** causes the camera inside the garage to capture an image of the interior of the garage and/or analyzes the image, at step **314**, to determine characteristic(s) of the interior of the garage. In some embodiments, at step **420**, the captured image is provided to and/or communicated to the processor **202**. In some embodiments, the characteristic of the interior of the garage includes at least one of lighting in the garage, a color of a floor of the garage, a floor plan of the garage, available floor space in the garage, and a proximity of a parked vehicle to a delivery location in the garage.

In some embodiments, at step **410**, the processor **202** in executing the computer-readable instructions **208** determines whether a drop-off location and/or area for the item to be delivered has been identified. In some embodiments, the processor **202** identifies a delivery location within the garage using the image data representative of the interior of the garage captured by the imaging device **204**. Alternatively, a drop-off location may be identified based on a user-specified or user-defined location. A user may specify or define a drop-off location physically (e.g. using a receptacle, a sign, etc.) or digitally (e.g. by indicating the location on a virtual floorplan via a client application). By one approach, at step **412**, if the drop-off location and/or area has been identified (e.g. a delivery receptacle or area that is detected, determined or otherwise specified in the garage), the processor **202** may determine that the retail packaging of the item to be delivered is/are suitable. For example, the processor **202** may determine suitability of the packaging based on the determination made by the processor **202** at step **316** of FIG. **3**. A retail packaging of an item is the packaging of the item when the item left the manufacturer or distributor. In the present disclosure, retail packaging generally refers to packaging that is employed to contain an item for display or merchandising (e.g. on a store shelf). Retail packaging may be embodied in various ways such as, including a corrugated paper carton with artwork, a sealed plastic clamshell through which the item and/or contents are visible, and others. In contrast to retail packaging, herein standard packaging generally refers to a packaging that facilitates shipping and/or handling of a retail-packaged item which is enclosed thereby. Standard packaging typically is considered an additional level or layer of packaging that may be optional in certain instances e.g. relative to the characteristics of the garage interior.

By another approach, at step **414**, if the drop-off location and/or area has not been identified, the processor **202** may determine a customized packaging based on the determination made by the processor **202** at step **314** of FIG. **3**. In some embodiments, the characteristic of the interior of the garage affects the selected packaging of the item to be delivered in the garage by causing the processor **202** to transmit a message data to the user device **216**. For example, upon receipt of the message data, the user device **216** displays a message banner on a display and/or output a text

message or email message instructing the user to customize the packaging of the item based on the selected packaging of the processor **202**.

In some embodiments, to effect delivery to the garage of the item with the packaging that was selected includes communicating to a delivery associate the delivery location and/or area within the garage. For example, the processor **202** may cause the delivery location and/or area to be communicated to the delivery associate. In an illustrative non-limiting example, the processor **202** transmits a text message or an email message to the user device **216**, which is employed by a delivery associate, or causes the user device **216** to display a message banner on a display screen of the user device **216** indicating the delivery location and/or area within the garage to place the item. The delivery associate can be a person, a drone, or a land-based robot. In embodiments where the delivery associate is a drone or a land-based robot, the user device **216** may correspond to a processor of the drone or the land-based robot. In other embodiments, to effect delivery to the garage of the item with the packaging that was selected includes a server computer (**218**) of a garage door operator system **100** communicating a message or information to another server computer of a merchant or a third-party entity such as a delivery/packaging/handling service that receives the item from the merchant. The communicated message or information may include one or more of: the determined characteristic of the garage interior; and a recommended, selected or identified packaging type based on the determined characteristic.

In some embodiments, the processor **202** identifies a delivery receptacle in the garage using the image data representative of the interior of the garage captured by the imaging device **204**. In some embodiments, the delivery receptacle may correspond to a particular delivery location in the garage, such as a bin, a stand, a shelf, and/or a cubby. Effecting delivery to the garage of the item with the selected packaging may include communicating a request to a delivery associate to deliver the item to the delivery receptacle. For example, the processor **202** may cause the request to be provided to the user device **216** associated with the delivery associate. In some embodiments, the request provided to the user device **216** includes an image/picture of the interior of the garage with an arrow or other indicator superimposed on the image/picture to highlight the delivery receptacle.

In some embodiments, the operations of the processor **202** described herein can be performed by the one or more computers **218**, the garage door operation system **100**, the user device **216**, or any combination thereof.

Uses of singular terms such as "a," "an," are intended to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms "comprising," "having," "including," and "containing" are to be construed as open-ended terms. It is intended that the phrase "at least one of" as used herein be interpreted in the disjunctive sense. For example, the phrase "at least one of A and B" is intended to encompass A, B, or both A and B.

Those skilled in the art will recognize that a wide variety of other modifications, alterations, and combinations can also be made with respect to the above-described embodiments without departing from the scope of the invention, and that such modifications, alterations, and combinations are to be viewed as being within the ambit of the inventive concept. Indeed, although the described and illustrated embodiments relate to in-garage delivery of an item, the present disclosure is intended to also facilitate delivery of an item to various secure locations other than a residential garage. As examples, the secure area may be a warehouse, a locked room of a building, an outside area monitored by video camera(s), etc. Accordingly, the present teachings may entail determining a characteristic of a secure area, and based on the characteristic that was determined selecting/identifying/recommending a particular packaging for an item that is to be delivered to the secure area. In one instance where the secure area is outside (e.g. a porch, a yard, and the like) the selected packaging may be a carton that is one or more of waterproof/weatherproof, insulated or temperature-controlled such that damage to the item within the packaging is prevented or minimized relative to precipitation, sun/UV, heat, cold, etc.

What is claimed is:

1. A system for facilitating in-garage delivery, the system comprising:

a memory configured to store computer-readable instructions; and

a processor operably coupled to the memory, the processor configured to execute the computer-readable instructions to:

cause a communication circuitry to send a signal to effect capture of image data by an imaging device, wherein the imaging device captures the image data in response to a movable barrier operator causing movement of a movable barrier between open and closed positions;

receive the image data from the imaging device;

process the image data to determine whether a delivery location in a garage is adjacent to a vehicle parking spot;

select a hardened packaging for an item to be delivered to the garage based on the delivery location being located adjacent to the vehicle parking spot and a characteristic of the item to be delivered; and

effect delivery to the garage of the item with the selected hardened packaging, wherein effecting delivery includes causing a message to display on a display screen of a user device associated with a delivery associate, wherein the message includes information associated with the delivery location within the garage.

2. The system of claim **1**, wherein the image data is further processed to determine a characteristic of the delivery location including at least one of:

lighting at the delivery location;

a color of a floor at the delivery location;

available floor space at the delivery location; and

a proximity of a parked vehicle to the delivery location.

3. The system of claim **1**, wherein the processor is configured to select a bright color, a blinking light, and/or a reflector for the hardened packaging when the delivery location is determined to be adjacent to the vehicle parking spot.

4. The system of claim **1**, wherein the processor is further configured to effectuate, via the communication circuitry of the system, a second user device prompting a user to capture at least one image of the delivery location using a camera of the second user device upon a determination that the imaging device is unable to provide the image data.

5. The system of claim **1**, wherein the processor is configured to effect capture of additional image data of the delivery location by the imaging device proximate a projected time of delivery of the item to the garage.

6. The system of claim 1, wherein communicating information associated with the delivery location comprises communicating delivery information to a drone or a land-based robot.

7. The system of claim 1, wherein communicating information associated with the delivery location comprises providing an image with an indicator superimposed on the image to highlight a delivery receptacle at the delivery location.

8. The system of claim 1, wherein the characteristic of the item includes at least one of:

a dimension of the item;

a color of retail packaging of the item; and

a fragility status of the item.

9. The system of claim 1, wherein the processor is part of the movable barrier operator comprising an electric motor that operably moves the movable barrier between open and closed positions.

10. A method for facilitating in-garage delivery, the method comprising:

receiving, at a communication circuitry, image data representative of an interior of a garage captured by an imaging device, wherein receiving the image data occurs in response to causing, by a processor in communication with the communication circuitry, the communication circuitry to send a signal to effect capture of the image data by the imaging device, and wherein the imaging device captures the image data in response to a movable barrier operator causing movement of a garage door between open and closed positions;

determining, by a processor in communication with the communication circuitry, that the image data is unable to provide a characteristic of the interior of the garage;

prompting, by the processor through the communication circuitry, a user device to capture at least one image of the interior of the garage using a camera of the user device based on determining that the image data is unable to provide the characteristic;

receiving, at the communication circuitry, the at least one image captured by the user device; and

processing, via the processor, the at least one image captured by the user device to determine the characteristic of the interior of the garage.

11. The method of claim 10, further comprising selecting, via the processor, a high-conspicuity packaging for an item to be delivered to the garage based on the determined characteristic of the interior of the garage and a characteristic of the item to be delivered.

12. The method of claim 11, wherein the characteristic of the item includes at least one of:

a dimension of the item;

a color of retail packaging of the item; and

a fragility status of the item.

13. The method of claim 11, wherein selecting the high-conspicuity packaging is performed in view of a suggestion or mandate from a manufacturer of the item, a vendor of the item, and/or a merchant of the item.

14. The method of claim 10, wherein prompting the user device comprises transmitting a control data to the user device via an application programming interface to cause the user device to display a message banner prompting the user to capture the at least one image.

15. The method of claim 10, wherein the processor is part of the movable barrier operator comprising an electric motor that operably moves the garage door between open and closed positions.

16. A method of selecting a packaging for an item to be delivered to an interior of a garage, the method comprising:

receiving, at a communication circuitry, image data representative of an interior of a garage captured by an imaging device;

processing, via a processor in communication with the communication circuitry, the image data to determine whether a delivery location is adjacent to a vehicle parking spot;

selecting, by the processor, a hardened packaging for an item to be delivered to the garage based on the delivery location being adjacent to the vehicle parking spot and a suggestion or mandate from a manufacturer of the item, a vendor of the item, and/or a merchant of the item; and

effecting delivery to the garage of the item with the selected hardened packaging including causing a garage door operator system to move a garage door to an open position.

17. The method of claim 16, wherein the image data is further processed to determine a characteristic of the delivery location including at least one of:

lighting at the delivery location;

a color of a floor at the delivery location;

available floor space at the delivery location; and

a proximity of a parked vehicle to the delivery location.

18. The system of claim 1, wherein the imaging device captures the image data in response to the moveable barrier operator causing movement of a garage door between open and closed positions.

19. The system of claim 16, wherein receiving the image data occurs in response to causing, by the processor in communication with the communication circuitry, the communication circuitry to send a signal to effect capture of the image data by the imaging device, and wherein the imaging device captures the image data in response to a movable barrier operator causing movement of the garage door between open and closed positions.

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