

Description

Title of Invention: Method and System for Recommending a Lift for Accessing a Unit at a Location

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FIELD OF INVENTION

[1] The present disclosure relates broadly, but not exclusively, to methods and systems for recommending a lift for accessing a unit at a location.

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BACKGROUND

[2] Delivery drivers for ride-hailing and delivery platforms often face the challenge of locating an exact drop-off point for a delivery. This can be difficult especially in complex last-mile conditions, such as for deliveries to a specific unit in locations such as large condominiums and HDBs. In Singapore, such buildings usually have multiple lifts, but only one or two lifts can provide access to a specific unit, while other lifts provide access to other units. With different lifts located far away from each other, it is time-consuming for drivers to check each lift or ask residents for directions, resulting in delivery delays and decreased efficiency.

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[3] To address the above issues, providing delivery drivers with knowledge of which lift to use for accessing a unit at a location can be helpful. However, while various industries have systems for recommending their products (e.g., including music, news, and e-commerce products) to customers, there has been no discussion on how such a system may be implemented for recommending a lift, for example to a delivery driver for accessing a unit at a location. Furthermore, each building can be different from one another in terms of which units each of their lifts provide access to, which complicates how a lift can be recommended.

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[4] A need therefore exists to provide methods and systems that seek to overcome or at least minimize the above mentioned challenges.

SUMMARY

[5] According to a first aspect of the present disclosure, there is provided a method for recommending a lift for accessing a unit at a location, the method comprising: identifying, by a processor, location information from a database that corresponds with location information of a unit at a location indicated in a request; identifying, by the processor, a lift from the database that has been used to access a unit associated with the identified location information; and recommending, by the processor, a lift for accessing the unit at the location based on the identified lift.

[6] According to a second aspect of the present disclosure, there is provided a system for recommending a lift for accessing a unit at a location, comprising: at least one processor; and at least one memory including computer program code; the at least one memory and the computer program code configured to, with the at least one processor, cause the system at least to: identify location information from a database that corresponds with location information of a unit at a location indicated in a request; identify a lift from the database that has been used to access a unit associated with the identified location information; and recommend a lift for accessing the unit at the location based on the identified lift.

BRIEF DESCRIPTION OF THE DRAWINGS

[7] Embodiments and implementations are provided by way of example only, and will be better understood and readily apparent to one of ordinary skill in the art from the following written description, read in conjunction with the drawings, in which:

[8] Fig. 1 illustrates a system for recommending a lift for accessing a unit at a location according to various embodiments of the present disclosure.

[9] Fig. 2 is a schematic diagram of a lift server, according to various embodiments of the present disclosure.

[10] Fig. 3 depicts a flowchart for recommending a lift for accessing a unit at a location according to various embodiments of the present disclosure.

[11] Fig. 4 depicts an exemplary illustration of a screenshot on a user device in which a lift is recommended according to various embodiments of the present disclosure.

[12] Fig. 5 illustrates an example flow diagram for recommending a lift for accessing a unit at a location according to various embodiments.

[13] Fig. 6 is a schematic block diagram of a general purpose computer system upon which the lift server of Fig. 2 can be practiced.

[14] Fig. 7 is a schematic block diagram of a general purpose computer system upon which a combined transaction processing and lift server of Fig. 1 can be practiced.

[15] Fig. 8 shows an example of a computing device to realize the transaction processing server shown in Fig. 1.

[16] Fig. 9 shows an example of a computing device to realize the lift server shown in Fig. 1.

[17] Fig. 10 shows an example of a computing device to realize a combined transaction processing and lift server shown in Fig. 1.

[18] Skilled artisans will appreciate that elements in the figures are illustrated for simplicity and clarity and have not necessarily been depicted to scale. For example, the dimensions of some of the elements in the illustrations, block diagrams or flowcharts may be exaggerated in respect to other elements to help to improve understanding of the present embodiments.

DETAILED DESCRIPTION

Terms Description

[19] A platform refers to a set of technologies that is used as a base for facilitating exchanges between two or more interdependent servers, entities and/or devices, for example between a requestor device (e.g., associated with a requestor of a product or

service) and a provider device (e.g., associated with a provider of the product or service). For example, a platform may offer a service offered by a provider such as a ride, delivery, online shopping, insurance, and other similar services to a requestor. A requestor can typically access the platform via a website, an application, or other similar methods using the requestor device. The provider device may be associated with a provider who may provide a ride or delivery that is requested (e.g., a request for a delivery or other services such as cleaning, repair, plumbing, renovation, medical emergency, and other similar services) by a requestor. In the present disclosure, the requestor device and the provider device may be referred to herein as a user device, wherein a user associated with the user device may be a requestor or a provider.

[20] A location refers to a building or infrastructure such as a condominium block, shopping centre, Housing Development Board (HDB) block, apartment building, office building, a hotel, a train station, a bus interchange, and other similar buildings. The location may comprise one or more floors (e.g., high rise floors and/or underground basement floors). The location may comprise one or more units (e.g., a condominium, a shop, a flat, an apartment, an office, and other similar units) that are located on different floors in the location. Each unit will thus have its own location information (e.g., comprising a floor number, a unit number, and other similar information) depending on where it is situated in the location. A request e.g., for a service such as a delivery to a specific unit at a location, may comprise location information of the specific unit (e.g., comprising a floor number, a unit number, and other similar information associated with the specific unit) so that a deliverer responding to the request can locate and deliver to the unit.

[21] The location may comprise one or more lifts providing access to each of the levels and/or each of the units. A database may be compiled with data relating to mappings between lifts and units at a location, for example a mapping between location information of a unit (e.g., a floor number and/or unit number of a unit) with a recommended lift (e.g., mapping of a floor number and/or unit number with a word, name, number or any similar identifier that the recommended lift is associated with) for accessing the unit (e.g., a lift that has been used by a user to arrive at the unit). Such data may be extracted from, for example, historical data relating to a request associated with a unit at a location. The historical data may comprise order notes, chats between a requestor and a provider, a user profile associated with the requestor, and other similar information associated with the request, from which location information of the unit, a corresponding lift that has been

used for accessing the unit (e.g., a lift recommended by a requestor and/or noted down by a provider for accessing a unit so that the requested service can arrive faster), and other similar information may be extracted. The historical data may also be stored in the database. Based on the database, a lift usage rule (herein referred to as a rule) for a location may be determined, for example based on deciphering a pattern in terms of lift(s) used to access each unit and a floor number or a unit number of each unit at the location. The rule reflects how lifts are used at the location for accessing each unit at the location, and is indicative of a floor number or unit number that is accessible by each lift at the location.

[22] Location information in a database that corresponds with location information indicated in the request may be identified, in which “corresponds with” may refer to: having a same floor number or unit number; having a floor number or unit number that is a part of a sequence (e.g., a neighbouring unit) with that indicated in the request such that a same lift may be used, or other similar references. A lift that has been used for accessing a unit associated with the identified location information may be identified by retrieving the name, number or similar identifier of the lift that is mapped to the identified location information in the database.

[23] A coverage metric refers to a metric for checking how much coverage the database provides in relation to lift recommendations for units. The coverage metric may be calculated based on a total number of units (at a location or at a plurality of locations) that are able to be recommended a lift from the database, and (e.g., divided by) a total number of units (at a location or at a plurality of locations) that are unable to be recommended a lift. An accuracy metric refers to a metric indicative of how accurate a lift recommendation for a request based on the database, by comparison with a lift indicated by a user device associated with the request. The accuracy metric may be calculated based on a total number of units with a recommended lift that is same as a lift indicated by a user device associated with a corresponding request, and (e.g., divided by) a total number of units with a recommended lift. It is possible to consider one or both of the coverage metric and accuracy metric according to a balance between a desired coverage and a desired accuracy range when determining whether to recommend a lift for accessing a unit at a location. For example, recommending a lift A, a lift B or a lift C may each result in a different coverage and accuracy metric, and it may be determined based on the coverage and accuracy metric which of lift A, lift B or lift C is to be recommended for accessing a unit at a location.

[24] A lift for accessing a unit may be recommended by providing a word, name, number or any similar identifier that the lift is associated with to a user device, so that a user associated with the user device can correctly select the lift associated with the identifier for accessing (e.g., reaching) the unit. For example, if a “lift A” is sent to a user device as a recommended lift for accessing a unit (e.g., with a floor number 3 and unit number 12) at a location, a user associated with the user device can select a lift identified as “lift A” at the location and use it to go up to the floor number 3 and find the unit with the unit number 12 on that floor. Recommendation of a lift may be disabled for a unit at a location (e.g., a mapping in the database associating a lift with a floor number or unit number of the unit may be flagged, removed, or other similar action, such that no lift will be recommended for the unit) if it is determined based on feedback (e.g., from a user device associated with a request) that the recommended lift is incorrect.

[25] In at least some embodiments, a user may be any suitable type of entity, which may include a person, a consumer looking to purchase a product or service via a transaction processing server, a seller or merchant looking to sell a product or service via the transaction processing server, a motorcycle driver or pillion rider in a case of the user looking to book or provide a motorcycle ride via the transaction processing server, a car driver or passenger in a case of the user looking to book or provide a car ride via the transaction processing server, and other similar entity. A user who is registered to the transaction processing server will be called a registered user. A user who is not registered to the transaction processing server will be called a non-registered user. The term user will be used to collectively refer to both registered and non-registered users. A user may interchangeably be referred to as a requestor (e.g., a person who requests for a product or service) or a provider (e.g., a person who provides the requested product or service to the requestor).

[26] In at least some embodiments, a lift server is a server that hosts software application programs for recommending a lift for accessing a unit at a location. The lift server may be implemented as shown in schematic diagram 200 of Fig. 2 for recommending a lift for accessing a unit at a location.

[27] In at least some embodiments, a transaction processing server is a server that hosts software application programs for processing payment transactions for, for example,

a request for a service, delivery, a travel-coordination request, purchasing of a good or service by a user, and other similar services. The transaction processing server communicates with any other servers (e.g., a lift server) concerning processing payment transactions relating to the purchasing of the good or service, such as a request for a service (which may be referred to as a request, for example for a ride, delivery, or other similar service that requires a provider to locate and arrive at a unit at a location as indicated in the request). For example, data relating to a request (e.g., date, time, a location, location information of a unit at the location, and other similar data) may be provided to the lift server and processed to identify and the location information, compare the location information with a database, recommend a lift for accessing the unit based on the comparison, and other similar services. The transaction processing server may use a variety of different protocols and procedures in order to process the payment and/or driver requests.

[28] Transactions that may be performed via a transaction processing server include product or service purchases, credit purchases, debit transactions, fund transfers, account withdrawals, etc. Transaction processing servers may be configured to process transactions via cash-substitutes, which may include payment cards, letters of credit, checks, payment accounts, etc.

[29] In at least some embodiments, the transaction processing server is usually managed by a service provider that may be an entity (e.g., a company or organization) which operates to process transaction requests and/or driver requests e.g., pair a driver to a requestor of the driver request. The transaction processing server may include one or more computing devices that are used for processing transaction requests and/or driver requests.

[30] In at least some embodiments, a transaction account is an account of a user who is registered at a transaction processing server. The user can be a customer, a merchant providing a product for sale on a platform and/or for onboarding the platform, a ride or delivery provider (e.g., a driver), or any third parties (e.g., a courier) who want to use the transaction processing server. In certain circumstances, the transaction account is not required to use the transaction processing server. A transaction account includes details (e.g., name, address, vehicle, face image, etc.) of a user. The transaction processing server manages the transaction.

[31] Embodiments will be described, by way of example only, with reference to the drawings. Like reference numerals and characters in the drawings refer to like elements or equivalents.

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[32] Some portions of the description which follows are explicitly or implicitly presented in terms of algorithms and functional or symbolic representations of operations on data within a computer memory. These algorithmic descriptions and functional or symbolic representations are the means used by those skilled in the data processing arts to convey most effectively the substance of their work to others skilled in the art. An algorithm is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities, such as electrical, magnetic or optical signals capable of being stored, transferred, combined, compared, and otherwise manipulated.

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[33] Unless specifically stated otherwise, and as apparent from the following, it will be appreciated that throughout the present specification, discussions utilizing terms such as “identifying”, “detecting”, “recommending”, “determining”, “associating”, “extracting”, “calculating”, “processing”, “storing”, “indicating”, “comparing”, “providing”, “dividing”, or the like, refer to the action and processes of a computer system, or similar electronic device, that manipulates and transforms data represented as physical quantities within the computer system into other data similarly represented as physical quantities within the computer system or other information storage, transmission or display devices.

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[34] In addition, the present specification also implicitly discloses a computer program, in that it would be apparent to the person skilled in the art that the individual steps of the method described herein may be put into effect by computer code. The computer program is not intended to be limited to any particular programming language and implementation thereof. It will be appreciated that a variety of programming languages and coding thereof may be used to implement the teachings of the disclosure contained herein. Moreover, the computer program is not intended to be limited to any particular control flow. There are many other variants of the computer program, which can use different control flows without departing from the scope of the specification.

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[35] Furthermore, one or more of the steps of the computer program may be performed in parallel rather than sequentially. Such a computer program may be stored on any computer readable medium. The computer readable medium may include storage devices such as magnetic or optical disks, memory chips, or other storage devices suitable for
5 interfacing with a computer. The computer readable medium may also include a hard-wired medium such as exemplified in the Internet system, or wireless medium such as exemplified in the GSM mobile telephone system. The computer program when loaded and executed on such a computer effectively results in an apparatus that implements the steps of the preferred method.

10 **[36]** In the present disclosure, a lift recommendation system is proposed for recommending a lift for accessing a unit at a location, to address the difficulty of locating a specific unit for services such as delivering an item, cleaning, repair, plumbing, renovation, medical emergency, and other similar services. All lifts available at a location
15 constitute a candidate pool from which a lift for accessing the unit is recommended. The recommendation process may start by identifying location information from a database that corresponds with location information of a unit at a location indicated in a request. A lift that has been used to access a unit associated with the identified location information may be identified from the database. A lift for accessing the unit at the location may be
20 recommended based on the identified lift.

[37] Advantageously, it is possible to recommend an optimal lift for accessing a unit to providers handling requests associated with the unit to reduce time required to reach the unit and improve service efficiency. The proposed solution offers several key advantages,
25 including: providing a comprehensive solution to how a unit may be quickly located and accessed; an offline inference-validation design that maximizes the coverage and quality of the database so that accurate lift recommendations are available for as many units as possible; and an online feedback mechanism that enables real-time updates to the database, ensuring continued relevance and accuracy of the lift recommendations.

30 **[38]** Fig. 1 illustrates a block diagram of an example system 100 for recommending a lift for accessing a unit at a location. In some embodiments, the system 100 enables a payment transaction for a good or service, and/or a request e.g., for a service or delivery of a physical item (e.g., one or more food items or a parcel) between a requestor and a
35 provider.

[39] The system 100 comprises a requestor device 102, a provider device 104, an acquirer server 106, a transaction processing server 108, an issuer server 110, a lift server 140 and a database 150.

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[40] The requestor device 102 is in communication with a provider device 104 via a connection 112, and may be associated with a user. The connection 112 may be wireless (e.g., via NFC communication, Bluetooth, etc.) or over a network (e.g., the Internet). The requestor device 102 is also in communication with the lift server 140 via a connection 121, wherein the lift server 140 may be configured to receive information relating to a request (e.g., a request for a service such as a delivery to a unit at a location, the information including location information of a unit at a location relating to the request, the location information comprising a floor number and a unit number of the unit, and other similar information) from the requestor device 102. The requestor device 102 may be configured to communicate with the provider device 104 (e.g., chat and exchange messages and notes relating to the request with the provider device 104). The requestor device 102 may also be configured to provide information to the lift server 140 and/or the provider device 104 relating to a recommended lift for accessing the unit at the location (e.g., an identifier of the recommended lift or other similar information). The connection 121 may be via a network (e.g., the Internet). The requestor device 102 may also be connected to a cloud that facilitates the system 100 for recommending a lift for accessing a unit at a location. For example, the requestor device 102 can send a signal or data to the cloud directly via a wireless connection (e.g., via NFC communication, Bluetooth, etc.) or over a network (e.g., the Internet). It will be appreciated that there can be a plurality of requestor devices 102 such that each requestor device 102 is associated with a respective user.

[41] The provider device 104 is in communication with the requestor device 102 as described above, usually via the transaction processing server 108, and may be associated with a provider of a service or delivery (e.g., a provider responding to a request for a service such as, for example, a delivery to a unit at a location). The provider device 104 is, in turn, in communication with an acquirer server 106 via a connection 114. The provider device 104 is also in communication with the lift server 140 via a connection 123, wherein the lift server 140 may be configured to receive information relating to a location (e.g., an identifier, an address, GPS information, latitudinal and longitudinal coordinates,

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geohash information, or other similar information associated with the location) at which the provider device 104 is located, a status of the driver (e.g., available, unavailable, driving for a trip booking, or other similar statuses), identification information relating to the requestor device 102 (e.g., associated with a request that the provider device 104 is handling) and/or provider device 104, and other similar information from the provider device 104. The provider device 104 may be configured to communicate with the requestor device 102 (e.g., chat and exchange messages and notes relating to the request with the requestor device 102), and may be configured to receive a recommended lift (e.g., an identifier of a recommended lift for accessing the unit) for accessing the unit at the location from the requestor device 102 and/or the lift server 140. The connections 114 and 123 may be via a network (e.g., the Internet). The provider device 104 may also be connected to a cloud that facilitates the system 100 for recommending a lift for accessing a unit at a location. For example, the provider device 104 can send a signal or data to the cloud directly via a wireless connection (e.g., via NFC communication, Bluetooth, etc.) or over a network (e.g., the Internet). It will be appreciated that there can be a plurality of provider devices 104 such that each provider device 104 is associated with a respective user.

[42] The acquirer server 106, in turn, is in communication with the transaction processing server 108 via a connection 116. The transaction processing server 108, in turn, is in communication with an issuer server 110 via a connection 118. The connections 116 and 118 may be via a network (e.g., the Internet).

[43] The transaction processing server 108 is further in communication with the lift server 140 via a connection 120. The connection 120 may be over a network (e.g., a local area network, a wide area network, the Internet, etc.). In one arrangement, the transaction processing server 108 and the lift server 140 are combined and the connection 120 may be an interconnected bus.

[44] The lift server 140, in turn, is in communication with the database 150 via respective connection 122. The connection 122 may be over a network (e.g., the Internet). The lift server 140 may also be connected to a cloud that facilitates the system 100 for recommending a lift for accessing a unit at a location. For example, the lift server 140 can send a signal or data to the cloud directly via a wireless connection (e.g., via NFC communication, Bluetooth, etc.) or over a network (e.g., the Internet).

[45] The database 150 may comprise data that is utilized by the lift server 140 for recommending a lift for accessing a unit at a location. For example, data relating to location information of a unit at a location, a lift that has been used to access the unit, an identifier associated with the lift, an identifier associated with the location, and other similar data, chat messages and notes relating to a request associated with a unit at a location, a user profile (e.g., user profile of a user associated with the user device) and other information associated with a user device (e.g., if not received directly from the user device or from the transaction processing server 108), and other information and/or data required for recommending a lift for accessing a unit at a location may be processed and stored in the database 150. In an implementation, the database 150 may be combined with the lift server 140. In an example, the database 150 may be managed by an external entity.

[46] The lift server 140 may be configured to identify location information from a database (e.g., from database 150) that corresponds with location information of a unit at a location indicated in a request. In an implementation, location information from the database having a same floor number or unit number as the location information indicated in the request may be identified. In an implementation, location information from the database having a floor number or unit number that is a part of a sequence (e.g., a neighbouring unit) with that indicated in the request may be identified. The lift server 140 may be further configured to identify a lift from the database that has been used to access a unit associated with the identified location information, and recommend a lift for accessing the unit at the location based on the identified lift.

[47] In an implementation, the lift server 140 may be configured to recommend the identified lift for accessing the unit at the location lift when the identified location information comprises a same floor number or unit number as that of the location information indicated in the request. The lift server 140 may be configured to recommend the identified lift for accessing the unit at the location lift when the identified location information comprises a floor number or unit number that is part of a sequence with that of the location information indicated in the request. In an implementation, the lift server 140 may be configured to calculate a coverage metric based on a total number of units with a recommended lift and (e.g., divided by) a total number of units without a recommended lift, calculate an accuracy metric based on a total number of units with a recommended lift that is same as a lift indicated by a user device associated with a corresponding request and (e.g., divided by) a total number of units with a recommended

lift; and determine whether to recommend the lift based on the accuracy metric and the coverage metric.

[48] In an implementation wherein the location information of the unit comprises a floor number of the unit, the lift server 140 may be configured to determine whether a floor number in the identified location information corresponds with (e.g., having a same floor number; having a floor number that is a part of a sequence with that indicated in the request such that a same lift may be used, or other similar references) the floor number of the unit; and recommend the lift further based on the determination.

[49] In an implementation wherein the location information of the unit comprises a unit number of the unit, the lift server 140 may be configured to determine whether a unit number in the identified location information corresponds with (e.g., having a same unit number; having a unit number that is a part of a sequence with that indicated in the request such that a same lift may be used, or other similar references) the unit number of the unit; and recommending the lift further based on the determination.

[50] In an implementation, the lift server 140 may be configured to determine a total number of times that the recommended lift does not correspond with a lift indicated by a user device associated with the request; and disabling recommendation of a lift for accessing the unit based on the determination. For example, recommendation of a lift may be disabled for a unit at a location (e.g., a mapping in the database associating a lift with a floor number or unit number of the unit may be flagged, removed, or other similar action, such that no lift will be recommended for the unit) if it is determined based on feedback (e.g., from a user device associated with a request) that the recommended lift is incorrect.

[51] In an implementation, there may be more than one databases, in which the lift server 140 may be configured to determine which database to use for each step during the process of recommending a lift for accessing a unit at a location. Alternatively, one or more modules may store the above-mentioned data instead of the database 150, wherein the module may be integrated as part of the lift server 140 or external from the lift server 140.

[52] In the illustrative embodiment, each of the devices 102, 104, and the servers 106, 108, 110, 140, and/or database 150 provides an interface to enable communication with other connected devices 102, 104 and/or servers 106, 108, 110, 140, and/or database

150. Such communication is facilitated by an application programming interface (“API”). Such APIs may be part of a user interface that may include graphical user interfaces (GUIs), Web-based interfaces, programmatic interfaces such as application programming interfaces (APIs) and/or sets of remote procedure calls (RPCs) corresponding to interface
 5 elements, messaging interfaces in which the interface elements correspond to messages of a communication protocol, and/or suitable combinations thereof. For example, it is possible for the requestor device 102 to send data relating to a request for a service such as location information of a unit at a location at which the service is required, and for the provider device 104 to send data relating to a location or a status of an associated
 10 provider, in response to an enquiry shown on the GUI running on the respective API.

[53] Use of the term ‘server’ herein can mean a single computing device or a plurality of interconnected computing devices which operate together to perform a particular function. That is, the server may be contained within a single hardware unit or be
 15 distributed among several or many different hardware units.

[54] The lift server 140 is associated with an entity (e.g., a company or organization or moderator of the service). In one arrangement, the lift server 140 is owned and operated by the entity operating the transaction processing server 108. In such an arrangement, the
 20 lift server 140 may be implemented as a part (e.g., a computer program module, a computing device, etc.) of the transaction processing server 108.

[55] The transaction processing server 108 may also be configured to manage the registration of users. A registered user has a transaction account (see the discussion
 25 above) which includes details of the user. The registration step is called on-boarding. A user may use either the requestor device 102 or the provider device 104 to perform on-boarding to the transaction processing server 108.

[56] It may not be necessary to have a transaction account at the transaction processing server 108 to access the functionalities of the transaction processing server 108. However, there are functions that are available to a registered user. These additional functions will be discussed below.

[57] The on-boarding process for a user is performed by the user through one of the
 35 requestor device 102 or the provider device 104. In one arrangement, the user downloads

an app (which includes the API to interact with the transaction processing server 108) to the requestor device 102 or the provider device 104. In another arrangement, the user accesses a website (which includes the API to interact with the transaction processing server 108) on the requestor device 102 or the provider device 104. The user is then able to interact with the lift server 140. The user may be a requestor or a provider associated with the requestor device 102 or the provider device 104, respectively.

[58] Details of the registration may include, for example, name of the user, address of the user, emergency contact, blood type or other healthcare information, next-of-kin contact, permissions to retrieve data and information from the requestor device 102 and/or the provider device 104 for recommending a lift for accessing a unit at a location, such as permission to retrieve location and status information, and/or retrieve location information of a unit at a location indicated in a request, and/or send push notifications including a request for verification whether a recommended lift is correct, and other similar data and information from the requestor device 102 and/or the provider device 104. Alternatively, another device (e.g., a mobile device, and other similar device) may be selected instead of the requestor device 102 and/or the provider device 104 for retrieving the data. Once on-boarded, the user would have a transaction account that stores all the details.

[59] The requestor device 102 is associated with a user (or requestor) who is a party to a transaction that occurs between the requestor device 102 and the provider device 104, or between the requestor device 102 and the lift server 140. The requestor device 102 may be a computing device such as a desktop computer, an interactive voice response (IVR) system, a smartphone, a laptop computer, a personal digital assistant computer (PDA), a mobile computer, a tablet computer, and the like. The requestor device 102 may be associated with a user who initiates a request for a trip booking.

[60] The requestor device 102 includes transaction credentials (e.g., a payment account) of a requestor to enable the requestor device 102 to be a party to a payment transaction. If the requestor has a transaction account, the transaction account may also be included (e.g., stored) in the requestor device 102. For example, a mobile device (which is a requestor device 102) may have the transaction account of the customer stored in the mobile device.

[61] In one example arrangement, the requestor device 102 is a computing device in a watch or similar wearable and is fitted with a wireless communications interface (e.g., a NFC interface). The requestor device 102 can then electronically communicate with the provider device 104 regarding a request (e.g., for a delivery or other similar service). The user uses the watch or similar wearable to make the request by pressing a button on the watch or wearable.

[62] The provider device 104 is associated with a provider who is also a party to the request (e.g., for a delivery or other similar service) that occurs between the requestor device 102 and the provider device 104. The provider device 104 may be a computing device such as a desktop computer, an interactive voice response (IVR) system, a smartphone, a laptop computer, a personal digital assistant computer (PDA), a mobile computer, a tablet computer, and the like. The provider device 104 may be associated with a provider of a ride or delivery (e.g., a provider responding to the request).

[63] Hereinafter, the term “provider” refers to a service provider and any third party associated with providing a product or service for purchase, or a travel or ride or delivery service via the provider device 104. Therefore, the transaction account of a provider refers to both the transaction account of a provider and the transaction account of a third party (e.g., a driver, travel co-ordinator or merchant) associated with the provider.

[64] If the provider has a transaction account, the transaction account may also be included (e.g., stored) in the provider device 104. For example, a mobile device (which is a provider device 104) may have the transaction account of the provider stored in the mobile device.

[65] In one example arrangement, the provider device 104 is a computing device in a watch or similar wearable and is fitted with a wireless communications interface (e.g., a NFC interface). The provider device 104 can then electronically communicate with the requestor to make the request by pressing a button on the watch or wearable.

[66] The acquirer server 106 is associated with an acquirer who may be an entity (e.g., a company or organization) which issues (e.g., establishes, manages, administers) a payment account (e.g., a financial bank account) of a merchant. Examples of the acquirer include a bank and/or other financial institution. As discussed above, the acquirer server

106 may include one or more computing devices that are used to establish communication with another server (e.g., the transaction processing server 108) by exchanging messages with and/or passing information to the other server. The acquirer server 106 forwards the payment transaction relating to a transaction request or a request for a delivery or other similar service to the transaction processing server 108.

[67] The transaction processing server 108 is configured to process processes relating to a transaction by, for example, forwarding data and information associated with the transaction to the other servers in the system 100 such as the lift server 140. In an example, the transaction processing server 108 may, instead of the requestor device 102 or provider device 104, transmit data relating to a request (e.g., date, time, a location, location information of a unit at the location, and other similar data) to the lift server 104. The transaction processing server 108 may use a variety of different protocols and procedures in order to process the payment and/or requests. It will be appreciated that payment for a transaction may be made via a variety of methods such as credit cards, debit cards, digital wallets, buy-first pay-later schemes, and other similar payment methods.

[68] The issuer server 110 is associated with an issuer and may include one or more computing devices that are used to perform a payment transaction. The issuer may be an entity (e.g., a company or organization) which issues (e.g., establishes, manages, administers) a transaction credential or a payment account (e.g., a financial bank account) associated with the owner of the requestor device 102. As discussed above, the issuer server 110 may include one or more computing devices that are used to establish communication with another server (e.g., the transaction processing server 108) by exchanging messages with and/or passing information to the other server.

[69] The database 150 is a database or server associated with an entity (e.g., a company or organization) which manages (e.g., establishes, administers) data relating to users, transactions, products, services, and other similar data, for example relating to the entity. In an arrangement, the database 150 may comprise data that is utilized by the lift server 140 for recommending a lift for accessing a unit at a location. For example, data relating to location information of a unit at a location, a lift that has been used to access the unit, an identifier associated with the lift, an identifier associated with the location, and other similar data, chat messages and notes relating to a request associated with a unit

at a location, a user profile (e.g., user profile of a user associated with the user device) and other information associated with a user device (e.g., if not received directly from the user device or from the transaction processing server 108), and other information and/or data required for recommending a lift for accessing a unit at a location may be processed and stored in the database 150. In an implementation, the database 150 may be combined with the lift server 140. In an example, the database 150 may be managed by an external entity.

[70] Advantageously, the system 100 recommends an optimal lift for accessing a unit to providers handling requests associated with the unit to reduce time required to reach the unit and improve service efficiency.

[71] Fig. 2 illustrates a schematic diagram of an example lift server 140 according to various embodiments. The lift server 140 may comprise a data module 260 configured to receive data and information from the requestor device 102, provider device 104, transaction processing server 108, database 150, a cloud and other sources of information to recommend a lift for accessing a unit at a location by the lift server 140. For example, the data module 260 may be configured to receive data and information required for: identifying location information from a database that corresponds with location information of a unit at a location indicated in a request, identifying a lift from the database that has been used to access a unit associated with the identified location information, and recommending a lift for accessing the unit at the location based on the identified lift; recommending the identified lift for accessing the unit at the location lift when the identified location information comprises a same floor number or unit number as that of the location information indicated in the request; recommending the identified lift for accessing the unit at the location lift when the identified location information comprises a floor number or unit number that is part of a sequence with that of the location information indicated in the request; determining whether a floor number or unit number in the identified location information corresponds with the floor number or unit number of the unit and recommending the lift for accessing the unit at the location further based on the determination; calculating a coverage metric based on a total number of units with a recommended lift and a total number of units without a recommended lift, calculating an accuracy metric based on a total number of units with a recommended lift that is same as a lift indicated by a user device associated with a corresponding request and a total number of units with a recommended lift, and determining whether to recommend the lift

for accessing the unit at the location further based on the accuracy metric and the coverage metric; determining a total number of times that the recommended lift does not correspond with a lift indicated by a user device associated with the request, and disabling recommendation of a lift for accessing the unit based on the determination; and other similar processes from the requestor device 102, the provider device 104, transaction processing server 108, database 150, and/or other sources of information. The data module 260 may be further configured to send information relating to data retrieved in response to a request to the requestor device 102, the provider device 104, the transaction processing server 108, or other destinations where the information is required.

[72] The lift server 140 may comprise an identification module 262 that is configured for identifying location information from a database that corresponds with location information of a unit at a location indicated in a request, and identifying a lift from the database that has been used to access a unit associated with the identified location information. In an implementation, the identification module 262 may be configured for identifying the location information comprising a same floor number or unit number as the location information indicated in the request, or a floor number or unit number that is a part of a sequence with that indicated in the request. The identification process is further explained in Figs. 3 and 5.

[73] The lift server 140 may also comprise a database module 264 that is configured for calculating a coverage metric based on a total number of units with a recommended lift and a total number of units without a recommended lift, and calculating an accuracy metric based on a total number of units with a recommended lift that is same as a lift indicated by a user device associated with a corresponding request and a total number of units with a recommended lift. In an implementation, the database module 264 may be configured to update the database, for example based on an input or feedback from a user device (e.g., indicating that another lift that is different from the recommended lift has been used to access the unit at the location), based on the coverage metric, based on the accuracy metric, or other similar factors. These processes are further explained in Fig. 3.

[74] The lift server 140 may also comprise a lift module 266 that is configured for recommending a lift for accessing the unit at the location based on the identified lift (e.g., identified by the identification module 262). In an implementation, the lift module 266 may be configured to recommend the identified lift for accessing the unit at the location lift when

the identified location information comprises a same floor number or unit number as that of the location information indicated in the request. In an implementation, the lift module 266 may be configured to recommend the identified lift for accessing the unit at the location lift when the identified location information comprises a floor number or unit number that is part of a sequence with that of the location information indicated in the request. In an implementation, wherein the location information of the unit comprises a floor number of the unit, the identification module 262 may be configured to determine whether a floor number in the identified location information corresponds with the floor number of the unit, and the lift module 266 may be configured to recommend the lift further based on the determination. In an implementation, wherein the location information of the unit comprises a unit number of the unit, the identification module 262 may be configured to determine whether a unit number in the identified location information corresponds with the unit number of the unit, and the lift module 266 may be configured to recommend the lift further based on the determination. In an implementation, the lift module 266 may be configured to determine whether to recommend the lift based on the accuracy metric and the coverage metric. The recommendation process is further explained in Figs. 3 and 5.

[75] Each of the data module 260, identification module 262, database module 264 and lift module 266 may further be in communication with a processing module (not shown) of the lift server 140, for example for coordination of respective tasks and functions during the process. The data module 260 may be further configured to communicate with and store data and information for each of the processing module, identification module 262, database module 264 and lift module 266. Alternatively, all the tasks and functions required for adaptively recommending a lift for accessing a unit at a location may be performed by a single processor of the lift server 140.

[76] Developing a comprehensive and robust lift knowledge base in the database is a crucial component of the proposed solution. The lift knowledge base may comprise two key components. Firstly, offline mining and inference techniques may be utilized to generate a lift knowledge base of the highest quality and coverage. Secondly, online recommendations and feedback are leveraged to enable automatic updates to the knowledge base, advantageously ensuring that it remains up-to-date and relevant.

[77] Fig. 3 depicts a flowchart 300 for building a lift knowledge database according to various embodiments of the present disclosure. Initial unit-lift mappings may be mined and extracted from a database e.g., of historical data comprising information shared by

requestors regarding a recommended lift. For example, a lift suggestion may be provided by a requestor in a user profile 302 of the requestor (e.g., the user profile indicating location information of a unit in which the requestor resides), in order notes 304 (e.g., notes taken and saved relating to a request) proactively or in chat messages 306 in response to providers' questions regarding a lift for accessing a unit at a location indicated in a request. Common patterns of how a lift recommendation may be presented in the user profile 302, order notes 304 and chat messages 306 may be summarized as regular expressions (regex representations), for example when "lifts" are mentioned, such as "lift A", "lift 3 or 4". Similar to how a lift identifier (ID) may be extracted, location information (e.g., comprising a floor number, a unit number, such as "#6-256", "unit 357, floor 6", or other similar information) may be mined and extracted in a process 308 from the order notes 304 and chat messages 306, for example if the information is not found in the user profile 302. Accordingly, each extracted location information and a corresponding recommended lift may be mapped together in the database to form an initial floor/unit-lift mapping 310.

[78] With mined floor/unit and lift mappings for a location, units without a recommended lift may be assigned a lift based on inference to increase the coverage of lift-to-unit mappings, so that lifts can also be recommended for requests in which the requestors did not provide a recommended lift. This advantageously expands the knowledge base coverage and maximizes its usefulness to a wider audience of users. Further, different locations hold different lift usage rules. For example, a location may have a lift usage rule in which lift A provides access to odd floors and lift B provides access to even floors, but at another location, all lower floors (e.g., floors 1-5) use lift 1 and high floors (e.g., floors 6-10) use lift 2.

[79] To find a widely applicable rule and do inferences based on the rule, a flexible inference and validation step 312 may be implemented. Specifically, a lift usage rule for a location may be translated into a hypothesis and inference is performed on a portion of a plurality of floor/unit-lift mappings for the location (e.g., a training group) based on the hypothesis. The inferred floor/unit-lift mappings may be validated based on another portion of the plurality of floor/unit-lift mappings for the location (e.g., a verification group) to verify whether the assumed lift usage rule for the location is met. This process is an inference and validation step 312. For example, 100 floor/unit-lift mappings may be mined for a location and then split into two groups (e.g., one group for training and the other group for

validation) randomly, for example a 50-50 split. Inference may then be performed on the training group based on a hypothesis for the location to infer the floor/unit-lift mappings missing from the training group (e.g., due to the 50-50 split). For example, a location may hold a lift usage rule in which floors do not affect lift choices, such that units #06-256 and #07-256 share the same lift. Based on the hypothesis for the location, it is possible to identify a lift for accessing a unit having a same unit number regardless of a floor number of the unit. In another example, a location may hold a lift usage rule in which a unit with a unit number value between two other unit numbers would share a same lift with two units on a same floor associated with the other two unit numbers. For instance, if a lift A is used to access unit #06-256 and unit #06-258 based on the database, it may be inferred that lift A can also be used to access unit #06-257. It will be appreciated that these examples are not exhaustive and other lift usage rules are possible. Advantageously, it is possible to increase the original floor/unit-lift mappings by this rule-based inference.

[80] Further, as part of the inference and validation step 312, an inferred lift for a floor/unit-lift mapping in the training group may be compared with a recommended lift (e.g., obtained from mining the database) for the same floor/unit-lift mapping in the validation group. An accuracy metric for the inferred lifts may be calculated, for example based on a total number of units with a recommended lift (e.g., a lift recommended by the lift module 266 for accessing a unit) that is same as a lift indicated by a user device associated with a corresponding request (e.g., a lift that is indicated by a user device via a feedback as a lift that can be used to access the unit) and (e.g., divided by) a total number of units with a recommended lift. Further, a coverage metric for monitoring coverage of the lift knowledge base may be calculated, for example based on a total number of units with a recommended lift (e.g., a lift recommended by the lift module 266 for accessing a unit) and a total number of units without a recommended lift. It will be appreciated that these examples are not exhaustive and other metrics or methods of calculating the metrics are possible. By comparing various rules used in the inference and validation step 312 based on the accuracy and coverage metrics, it is possible to select a rule with a largest coverage and/or accuracy to build a lift knowledge base 314 (e.g., stored in the database 150), for example using a complete set of mined and inferred floor/unit-lift mappings.

[81] With the lift knowledge base 314, lift recommendation for a request may simply be a parsing-searching process. For example, location information that corresponds with location information of a unit at a location indicated in the request may be identified from

the lift knowledge base 314. In an implementation, location information from the lift knowledge base 314 having a same floor number or unit number as the location information indicated in the request may be identified. In an implementation, location information from the lift knowledge base 314 having a floor number or unit number that is close in value to that of the location information indicated in the request may be identified. The location information indicated in the request may include an identifier associated with the location, for example a place of interest identifier (POI ID) associated with the location, that may be used to identify a set of floor/unit-lift mappings in the lift knowledge base 314 for the location indicated in the request. A lift that has been used to access a unit associated with the identified location information may be identified from the lift knowledge base 314. Then, a lift for accessing the unit at the location may be recommended based on the identified lift.

[82] Fig. 4 depicts an exemplary illustration of a screenshot 400 on a user device in which a lift is recommended according to various embodiments of the present disclosure. For example, a request for a delivery as depicted in illustration 400 indicates location information 402 comprising a floor number (e.g., floor 3) and a unit number (e.g., unit number 131) of a unit at a location to which the requested delivery is to be made. In response to the request, a lift for accessing the unit may be recommended. For example, a lift (e.g., a lift having an identifier B) may be recommended for accessing the unit (e.g., unit #03-131) at reference 404 (e.g., sent to a user device of a provider).

[83] Fig. 5 illustrates an example flow diagram for a method 500 for detecting a weather condition of a location according to various embodiments. In a step 502, location information is identified from a database that corresponds with location information of a unit at a location indicated in a request. In a step 504, a lift is identified from the database that has been used to access a unit associated with the identified location information. In a step 506, a lift for accessing the unit at the location is recommended based on the identified lift.

[84] Fig. 6 depict an example computer system 1400, in accordance with which the lift server 140 described can be practiced. The computer system 1400 includes a computer module 1401. An external Modulator-Demodulator (Modem) transceiver device 1416 may be used by the computer module 1401 for communicating to and from a communications network 1420 via a connection 1421. The communications network 1420 may be a wide-

area network (WAN), such as the Internet, a cellular telecommunications network, or a private WAN. Where the connection 1421 is a telephone line, the modem 1416 may be a traditional “dial-up” modem. Alternatively, where the connection 1421 is a high capacity (e.g., cable) connection, the modem 1416 may be a broadband modem. A wireless
 5 modem may also be used for wireless connection to the communications network 1420.

[85] The computer module 1401 typically includes at least one processor unit 1405, and a memory unit 1406. For example, the memory unit 1406 may have semiconductor random access memory (RAM) and semiconductor read only memory (ROM). The
 10 computer module 1401 also includes an interface 1408 for the external modem 1416. In some implementations, the modem 1416 may be incorporated within the computer module 1401, for example within the interface 1408. The computer module 1401 also has a local network interface 1411, which permits coupling of the computer system 1400 via a connection 1423 to a local-area communications network 1422, known as a Local Area
 15 Network (LAN). As illustrated in Fig. 8A, the local communications network 1422 may also couple to the wide network 1420 via a connection 1424, which would typically include a so-called “firewall” device or device of similar functionality. The local network interface 1411 may comprise an Ethernet circuit card, a Bluetooth® wireless arrangement or an IEEE 802.11 wireless arrangement; however, numerous other types of interfaces
 20 may be practiced for the interface 1411.

[86] The I/O interfaces 1408 may afford either or both of serial and parallel connectivity, the former typically being implemented according to the Universal Serial Bus (USB) standards and having corresponding USB connectors (not illustrated). Storage
 25 devices 1409 are provided and typically include a hard disk drive (HDD) 1410. Other storage devices such as a floppy disk drive and a magnetic tape drive (not illustrated) may also be used. An optical disk drive 1412 is typically provided to act as a non-volatile source of data. Portable memory devices, such optical disks, USB-RAM, portable, external hard drives, and floppy disks, for example, may be used as appropriate sources of data to the
 30 system 1400.

[87] The components 1405 to 1412 of the computer module 1401 typically communicate via an interconnected bus 1304 and in a manner that results in a conventional mode of operation of the computer system 1400 known to those in the
 35 relevant art. For example, the processor 1405 is coupled to the system bus 1404 using a

connection 1418. Likewise, the memory 1406 and optical disk drive 1412 are coupled to the system bus 1404 by connections 1419. Examples of computers on which the described arrangements can be practised include IBM-PC's and compatibles, Sun Sparcstations, Apple or like computer systems.

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[88] The method 500, where performed by the lift server 140 may be implemented using the computer system 1400. The processes may be implemented as one or more software application programs 1433 executable within the computer system 1400. In particular, the method 700 is effected by instructions in the software 1433 that are carried out within the computer system 1400. The software instructions may be formed as one or more code modules, each for performing one or more particular tasks. The software may also be divided into two separate parts, in which a first part and the corresponding code modules performs the method 500 and a second part and the corresponding code modules manage a user interface between the first part and the user.

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[89] The software may be stored in a computer readable medium, including the storage devices described below, for example. The software is loaded into the computer system 1400 from the computer readable medium, and then executed by the computer system 1400. A computer readable medium having such software or computer program recorded on the computer readable medium is a computer program product. The use of the computer program product in the computer system 1400 preferably effects an advantageous apparatus for a lift server 140.

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[90] The software 1433 is typically stored in the HDD 1410 or the memory 1406. The software is loaded into the computer system 1400 from a computer readable medium, and executed by the computer system 1400. Thus, for example, the software 1433 may be stored on an optically readable disk storage medium (e.g., CD-ROM) 1425 that is read by the optical disk drive 1412. A computer readable medium having such software or computer program recorded on it is a computer program product. The use of the computer program product in the computer system 1400 preferably effects an apparatus for a lift server 140.

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[91] In some instances, the application programs 1433 may be supplied to the user encoded on one or more CD-ROMs 1425 and read via the corresponding drive 1412, or alternatively may be read by the user from the networks 1420 or 1422. Still further, the

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software can also be loaded into the computer system 1400 from other computer readable media. Computer readable storage media refers to any non-transitory tangible storage medium that provides recorded instructions and/or data to the computer system 1400 for execution and/or processing. Examples of such storage media include floppy disks, magnetic tape, optical disc, a hard disk drive, a ROM or integrated circuit, USB memory, a magneto-optical disk, or a computer readable card such as a PCMCIA card and the like, whether or not such devices are internal or external of the computer module 1401. Examples of transitory or non-tangible computer readable transmission media that may also participate in the provision of software, application programs, instructions and/or data to the computer module 1401 include radio or infra-red transmission channels as well as a network connection to another computer or networked device, and the Internet or Intranets including e-mail transmissions and information recorded on Websites and the like.

[92] The second part of the application programs 1433 and the corresponding code modules mentioned above may be executed to implement one or more graphical user interfaces (GUIs) to be rendered or otherwise represented upon a display. Through manipulation of typically a keyboard and a mouse, a user of the computer system 1400 and the application may manipulate the interface in a functionally adaptable manner to provide controlling commands and/or input to the applications associated with the GUI(s). Other forms of functionally adaptable user interfaces may also be implemented, such as an audio interface utilizing speech prompts output via loudspeakers and user voice commands input via a microphone.

[93] It is to be understood that the structural context of the computer system 1400 (i.e., the lift server 140) is presented merely by way of example. Therefore, in some arrangements, one or more features of the computer system 1400 may be omitted. Also, in some arrangements, one or more features of the computer system 1400 may be combined together. Additionally, in some arrangements, one or more features of the computer system 1400 may be split into one or more component parts.

[94] Fig. 7 shows an implementation of the transaction processing server 108 (i.e., the computer system 1300). In this implementation, the transaction processing 108 may be generally described as a physical device comprising at least one processor 802 and at least one memory 804 including computer program codes. The at least one memory 804

and the computer program codes are configured to, with the at least one processor 802, cause the transaction processing server 108 to facilitate the operations described in method 500. The transaction processing server 108 may also include a transaction processing module 806. The memory 804 stores computer program code that the processor 802 compiles to have transaction processing module 806 perform the respective functions.

[95] With reference to Fig. 1, the transaction processing module 806 performs the function of communicating with the requestor device 102 and the provider device 104, and the acquirer server 106 and the issuer server 110 to respectively receive and transmit a transaction, a request for a service, delivery, a travel-coordination request, purchasing of a good or service by a user, and other similar services. The transaction processing module 806 may be configured to process processes relating to a transaction by, for example, forwarding data and information associated with the transaction to the other servers in the system 100 such as the lift server 140. In an example, the transaction processing module 806 may, instead of the requestor device 102 or provider device 104, transmit data relating to a request (e.g., date, time, a location, location information of a unit at the location, and other similar data) to the lift server 104. The transaction processing module 806 may use a variety of different protocols and procedures in order to process the payment and/or requests. It will be appreciated that payment for a transaction may be made via a variety of methods such as credit cards, debit cards, digital wallets, buy-first pay-later schemes, and other similar payment methods.

[96] Fig. 10 shows an alternative implementation of the lift server 140 (e.g., the computer system 1400). In the alternative implementation, lift server 140 may be generally described as a physical device comprising at least one processor 902 and at least one memory 904 including computer program codes. The at least one memory 904 and the computer program codes are configured to, with the at least one processor 902, cause the lift server 140 to perform the operations described in the method 700. The lift server 140 may also include a data module 906, a identification module 908, a database module 910 and a lift module 912. The memory 904 stores computer program code that the processor 902 compiles to have each of the modules 906 to 912 performs their respective functions.

[97] With reference to Figs. 1 to 7, the identification module 908 performs the function of identifying location information from a database that corresponds with location

information of a unit at a location indicated in a request, and identifying a lift from the database that has been used to access a unit associated with the identified location information. In an implementation, the identification module 908 may be configured for identifying the location information comprising a same floor number or unit number as the location information indicated in the request, or a floor number or unit number that is a part of a sequence with that indicated in the request.

[98] With reference to Figs. 1 to 7, the database module 910 performs the function of calculating a coverage metric based on a total number of units with a recommended lift and a total number of units without a recommended lift, and calculating an accuracy metric based on a total number of units with a recommended lift that is same as a lift indicated by a user device associated with a corresponding request and a total number of units with a recommended lift. In an implementation, the database module 910 may be configured to update the database, for example based on an input or feedback from a user device (e.g., indicating that another lift that is different from the recommended lift has been used to access the unit at the location), based on the coverage metric, based on the accuracy metric, or other similar factors.

[99] With reference to Figs. 1 to 7, the lift module 912 performs the function of recommending a lift for accessing the unit at the location based on the identified lift (e.g., identified by the identification module 908). In an implementation, the lift module 912 may be configured to recommend the identified lift for accessing the unit at the location lift when the identified location information comprises a same floor number or unit number as that of the location information indicated in the request. In an implementation, the lift module 912 may be configured to recommend the identified lift for accessing the unit at the location lift when the identified location information comprises a floor number or unit number that is part of a sequence with that of the location information indicated in the request. In an implementation, wherein the location information of the unit comprises a floor number of the unit, the identification module 908 may be configured to determine whether a floor number in the identified location information corresponds with the floor number of the unit, and the lift module 912 may be configured to recommend the lift further based on the determination. In an implementation, wherein the location information of the unit comprises a unit number of the unit, the identification module 908 may be configured to determine whether a unit number in the identified location information corresponds with the unit number of the unit, and the lift module 912 may be configured to recommend the

lift further based on the determination. In an implementation, the lift module 912 may be configured to determine whether to recommend the lift based on the accuracy metric and the coverage metric.

5 **[100]** With reference to Figs. 1 to 7, the data module 906 performs the functions of receiving data and information from the requestor device 102, provider device 104, transaction processing server 108, database 150, a cloud and other sources of information to recommend a lift for accessing a unit at a location by the lift server 140. For example, the data module 906 may be configured to receive data and information required for:

10 identifying location information from a database that corresponds with location information of a unit at a location indicated in a request, identifying a lift from the database that has been used to access a unit associated with the identified location information, and recommending a lift for accessing the unit at the location based on the identified lift; recommending the identified lift for accessing the unit at the location lift when the identified

15 location information comprises a same floor number or unit number as that of the location information indicated in the request; recommending the identified lift for accessing the unit at the location lift when the identified location information comprises a floor number or unit number that is part of a sequence with that of the location information indicated in the request; determining whether a floor number or unit number in the identified location

20 information corresponds with the floor number or unit number of the unit and recommending the lift for accessing the unit at the location further based on the determination; calculating a coverage metric based on a total number of units with a recommended lift and a total number of units without a recommended lift, calculating an accuracy metric based on a total number of units with a recommended lift that is same as

25 a lift indicated by a user device associated with a corresponding request and a total number of units with a recommended lift, and determining whether to recommend the lift for accessing the unit at the location further based on the accuracy metric and the coverage metric; determining a total number of times that the recommended lift does not correspond with a lift indicated by a user device associated with the request, and disabling

30 recommendation of a lift for accessing the unit based on the determination; and other similar processes from the requestor device 102, the provider device 104, transaction processing server 108, database 150, and/or other sources of information. The data module 906 may be further configured to send information relating to data retrieved in response to a request to the requestor device 102, the provider device 104, the transaction

35 processing server 108, or other destinations where the information is required.

[101] Fig. 8B depicts a general-purpose computer system 1500, upon which a combined transaction processing server 108 and lift server 140 described can be practiced. The computer system 1500 includes a computer module 1501. An external Modulator-Demodulator (Modem) transceiver device 1516 may be used by the computer module 1501 for communicating to and from a communications network 1520 via a connection 1521. The communications network 1520 may be a wide-area network (WAN), such as the Internet, a cellular telecommunications network, or a private WAN. Where the connection 1521 is a telephone line, the modem 1516 may be a traditional “dial-up” modem. Alternatively, where the connection 1521 is a high capacity (e.g., cable) connection, the modem 1516 may be a broadband modem. A wireless modem may also be used for wireless connection to the communications network 1520.

[102] The computer module 1501 typically includes at least one processor unit 1505, and a memory unit 1506. For example, the memory unit 1506 may have semiconductor random access memory (RAM) and semiconductor read only memory (ROM). The computer module 1501 also includes an interface 1508 for the external modem 1516. In some implementations, the modem 1516 may be incorporated within the computer module 1501, for example within the interface 1508. The computer module 1501 also has a local network interface 1511, which permits coupling of the computer system 1500 via a connection 1523 to a local-area communications network 1522, known as a Local Area Network (LAN). As illustrated in Fig. 8D, the local communications network 1522 may also couple to the wide network 1520 via a connection 1524, which would typically include a so-called “firewall” device or device of similar functionality. The local network interface 1511 may comprise an Ethernet circuit card, a Bluetooth® wireless arrangement or an IEEE 802.11 wireless arrangement; however, numerous other types of interfaces may be practiced for the interface 1511.

[103] The I/O interfaces 1508 may afford either or both of serial and parallel connectivity, the former typically being implemented according to the Universal Serial Bus (USB) standards and having corresponding USB connectors (not illustrated). Storage devices 1509 are provided and typically include a hard disk drive (HDD) 1510. Other storage devices such as a floppy disk drive and a magnetic tape drive (not illustrated) may also be used. An optical disk drive 1512 is typically provided to act as a non-volatile source of data. Portable memory devices, such optical disks, USB-RAM, portable, external hard

drives, and floppy disks, for example, may be used as appropriate sources of data to the system 1500.

5 **[104]** The components 1505 to 1512 of the computer module 1501 typically communicate via an interconnected bus 1504 and in a manner that results in a conventional mode of operation of the computer system 1500 known to those in the relevant art. For example, the processor 1505 is coupled to the system bus 1504 using a connection 1518. Likewise, the memory 1506 and optical disk drive 1512 are coupled to the system bus 1504 by connections 1519. Examples of computers on which the
10 described arrangements can be practised include IBM-PC's and compatibles, Sun Sparcstations, Apple or like computer systems.

15 **[105]** The steps of the method 500 performed by the lift server 140 and facilitated by the transaction processing server 108 may be implemented using the computer system 1500. For example, the steps of the method 500 as performed by the lift server 140 may be implemented as one or more software application programs 1533 executable within the computer system 1500. In particular, the steps of the method 500 are effected by instructions in the software 1533 that are carried out within the computer system 1500. The software instructions may be formed as one or more code modules, each for
20 performing one or more particular tasks. The software may also be divided into two separate parts, in which a first part and the corresponding code modules performs the steps of the method 700 and a second part and the corresponding code modules manage a user interface between the first part and the user.

25 **[106]** The software may be stored in a computer readable medium, including the storage devices described below, for example. The software is loaded into the computer system 1500 from the computer readable medium, and then executed by the computer system 1500. A computer readable medium having such software or computer program recorded on the computer readable medium is a computer program product. The use of
30 the computer program product in the computer system 1500 preferably effects an advantageous apparatus for a combined transaction processing and lift server.

35 **[107]** The software 1533 is typically stored in the HDD 1510 or the memory 1506. The software is loaded into the computer system 1500 from a computer readable medium, and executed by the computer system 1500. Thus, for example, the software 1533 may be

stored on an optically readable disk storage medium (e.g., CD-ROM) 1525 that is read by the optical disk drive 1512. A computer readable medium having such software or computer program recorded on it is a computer program product. The use of the computer program product in the computer system 1500 preferably effects an apparatus for a combined transaction processing and lift server.

[108] In some instances, the application programs 1533 may be supplied to the user encoded on one or more CD-ROMs 1525 and read via the corresponding drive 1512, or alternatively may be read by the user from the networks 1520 or 1522. Still further, the software can also be loaded into the computer system 1500 from other computer readable media. Computer readable storage media refers to any non-transitory tangible storage medium that provides recorded instructions and/or data to the computer system 1500 for execution and/or processing. Examples of such storage media include floppy disks, magnetic tape, optical disc, a hard disk drive, a ROM or integrated circuit, USB memory, a magneto-optical disk, or a computer readable card such as a PCMCIA card and the like, whether or not such devices are internal or external of the computer module 1501. Examples of transitory or non-tangible computer readable transmission media that may also participate in the provision of software, application programs, instructions and/or data to the computer module 1501 include radio or infra-red transmission channels as well as a network connection to another computer or networked device, and the Internet or Intranets including e-mail transmissions and information recorded on Websites and the like.

[109] The second part of the application programs 1533 and the corresponding code modules mentioned above may be executed to implement one or more graphical user interfaces (GUIs) to be rendered or otherwise represented upon a display. Through manipulation of typically a keyboard and a mouse, a user of the computer system 1500 and the application may manipulate the interface in a functionally adaptable manner to provide controlling commands and/or input to the applications associated with the GUI(s). Other forms of functionally adaptable user interfaces may also be implemented, such as an audio interface utilizing speech prompts output via loudspeakers and user voice commands input via a microphone.

[110] It is to be understood that the structural context of the computer system 1500 (e.g., combined transaction processing and lift server 1500) is presented merely by way of

example. Therefore, in some arrangements, one or more features of the server 1500 may be omitted. Also, in some arrangements, one or more features of the server 1500 may be combined together. Additionally, in some arrangements, one or more features of the server 1500 may be split into one or more component parts.

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[111] Fig. 10 shows an alternative implementation of combined transaction processing and lift server (i.e., the computer system 1500). In the alternative implementation, the combined transaction processing and lift server may be generally described as a physical device comprising at least one processor 1002 and at least one memory 904 including computer program codes. The at least one memory 1004 and the computer program codes are configured to, with the at least one processor 1002, cause the combined transaction processing and lift server to perform the operations described in the steps of the method 700. The combined transaction processing and lift server may also include a transaction processing module 806, a data module 906, a identification module 908, a verification module 910 and a lift module 912. The memory 1004 stores computer program code that the processor 1002 compiles to have each of the modules 806 to 912 performs their respective functions. The transaction processing module 806 performs the same functions as described for the same transaction processing module in Fig. 8. The data module 906, identification module 908, verification module 910 and lift module 912 perform the same functions as described for the same corresponding modules in Fig. 9.

[112] It will be appreciated by a person skilled in the art that numerous variations and/or modifications may be made to the present disclosure as shown in the specific embodiments without departing from the scope of the specification as broadly described. The present embodiments are, therefore, to be considered in all respects to be illustrative and not restrictive.

25

CLAIMS

What is claimed is:

1. A method for recommending a lift for accessing a unit at a location, comprising:
5 identifying, by a processor, location information from a database that corresponds with location information of a unit at a location indicated in a request; identifying, by the processor, a lift from the database that has been used to access a unit associated with the identified location information; and recommending, by the processor, a lift for accessing the unit at the location
10 based on the identified lift.
2. The method of claim 1, wherein recommending the lift further comprises:
recommending the identified lift for accessing the unit at the location lift
when the identified location information comprises a same floor number or unit
15 number as that of the location information indicated in the request.
3. The method of claim 1, wherein recommending the lift further comprises:
recommending the identified lift for accessing the unit at the location lift
when the identified location information comprises a floor number or unit number
20 that is part of a sequence with that of the location information indicated in the request.
4. The method of claim 1, wherein the location information of the unit comprises a floor number of the unit, and recommending the lift further comprises:
25 determining whether a floor number in the identified location information corresponds with the floor number of the unit; and recommending the lift further based on the determination.
5. The method of claim 1, wherein the location information of the unit comprises a unit number of the unit, and recommending the lift further comprises:
30 determining whether a unit number in the identified location information corresponds with the unit number of the unit; and recommending the lift further based on the determination.
- 35 6. The method of claim 1, further comprising:

calculating a coverage metric based on a total number of units with a recommended lift and a total number of units without a recommended lift;

calculating an accuracy metric based on a total number of units with a recommended lift that is same as a lift indicated by a user device associated with a corresponding request and a total number of units with a recommended lift; and

determining whether to recommend the lift for accessing the unit at the location further based on the accuracy metric and the coverage metric.

7. The method of claim 1, further comprising:

determining a total number of times that the recommended lift does not correspond with a lift indicated by a user device associated with the request; and
disabling recommendation of a lift for accessing the unit based on the determination.

8. A system for recommending a lift for accessing a unit at a location, comprising:

at least one processor; and at least one memory including computer program code; the at least one memory and the computer program code configured to, with the at least one processor, cause the system at least to:

identify location information from a database that corresponds with location information of a unit at a location indicated in a request;
identify a lift from the database that has been used to access a unit associated with the identified location information; and
recommend a lift for accessing the unit at the location based on the identified lift.

9. The system of claim 1, wherein recommending the lift further comprises:

recommending the identified lift for accessing the unit at the location lift when the identified location information comprises a same floor number or unit number as that of the location information indicated in the request.

10. The system of claim 1, wherein recommending the lift further comprises:

recommending the identified lift for accessing the unit at the location lift when the identified location information comprises a floor number or unit number that is part of a sequence with that of the location information indicated in the request.

11. The system of claim 1, wherein the location information of the unit comprises a floor number of the unit, and recommending the lift further comprises:

determining whether a floor number in the identified location information corresponds with the floor number of the unit; and

5 recommending the lift further based on the determination.

12. The system of claim 1, wherein the location information of the unit comprises a unit number of the unit, and recommending the lift further comprises:

determining whether a unit number in the identified location information corresponds with the unit number of the unit; and

10 recommending the lift further based on the determination.

13. The system of claim 1, further configured to:

calculate a coverage metric based on a total number of units with a recommended lift and a total number of units without a recommended lift;

15 calculate an accuracy metric based on a total number of units with a recommended lift that is same as a lift indicated by a user device associated with a corresponding request and a total number of units with a recommended lift; and

20 determine whether to recommend the lift for accessing the unit at the location further based on the accuracy metric and the coverage metric.

14. The system of claim 1, further configured to:

determine a total number of times that the recommended lift does not correspond with a lift indicated by a user device associated with the request; and

25 disable recommendation of a lift for accessing the unit based on the determination.