US Patent & Trademark Office
Patent Public Search | Text View

DYNAMIC PROCESSING OF ELECTRONIC MESSAGING DATA AND PROTOCOLS TO AUTOMATICALLY GENERATE LOCATION PREDICTIVE RETRIEVAL USING A NETWORKED, MULTI-STACK COMPUTING ENVIRONMENT

Abstract

Various embodiments relate generally to computer science, data science, software, and computer program and platform architectures, including processing data received at an adaptive distribution platform to identify a point of time, initiating automatic replenishment of the item by the adaptive distribution platform if the point of time is substantially within the date range, transmitting a message to a client, the message including a characteristic of the item and a control user input, receiving a response to the message, processing the response to determine whether to adjust the scheduled delivery to replenish the item, generating a confirmation message to the client, transmitting a control signal from the adaptive distribution platform to a system, and adapting a predicted distribution event associated with the item.

Inventors: **Fredrich; Paul (Brooklyn, NY), Bifolco; Michael (Irvington, NY), Alvo; Greg E. (Miami, FL), Shalom; Ofir (Jersey City, NJ)**

Applicant: **OrderGroove, LLC** (Miami, FL)

Family ID: **64658196**

Assignee: **OrderGroove, LLC (Miami, FL)**

Appl. No.: **19/051109**

Filed: **February 11, 2025**

Related U.S. Application Data

parent US continuation 16779600 20200201 parent-grant-document US 12223532 child US 19051109

Publication Classification

Int. Cl.: **G06Q30/0601** (20230101); **G06F16/21** (20190101); **G06F16/9537** (20190101); **G06F17/18** (20060101); **G06F40/205** (20200101); **G06Q10/083** (20240101); **G06Q30/0251** (20230101); **H04L51/046** (20220101); **H04W4/021** (20180101); **H04W4/14** (20090101)

U.S. Cl.:

CPC **G06Q30/0625** (20130101); **G06F16/211** (20190101); **G06F16/9537** (20190101); **G06F17/18** (20130101); **G06F40/205** (20200101); **G06Q10/083** (20130101); **G06Q30/0267** (20130101); **G06Q30/0271** (20130101); **G06Q30/0631** (20130101); **G06Q30/0633** (20130101); **H04L51/046** (20130101); **H04W4/021** (20130101); **H04W4/14** (20130101);

Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application is a continuation application of copending U.S. patent application Ser. No. 16/779,600, filed Feb. 1, 2020 and entitled, "DYNAMIC PROCESSING OF ELECTRONIC MESSAGING DATA AND PROTOCOLS TO AUTOMATICALLY GENERATE LOCATION PREDICTIVE RETRIEVAL USING A NETWORKED, MULTI-STACK COMPUTING ENVIRONMENT," U.S. patent application Ser. No. 16/779,600 is a continuation application of U.S. patent application Ser. No. 16/115,474, filed Aug. 28, 2018, now U.S. Pat. No. 10,614,501 and entitled, "DYNAMIC PROCESSING OF ELECTRONIC MESSAGING DATA AND PROTOCOLS TO AUTOMATICALLY GENERATE LOCATION PREDICTIVE RETRIEVAL USING A NETWORKED, MULTI-STACK COMPUTING ENVIRONMENT," U.S. patent application Ser. No. 16/115,474 is a continuation application of U.S. patent application Ser. No. 16/046,690, filed Jul. 26, 2018, now U.S. Pat. No. 10,586,266 and entitled, "DYNAMIC PROCESSING OF ELECTRONIC MESSAGING DATA AND PROTOCOLS TO AUTOMATICALLY GENERATE LOCATION PREDICTIVE RETRIEVAL USING A NETWORKED, MULTI-STACK COMPUTING ENVIRONMENT," U.S. patent application Ser. No. 16/046,690 is a continuation-in-part application of U.S. patent application Ser. No. 15/716,486, filed Sep. 26, 2017, now U.S. Pat. No. 11,144,980 and entitled, "ADAPTIVE SCHEDULING OF ELECTRONIC MESSAGING BASED ON PREDICTIVE CONSUMPTION OF THE SAMPLING OF ITEMS VIA A NETWORKED COMPUTING PLATFORM," U.S. patent application Ser. No. 15/716,486 is a continuation-in-part application of U.S. patent application Ser. No. 15/479,230, filed Apr. 4, 2017, now U.S. Pat. No. 11,416,810 and entitled, "ELECTRONIC MESSAGING TO DISTRIBUTE ITEMS BASED ON ADAPTIVE SCHEDULING," U.S. patent application Ser. No. 16/046,690 is also a continuation-in-part application of U.S. patent application Ser. No. 15/821,362 filed Nov. 22, 2017, now U.S. Pat. No. 10,719,860 and entitled, "ADAPTIVE SCHEDULING TO FACILITATE OPTIMIZED DISTRIBUTION OF SUBSCRIBED ITEMS," U.S. patent application Ser. No. 15/821,362 claims the benefit of U.S. Provisional Patent Application No. 62/425,191, filed Nov. 22, 2016 and entitled, "ADAPTIVE SCHEDULING TO FACILITATE OPTIMIZED DISTRIBUTION OF SUBSCRIBED ITEMS," U.S. patent application Ser. No. 16/115,474 is also a continuation-in-part application of U.S. patent application Ser. No. 15/716,486, filed Sep. 26, 2017, now U.S. Pat. No. 11,144,980 and entitled, "ADAPTIVE SCHEDULING OF ELECTRONIC MESSAGING BASED ON PREDICTIVE CONSUMPTION OF THE SAMPLING OF ITEMS VIA A NETWORKED COMPUTING PLATFORM," U.S. patent

application Ser. No. 15/716,486 is a continuation-in-part application of U.S. patent application Ser. No. 15/479,230, filed Apr. 4, 2017, now U.S. Pat. No. 11,416,810 and entitled, "ELECTRONIC MESSAGING TO DISTRIBUTE ITEMS BASED ON ADAPTIVE SCHEDULING," U.S. patent application Ser. No. 16/115,474 is also a continuation-in-part application of U.S. patent application Ser. No. 15/821,362, filed Nov. 22, 2017, now U.S. Pat. No. 10,719,860 and entitled, "ADAPTIVE SCHEDULING TO FACILITATE OPTIMIZED DISTRIBUTION OF SUBSCRIBED ITEMS," U.S. patent application Ser. No. 15/821,362 claims the benefit of U.S. Provisional Patent Application No. 62/425,191, filed Nov. 22, 2016 and entitled, "ADAPTIVE SCHEDULING TO FACILITATE OPTIMIZED DISTRIBUTION OF SUBSCRIBED ITEMS," all of which are herein incorporated by reference in their entirety for all purposes.

FIELD

[0002] Various embodiments relate generally to computer and data science, computer software, distributed network computing, and computer systems, software, and application architecture. More specifically, techniques for dynamic parsing of electronic messaging data and protocols to automatically generate location predictive retrieval options using a networked, multi-stack computing environment are described.

BACKGROUND

[0003] Advances in computing hardware and software, as well as computing networks and network services, have bolstered growth of Internet-based product and service procurement and delivery. For example, online shopping, in turn, has fostered the use of "subscription"-based delivery computing services with an aim to provide convenience to consumers. In particular, a user becomes a subscriber when associated with a subscriber account, which is typically implemented on a remote server for a particular seller. In exchange for electronic payment, which is typically performed automatically, a seller ships a specific product (or provides access to a certain service) at periodic times, such as every three (3) months, every two (2) weeks, etc., or any other repeated periodic time intervals. With conventional online subscription-based ordering, consumers need not plan to reorder to replenish supplies of a product.

[0004] But conventional approaches to provide subscription-based order fulfillment, while functional, suffer a number of other drawbacks. For example, traditional subscription-based ordering relies on computing architectures that predominantly generate digital "shopping cart" interfaces with which to order and reorder products and services. Traditional subscription-based ordering via shopping cart interfaces generally rely on a user to manually determine a quantity and a time period between replenishing shipments, after which the quantity is shipped after each time period elapses. Essentially, subscribers receive products and services on "auto-pilot."

[0005] So while the conventional approaches to implementing shopping cart interfaces may be functional for stable rates of consumption, such approaches are not well-suited to facilitate timely reordering of products and services with which consumers may use at rates that vary from the fixed periods of time between repeated deliveries. Thus, conventional approaches to reordering or procuring subsequent product and services deliveries are plagued by various degrees of rigidity that interject sufficient friction into reordering that cause some users to either delay or skip making such purchases. Unfortunately, such friction causes some users to supplement the periodic deliveries manually if an item is discovered to be running low more quickly than otherwise might be the case (e.g., depleting coffee, toothpaste, detergent, wine, or any other product more quickly than normal).

[0006] Examples of such friction include "mental friction" that may induce stress and frustration in such processes. Typically, a user may be required to rely on one's own memory to supplement depletion of a product and services prior to a next delivery (e.g., remembering to buy coffee before running out) or time of next service. Examples of such friction include "physical friction," such as weighing expending time and effort to either physically confront a gauntlet of lengthy check-out and shopping cart processes, or to make an unscheduled stop at a physical store.

[0007] Typical online approaches, including conventional shopping cart interfaces, suffer from less than optimal means with which to reconcile the different rates of product and service usage of different users. One prevalent consequence of mismatches between time periods for delivering subscribed products or services and consumption rates by consumers is that, over time, the supply of a subscribed item is either over-delivered or under-delivered. An oversupply of subscribed product or service typically degrades consumer experience due to a number of reasons. For example, subscribers may believe that a seller is "over-billing" the customer for unneeded products or services. Similarly, an under-supply of subscribed product may give to frustration and friction that an expected subscribed product or service is scarce or unavailable.

[0008] Online retailers and merchants may experience similar consequences due to mismatching of delivery times and consumption rates, such as at an aggregate level of subscribers. In the aggregate, the mismatches may cause either overstocking or understocking of inventory of the online retailers and merchants. Fluctuations in inventory may cause non-beneficial consumption of resources and time. Note, too, that the computing systems of online retailers and merchants are not well-adapted to address the above-described mismatching phenomena when ordering, shipping, and performing inventory management. These types of subscription models, therefore, are not generally well-suited for application to usual consumption rates of depletable products and services (e.g., product usage that depletes some or all of the product or service).

[0009] In some approaches, online retailers and merchants attempt to increase exposure and awareness of certain products by, for instance, providing samples of products to potential consumers. In one approach, a printed paper, such as a "flyer," is typically added a box containing a purchased product being readied for shipment (e.g., from a warehouse). The flyer usually conveys information about a product in which a consumer may purchase in the future. For example, a flyer may include a website or other contact information that accompanies a variety of snacks and directs a recipient how to order a favored snack from the variety of snacks. But prior to sampling a product, the "friction" encountered by a consumer to acquire the sample described in a flyer is relatively high (e.g., a low likelihood of future acquisition of the item). Consumers have little time to follow directions to receive a sample for a product they are not aware that they would like to receive. In a modified approach, a sample of the product (e.g., either free or at a nominal price) may be included in a boxed shipment and the flyer, which explains how to purchase a product should the consumer desire.

[0010] Conventional computing platforms that implement traditional online merchant techniques, while functional, suffer drawbacks that limit opportunities to receive information regarding one or more consumers' experiences regarding a product. Known software and applications, therefore, are suboptimal in determining information of consumer experiences. As manufacturers and retailers expend millions to billions of dollars in investing in manufacturing samples for distribution, the information received back via conventional software and applications have yet to reach their potential.

[0011] Thus, what is needed is a solution to facilitate techniques for dynamically process electronic data to generate location resultants to optimize physical product distribution in networked application and platform architectures, without the limitations of conventional techniques.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Various embodiments or examples ("examples") of the invention are disclosed in the following detailed description and the accompanying drawings:

[0013] FIG. **1** is a diagram depicting an adaptive distribution platform, according to some embodiments;

[0014] FIG. **2** is a diagram depicting an example of a conversation platform controller, according to some embodiments;

[0015] FIG. **3** is a diagram depicting an example of operation of a distribution predictor, according to some embodiments;

[0016] FIG. **4** is a diagram depicting an example of a flow, according to some embodiments;

[0017] FIG. **5** depicts an example of another flow, according to some embodiments;

[0018] FIG. **6** depicts an example of yet another flow, according to some embodiments;

[0019] FIG. **7** is a diagram depicting an example of operation for a distribution predictor to generate predictive distribution data based on derived usage data, according to some embodiments; and

[0020] FIG. **8** illustrates examples of various computing platforms configured to provide various functionalities to predict a time of distribution of an item relative to an adaptive schedule, according to various embodiments;

[0021] FIG. **9** is a diagram depicting another example of an adaptive distribution platform, according to some embodiments;

[0022] FIG. **10** is a diagram depicting an example of operation of an information feedback predictor, according to some embodiments;

[0023] FIG. **11** is a diagram depicting an example of a flow to facilitate predictive consumption of a sample for an item that implements an automatically adaptive schedule, according to some embodiments;

[0024] FIG. **12** is a diagram depicting examples of integrated interfaces to facilitate predictions of sample consumption, according to some embodiments;

[0025] FIG. **13** is an exemplary system configured to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment;

[0026] FIG. **14** is an exemplary application architecture for a data management platform configured to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment;

[0027] FIG. **15** illustrates exemplary data types operated upon in an exemplary system configured to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment;

[0028] FIG. **16** is an exemplary algorithmic flow diagram to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment;

[0029] FIG. **17** is an alternative exemplary algorithmic flow diagram to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment;

[0030] FIG. **18**A is another exemplary algorithmic flow diagram to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment;

[0031] FIG. **18**B is a further exemplary algorithmic flow diagram to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment;

[0032] FIG. **18**C is another exemplary algorithmic flow diagram to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment;

[0033] FIG. **18**D is yet another exemplary algorithmic flow diagram to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment; and

[0034] FIG. **18**E is a still further exemplary algorithmic flow diagram to dynamically process

electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment.

DETAILED DESCRIPTION

[0035] Various embodiments or examples may be implemented in numerous ways, including as a system, a process, an apparatus, a user interface, or a series of program instructions on a computer readable medium such as a computer readable storage medium or a computer network where the program instructions are sent over optical, electronic, or wireless communication links. In general, operations of disclosed processes may be performed in an arbitrary order, unless otherwise provided in the claims.

[0036] A detailed description of one or more examples is provided below along with accompanying figures. The detailed description is provided in connection with such examples, but is not limited to any particular example. The scope is limited only by the claims, and numerous alternatives, modifications, and equivalents thereof. Numerous specific details are set forth in the following description in order to provide a thorough understanding. These details are provided for the purpose of example and the described techniques may be practiced according to the claims without some or all of these specific details. For clarity, technical material that is known in the technical fields related to the examples has not been described in detail to avoid unnecessarily obscuring the description.

[0037] FIG. **1** is a diagram depicting an adaptive distribution platform, according to some embodiments. Diagram **100** depicts an example of adaptive distribution platform **110** that may be configured to facilitate automatic distribution of items in accordance with an adaptive schedule. For example, adaptive distribution platform **110** may be configured to initiate electronic messaging (e.g., as reminder messages) of pending exhaustion of an item, which may be any good or service, to facilitate replenishment. The timing of the distribution may be adapted to a specific user **144** (or group of users **144**). In the example shown, adaptive distribution platform **110** may include a commerce platform controller **112**, a distribution predictor **114**, and a conversation platform controller **115**. Adaptive distribution platform **110** and any of its elements, such as commerce platform controller **112**, distribution predictor **114**, and conversation platform controller **115**, may include logic, whether implemented in hardware or software, or a combination thereof.

[0038] Commerce platform controller **112** may be configured to perform functions to support the initiation of the distribution (e.g., shipment) of an item, among other things. For example, commerce platform controller **112** may be configured to facilitate financial-related transactions with one or more merchant computing systems **130***a*, **130***b*, and **130***n*, including, but not limited to, credit card transactions or the like. In some cases, commerce platform controller **112** may also control participation by users and their electronic interactions with adaptive distribution platform **110**. For example, commerce platform controller **112** may manage enrollment of a user to form an electronic account that enables access via a computing device, such as one of mobile computing devices **152***a* and **152***b*, to adaptive distribution platform **110**.

[0039] Distribution predictor **114** may be configured to predict a point in time (or a range of time) at which an item may be exhausted, and based on the prediction, adaptive distribution platform **110** may be further configured to determine a zone of time (not shown) in which depletion and near exhaustion of an item is predicted. Further, distribution predictor **114** may be configured to determine the zone of time relative to a distribution event. In some cases, a zone of time is determined as a range of time preceding the distribution event. Distribution predictor **114** may be configured to associated a point in time with the zone of time, the point in time defining a moment at which an electronic message may be transmitted to a computing device **142**, **152***a*, or **152***b* to inform a user of a pending exhaustion of an item and to provide an opportunity to replenish the item in a configurable manner.

[0040] Conversation platform controller **115** may be configured to facilitate an exchange of electronic messages and data, as a "conversation," between adaptive distribution platform **110** and

any of user computing devices **142**, which may include mobile computing devices **152***a* and **152***b*. According to some examples, conversation platform controller **115** may be configured to monitor whether to replenish an item, for example, by determining whether a particular date coincides with a zone of time. If the particular date coincides with a date range of the zone of time, conversation platform controller **115** may transmit data representing an electronic message **124***a* via one or more networks **120***a* and **120***b* to mobile computing device **152***b* to cause presentation of a reminder message in an interface **156***b*. In response, mobile computing device **152***b* may transmit data representing an electronic message **124***b* to initiate distribution (e.g., shipment) of an item.

[0041] In some examples, conversation platform controller **115** may be configured to receive an electronic message **122***b* originating at user computing device **152***a* as conversation platform controller **115** monitors whether to replenish an item. Electronic message **122***b* may include data representing an item characteristic (e.g., a product classification, such as "paper towels," or a product type, such as a brand name (e.g., "Brand 'X'")). In this example, a user **144** may enter a product classification ("paper towels") **158***a* as displayed in a user interface **156***a*. Also, conversation platform controller **115** may be configured to initiate transmission of a control message (e.g., via commerce platform controller **112**) to one of merchant computing systems **130***a*, **130***b*, and **130***n* to initiate distribution of an item for replenishment, whereby a merchant computing system may initiate distribution, shipment, delivery, etc. of the item, by any known means, to a geographic location (e.g., an address) associated with an account (e.g., a user account associated with user **144**). Thus, conversation platform controller **115** may be configured to control replenishment of an item regardless of whether an electronic message that initiates a conversation originates at adaptive distribution platform **110** or at user computing device **142**, **152***a*, or **152***b*.

[0042] Adaptive distribution platform **110** may be configured to facilitate "adaptive" scheduling services via a computing system platform for multiple online or Internet-based retailers and service providers, both of which may be referred to as merchants. In this example, a merchant may be associated with a corresponding one of merchant computing systems **130***a*, **130***b*, or **130***n* that includes one or more computing devices (e.g., processors, servers, etc.), one or more memory storage devices (e.g., databases, data stores, etc.), and one or more applications (e.g., executable instructions for performing adaptive subscription services, etc.). Examples of merchant computing systems **130***a*, **130***b*, or **130***n* may be implemented by any other online merchant. Accordingly, adaptive distribution platform **110** can be configured to distribute items in accordance with predicted distribution events (e.g., a predicted time of distribution), any of which may be adaptively derived to optimize delivery of items.

[0043] In view of the foregoing, the structures and/or functionalities depicted in FIG. **1** may illustrate an example of adaptive scheduling to automatically facilitate the optimal replenishment and distribution of items, such as shipping an item that is ordered or reordered in accordance with various embodiments. According to some embodiments, adaptive distribution platform **110** may be configured to facilitate online ordering and shipment of a product responsive to an electronic message **122***b*, **124***b*, whereby at least one electronic message **122***b*, **124***b* may be sufficient to complete a transaction with at least one of merchant computing systems **130***a*, **130***b*, and **130***n*. Thus, consumption of resources and time for both users and merchant, as well as associated computing systems, may be reduced such that "friction" of replenishment is reduced or negated, at least in some cases. In the example shown, computing device **152***a* may include an application (e.g., a text messaging application) configured to receive input via a user interface, such as an input ("paper towels") **158***a* and a destination account identifier ("774169") **154***a* via interface **156***a*. Computing device **152***b* may also include an application to receive, for example, a user input "NOW" (or any other input) responsive to displayed message **158***b* via interface **156***b*. Further to this example, electronic messages **122***b* and **124***b* may be text messages that each includes sufficient information and data to initiate and complete replenishment of an item as a transaction. In some cases, data representing an identification of a product classification (or type) and an

associated account identifier (e.g., a mobile phone number) in text messages **122***b* and **124***b* may be sufficient. In some examples, adaptive distribution platform **110** may provide replenishment services for multiple entities (e.g., for multiple merchant computing systems **130**), thereby reducing resources that otherwise may be needed to perform replenishment services individually at each merchant computing system **130***a*, **130***b*, and **130***n.*

[0044] According to various examples, a distribution event may be predicted automatically or manually to form an adaptive schedule (e.g., an adaptive shipment schedule). A "distribution event" may refer, at least in some examples, to an event at which a shipment is to occur (or is likely to occur), or at which an item (e.g., a depletable item) is predicted to be exhausted. For example, a distribution event (e.g., either depletion or shipment) may be timed to occur at the 30th day after a user has purchased a bottle of vitamin supplements having 30 tablets that are taken once a day (e.g., at a depletion rate of 1 tablet per day). In some examples, a distribution event (e.g., a time of distribution) may be predicted as a "predicted distribution event" (e.g., a "predicted time of distribution") based on any number of sources of information and/or item characteristics, including, but not limited to, as a usage rate of item by a particular user **144** or a population of users **144** associated with one or more merchant computing systems **130***a*, **130***b*, and **130***n*. In some examples, a usage rate may be a function of a depletion rate. Further, a "predicted distribution event" may be optimized based on, for example, feedback or results of various data analyses. For example, a value representing a predicted distribution event or date may be optimized by including a user's monitored preference in predicting a modified distribution event. A particular user may prefer to deviate from a predicted distribution event by delaying or expediting a shipment (e.g., repeatedly pushing back or pulling forward shipment dates). Thus, a reminder message may be generated in accordance with the user's preference.

[0045] According to some examples, a term "order" may be used interchangeably with "reorder." In some cases, an "order" may refer to a first transaction for a good or service, and a "reorder" may refer to subsequent transactions. During a first transaction, such as a text requesting an order to a merchant via adaptive distribution platform **110**, a prior relationship may not exist with a merchant. If a prior relationship has yet to exist between user **144** and a merchant computing system **130***a*, payment information and shipping address information may not be available to a merchant with which user **144** is engaging. In some examples, adaptive distribution platform **110** may determine user **144** has a prior relationship with any other networked merchant computing systems (e.g., systems **130***b* and **130***n*). Thus, payment information and shipping address information may be used from prior orders with merchant computing systems **130***b* and **130***n*. In one case, however, if no relationship exists with either adaptive distribution platform **110** or any merchant computing systems **130***a*, **130***b*, and **130***n*, adaptive distribution platform **110** may generate an electronic message requesting payment information and shipping address information. The payment information and shipping address information may be transmitted via any medium (e.g., website, via phone, email, text messaging, etc.).

[0046] In some embodiments, data representing a predicted or unpredicted distribution event for any item, regardless of whether due to fulfillment of a subscription, one-time, ad hoc, randomly-generated, infrequent, frequent, periodic, scheduled, or other type of order, or any other data described herein may be implemented by an inventory management controller **131** to manage an amount of inventory to enhance optimally the efficacy of fulfilling and replenishing items for an aggregate number of users **144**. In some examples, other data may include item, shipping, user (e.g., address, city, state, zip code, province, country, or the like), user behavior (e.g., what stores are visited by a user, stores in which a user purchases an item, physical locations in which user has historically purchased items, and the like), order history (e.g., have items been purchased by a given user using an online ordering application or platform or physical retail or wholesale location, what types of online orders have been placed, periodicity of online orders relative to in-store pick up (i.e., retrieval), and the like), billing, payment, merchant, warehouse, shipping, fulfillment, or

other data (e.g., geolocation, geographic information systems (GIS) data, among others) or information that may be used to order and/or prepare an item for shipment or retrieval (i.e., "pick up") from a physical location. A merchant computing system, such as merchant computing system **130a**, may include an inventory management controller **131**, which may be implemented as a known inventory management software application. The inventory management software application may be adapted to receive an aggregate number of predicted distribution events for group of users **144** (or an aggregated representation thereof) to refine, for example, amounts of inventory at a storage facility prior to dispatch or replenishment. Adaptive distribution platform **110** may be configured to provide a subset of predicted distribution events (e.g., predicted shipment dates) for an item for respective users. Alternatively, platform **110** may provide an optimal value for a predicted distribution event for an item to inventory management controller **131**. Accordingly, inventory management controller **131** may be configured to determine an inventory amount (e.g., dynamically) based on the values representing one or more predicted distribution events. Therefore, a merchant associated with merchant computing system **130a** may be configured to optimally determine an amount or quantity of items for fulfillment in an inventory based on, for example, a predicted shipment date and/or a predicted date of exhaustion.

[0047] As described, commerce platform controller **112** may facilitate financial-related transactions and enrollment of user accounts. According to some examples, commerce platform controller **112** may be configured to enroll user **144** and form a corresponding electronic account as a data arrangement, which may include data representing an indication that user **144** has interacted at least one time with at least one of merchant computing systems **130a**, **130b**, and **130n** (i.e., a consumer has purchased previously a product from a merchant, and a data relationship between the merchant and the consumer may exist). Based on a previous purchase, commerce platform controller **112** may access data to facilitate reordering, such as data representing a geographic location (e.g., a shipping address), a payment instrument (e.g., a credit card number, a debit card number, a PayPal™ number, or any other type or form of payment, etc.) and a list of products previously ordered. A user computing device identifier, such as a user's mobile phone number, email address, etc., may also be included as data in the electronic account, which may be formed during an enrollment process or upon initiation of the distribution of an item (e.g., during reordering). An enrollment process may be implemented as an algorithm that may be executed during a check-out process so user **144** may opt to include the above-described data, including authorization to receive electronic messages (e.g., text messages), at a mobile computing device. Further, the enrollment process may be performed at a merchant or a point of sale. For example, a customer of a health food establishment may be presented with an opportunity to enroll (e.g., provide payment and shipping information). In some cases, the opportunity to avail oneself of the various features described herein may be integrated or supplemented with the merchant's loyalty or member program.

[0048] In at least one example, data relating to a user profile acquired in a previous transaction may be disposed in a merchant repository **174**, which may include data generated by one or more of merchant computing systems **130a**, **130b**, and **130n**. User profile and account data may be stored in user repository **170**, which may include data relating to one or more users **144**, or stored in a platform repository **172**, which may include data relating to any aspect of data transactions among users **144** and merchant computing systems **130a**, **130b**, and **130n** used to facilitate operability of adaptive distribution platform **110**.

[0049] Commerce platform controller **112** may be configured to facilitate financial-related transactions and need not perform a financial transaction. For example, commerce platform controller **112** may receive a control message to initiate distribution of an item. In response, commerce platform controller **112** may transmit transaction-related data (e.g., credit card information, destination address, etc.) to one of merchant computing systems **130a**, **130b**, and **130n**, which, in turn applies payment (e.g., receives credit card authorization) and distributes an

item. Hence, commerce platform controller **112** may provide data transfer of information so that each of merchant computing systems **130***a*, **130***b*, and **130***n* may be a merchant of record.

[0050] Distribution predictor **114** may include a distribution calculator **116**, a distribution optimizer **118**, and a zone generator **119**. Distribution calculator **116** may be configured to calculate one or more predicted distribution events or replenishment-related data to form an adaptive schedule (e.g., an adaptive shipping schedule). Distribution optimizer **118** may be configured to optimize values of predicted distribution events to, for example, adapt scheduling of distributed items (i.e., product shipments) to conform (or substantially conform) to delivery or usage preferences of user **144** or a group of users **144**. For example, distribution optimizer **118** may be configured to analyze data representing purchasing patterns related to a particular item for a specific user **144**. Based on the results of such an analysis, distribution optimizer **118** may be configured to emphasize certain item characteristics (or values thereof) that may align more closely to a user's ordering or reordering patterns. For example, replenishment of an exact brand name at a later date may be preferred by user **144** over substitution of a comparable other brand at an earlier date. Zone generator **119** may be configured to define a zone of time, which may be configurable or adjusted based on, for example, one or more of user preferences, an amount of time since a prior distribution (e.g., a prior purchase), one or more usage rates, units of depletion or depletion rate, etc. An example of a depletion rate is the rate at which 2 units of a product are depleted per unit time. To illustrate another example, consider that a bottle of vitamins has 180 tablets and is reordered or depleted every 72 days. Thus, a predicted rate of depletion may be 2.5 per day (e.g., 180 units/72 days). For example, a user may consume 2 to 3 tablets per every other day).

[0051] Distribution calculator **116** may be configured to receive data representing item characteristics data **102**, according to some embodiments, and may be configured further to determine (e.g., identify, calculate, derive, etc.) one or more distribution events based on one or more item characteristics **102**, or combinations thereof (e.g., based on derived item characteristics). For example, distribution calculator **116** may compute a projected date of depletion for a particular product, such as a vitamin product, based on usage patterns and/or ordering patterns of a specific user **144**. Note, however, a projected date of depletion may also be based on usage patterns and/or ordering patterns of other users **144** over any number of merchant computing systems **130***a*, **130***b*, and **130***n*. In some examples, a projected data of depletion may be correlated to, or used interchangeably with, the terms a "predicted distribution event," a "predicted shipment date," a "predicted time of distribution," or the like.

[0052] In at least one example, distribution calculator **116** may be configured to operate on data representing an item characteristic **102**, which may be derived or calculated based on one or more other item characteristics **102**. Examples of item characteristics data **102** may include, but are not limited to, data representing one or more characteristics describing a product, such as a product classification (e.g., generic product name, such as paper towels), a product type (e.g., a brand name, whether derived from text or a code, such as a SKU, UPC, etc.), a product cost per unit, item data representing a Universal Product Code ("UPC"), item data representing a stock keeping unit ("SKU"), etc., for the same or similar items, or complementary and different items. Item characteristics **102** may also include product descriptions associated with either a SKU or UPC. Based on a UPC for paper towels, for example, item characteristics **102** may include a UPC code number, a manufacture name, a product super-category (e.g., paper towels listed under super-category "Home & Outdoor"), product description (e.g., "paper towels," "two-ply," "large size," etc.), a unit amount (e.g., **12** rolls), etc. Item characteristics **102** also may include any other product characteristic, and may also apply to a service, as well as a service type or any other service characteristic. In some examples, data representing item characteristics **102** may be accessed from and/or stored in any of repositories **170**, **172**, and **174**.

[0053] A predicted distribution event for an item may be based on a usage rate of the item (e.g., a calculated usage rate), whereby a usage rate may be a rate at which a product or service is

distributed (e.g., ordered or reordered), consumed, or depleted. In one example, predicted distribution of an item for a user **144** may be based on a predicted time of exhaustion, such as exemplified in the above example in which a distribution event for a bottle of 30 vitamin tablets is predicted to occur at the 30th day (e.g., relative to a previous delivery). In another example, predicted distribution of an item for user **144** may be based on the user's pattern of purchasing, using, ordering, or reordering the item (or generically similar or complementary items). For example, a predicted time of distribution to replenish an item, such as a bottle of ketchup, may be based on a user's past rates of replenishment (e.g., shipment rates), such as a median or average time between successive requests to distribute reordered items. A distribution event may be predicted or supplemented by predicting a time of distribution for ketchup based on rates of past replenishment of mustard, a complementary product having a usage rates that may correlate to that of ketchup as both items may be used together (and thus consumed at similar depletion rates). Other users' patterns of purchasing, using, ordering, or reordering of the same item (e.g., same brand of vitamin A at the same merchant) or equivalent item (e.g., different brands of vitamin A at the same or different merchants) may also be used to predict a time of distribution. For example, consider that user **144** is replenishing an item, such a vitamin A tablets, at a merchant X. However, there may be negligible information to predict a usage rate (or a time of distribution) for that item at merchant X. Therefore, other users' patterns of reordering vitamin A at another merchant, merchant Y, may be used to form a predicted time of distribution for use in purchasing vitamin A tablets at merchant X.

[0054] In some examples, a usage rate to determine a predicted time of distribution may be based on identifying distribution rates of an item relative to one or more other accounts associated with one or more other users or other user computing systems to form an aggregate usage rate. An aggregated usage rate for an item may express, for example, a nominal usage rate that may be used (at least initially) to ascertain predicted time of reorder with a relatively high degree of confidence. Thus, the aggregated usage rate may be used to generate a predicted time of distribution. According to one implementation, usage rates associated with other users may originate from item characteristic data accessed from one or more merchant computing systems **130***a*, **130***b*, and **130***n*. The usage rates received from merchants may be to determine a predicted time of distribution for an item. As an example, usage rates may be derived by analyzing shipment rates of an item to identify time periods between deliveries (i.e., time intervals between order and reorder) relative to one or more merchant computing systems **130***a*, **130***b*, and **130***n*. Thereafter, a usage rate may be used to calculate a predicted time of distribution.

[0055] Distribution optimizer **118** may be configured to optimize values of predicted times of distribution, for example, by adapting scheduled distribution of items to conform (or substantially conform) to, for example, usage preferences of user **144** or a group of users **144**. Distribution optimizer **118** may configured to receive data representing distribution-related data from distribution calculator **116**, including predicted times of distribution, usage rates, etc., as well as item characteristics data **102**, to determine one or more optimized times of distribution, according to some embodiments. In at least one example, distribution optimizer **118** may be configured to determine an optimal default predicted times of distribution with which to establish a time frame to deliver an item. In some examples, distribution optimizer **118** may be configured to modify a value of predicted time of distribution relative to, for example, a prior shipment, or a receipt of a reminder message, etc. A value of predicted time distribution may be modified, for example, by an adjustment factor that may be derived through computation or determined empirically. To illustrate, consider that user **144** receives electronic messages **124***a* at computing system **152***b* over multiple periods of time, whereby user **144** responds via electronic messages **124***b* to request a shipment delay of seven ("7") days rather than ordering at time of that message **158***b* is initially received. In this example, the adjustment factor may have a value of "7" that may modify a value of predicted time of distribution to form a modified value of predicted time of distribution (e.g., modified to 37

days after a last order of 30 vitamin tablets rather than 30 days). According to some embodiments, distribution calculator **116** and/or distribution optimizer **118** may be configured to monitor and update the one or more values of the item characteristics. As such, distribaution optimizer **118** may be configured to dynamically determine a modified time of distribution with which to associate with a specific item (e.g., for specific user **144**), among other parameters. Further, distribution optimizer **118** may be configured to derive an adjustment factor value in accordance with any number of processes or techniques described herein or that are otherwise known.

[0056] Zone generator **119** may be configured to determine a zone of time as a function of an item and/or a user, among other parameters, according to various examples. Zone generator **119** may form a zone of time (not shown) in which depletion or near exhaustion of an item is predicted. A zone of time may be relative to a distribution event (e.g., a time of distribution). In some cases, zone generator **119** may generate a zone of time as a range of time either preceding a distribution event, or subsequent thereto, or both. To illustrate, consider an example in which an item of paper towels may be exhausted in eight (8) days from generation of a reminder electronic message **124***a*. A zone of time may include a range of seven (7) days during which user **144** may select to delay delivery of the item by any day from seven days to one (1) day prior to the day of exhaustion. Optionally, a zone of time may also include another range of seven (7) days extending after the day of exhaustion. Thus, a user may delay or postpone replenishment of an item with any time during a range of 14 days. Note that the above-described values defining the example of a zone of time are not intended to be limiting, but may be of any value or number of days in accordance with various examples.

[0057] Conversation platform controller **115** may include a data interface **117**, and may be configured to facilitate an exchange of electronic messages and data via data interface **117** between adaptive distribution platform **110** and mobile computing devices **152***a* and **152***b* to replenish a consumable item (e.g., a depletable product). Adaptive distribution platform **110** may be configured to replenish an item responsive to one of electronic messages **122***b* and **124***b*, according to some examples. In at least one implementation, adaptive distribution platform **110** may facilitate a complete transaction, from online ordering to shipment, of a product responsive to a unitary electronic message, such as electronic messages **122***b* or **124***b*. In at least one example, electronic messages **122***b* or **124***b* are text messages configured to include 160 characters or fewer.

[0058] Conversation platform controller **115** further may include logic, whether implemented in hardware or software, or a combination thereof, configured to control one or more exchanges of data to identify or determine one or more of a user account (and associated user or consumer), one or more item characteristics, and a destination account identifier. According to various examples, adaptive distribution platform **110** may initiate item replenishment. To illustrate, consider the following example. Conversation platform controller **115**, or any other element of adaptive distribution platform **110**, may include logic configured to monitor values of data representing predicted distribution events for user computing systems **142** and corresponding users **144**. The logic may also monitor values of data representing a zone of time associated with a predicted distribution event. For example, conversation platform controller **115** may compare a point of time (e.g., a date and/or time, such as December 7, 20XX at 5:00 pm) against a zone of time (e.g., a date range from December 7, 20XX to December 14, 20XX) associated with a predicted time of distribution for an item, such as "paper towels." If conversation platform controller **115** detects that a point of time, such as 5:00 pm on December 7, 20XX, coincides with a zone of time for an item "paper towels," conversation platform controller **115** may initiate transmission of an electronic message **124***a* via data interface **117** to, for example, user computing device **152***b*. Further to the example, December 14, 20XX may coincide with a predicted date of exhaustion, whereby message **124***a* is transmitted at a point of time that is 7 days prior. Thus, a user has an opportunity to conveniently replenish an item prior to exhaustion.

[0059] Data interface **117** may be configured to adapt data transmission to a particular

communication medium and application, as well as data protocol, to form electronic message **124***a*. For example, data interface **117** may adapt electronic messages to implement short message service ("SMS"), as a text messaging service for reception by a mobile computing device, including mobile phones, or any other networked computing device. An example of SMS is described in one or more standards, including RFC 5724 maintained by the Internet Engineering Task Force ("IETF"), among others. According to some embodiments, electronic messages **124***a* need not be initiated as a function of predicted times of distribution. In some cases, electronic messages **124***a* (and **122***a*) may be manually-generated (e.g., other than algorithmically triggered).

[0060] Electronic message **124***a* transmitted to computing device **152***b* may include data configured to present via user interface **156***b* the following reminder message **158***b* to user **144**, who is associated with a pending exhaustion of paper towels: "You're likely running low on {PAPER TOWELS}. Reply 'NOW', if you'd like to order 1 unit of **12** rolls of {BRAND X} paper towels for $17.95 incl. tax and shipping. If you'd like to place a future order, reply with the number of days when you'd like to place your order (e.g., text '7' if you'd like your order to be shipped in 7 days from today)." Data representing a destination account identifier **154***b* may also be transmitted in electronic message **124***a*, and, as such, user interface **156***b* need only receive at least one user input by user **144** to effect replenishment. In this example, destination account identifier ("324178") **154***b* may be implemented as a "shortcode" (e.g., five- or six-digit SMS-based shortcode) associated with either adaptive distribution platform **110** or one or more of merchant computing systems **130***a*, **130***b*, and **130***n*. Destination account identifier **154***b* may also be implemented as a phone number or as any other type of identifier.

[0061] If user **144** desires to ensure a supply of paper towels is not exhausted at or around the projected date of exhaustion, interface **156***b* may be configured to receive an input "NOW," which, in turn, may be transmitted as electronic message **124***b* to adaptive distribution platform **110**. Conversation platform controller **115** generates a control message **121** to, for example, merchant computing system **130***a* to initiate completion of the transaction. Optionally, conversation platform controller **115** may generate a confirmation electronic message for transmission to user computing device **152***b* to confirm acceptance of order. Control message **121** may include financial data associated with user **144** (e.g., credit card information) to initiate authorization at merchant computing system **130***a*, which, in turn, ships the item and optionally sends shipping confirmation to user computing device **152***b* to notify user **144** of an item in transit.

[0062] If user **144** desires to modify a distribution event (e.g., a shipment), interface **156***b* may be configured to receive an input "#," which may represent a value with which to delay the distribution event relative to a predicted distribution event. For example, a user input "7" may be received into user interface **156***b*. Computing device **152***b* then may transmit data indicated an amount of delay as via electronic message **124***b*. According to some examples, a value **159** may be presented that is adapted to particular user **144** or item. For example, if user **144** historically postpones delivery by 7 days for this or other items, a value of "7" may be presented. Alternatively, a value **159** may be based on other users' patterns of postponement. Conversation platform controller **115** generates control message **121** for transmission to, for example, merchant computing system **130***a*, which, in turn, initiates authorization of the transaction, but with a hold on shipment (until an amount of delay expires). For example, control message **121** may include financial data to enable authorization at merchant computing system **130***a*. Optionally, conversation platform controller **115** may generate a confirmation electronic message for transmission to user computing device **152***b* to confirm a "future" order. Subsequently, conversation platform controller **115** may detect that an amount of delay has elapsed (e.g., 7 days), and, in response, may generate control message **121** to cause merchant computing system **130***a* to generate an order, charge the credit card, ship the item, and optionally send shipping confirmation.

[0063] In other examples, a user computing device **152***a* may initiate item replenishment. For example, user interface **156***a* may receive a user input **158***a* of "paper towels," and, optionally, a

destination account identifier ("774169") **154***a*, such as a shortcode (or a phone number, an email address, a URL, etc.). User computing device **152***a* may be configured to transmit data representing user input **158***a* as electronic message **122***b*, which may also include data representing an account identifier (e.g., a mobile phone number) associated with user **144**. Conversation platform controller **115** includes logic configured to extract data representing a portion of text, "paper towels," and analyzes the extracted data to determine that the text entered correlates to a specific item requested for replenishment. Conversation platform controller **115**, for example, can compare text "paper towels" (or alternatively texted as "papr towls," or other like short-hand or erroneous entries) to data stored in one or more repositories **170**, **172**, and **174** to confirm that user **144** is requesting paper towels.

[0064] Once the item is identified, conversation platform controller **115** may be configured to match "paper towels" against data representing UPC information, SKU information, and other information, as well as any other associations to user **144** based on data linked to the user's account identifier. A mobile phone number can be used to link or identify item characteristics associated with past purchases of paper towels by user **144**. In situations in which user **144** has historically purchased paper towels with different item characteristics (e.g., different SKUs, UPCs, etc.), conversation platform controller **115** may select an item based on the latest purchase. According to at least one example, the above-described actions may be sufficient to complete a transaction with at least one of merchant computing systems **130***a*, **130***b*, and **130***n*.

[0065] Item replenishment may proceed as follows, according to some further examples. Conversation platform controller **115** may transmit a summary electronic message **122***a* (not shown) of the item to be replenished, such as "If you would like to order 1 unit of **12** rolls of {BRAND X} paper towels for $17.95 including tax and shipping, please reply 'YES.'" In response, user interface **156***a* may receive a user input "YES," thereby causing user computing device **152***a* to transmit order affirmation as electronic message **122***b*. Responsive to receiving "YES," conversation platform controller **115** may generate a control message **121** for transmission to, for example, merchant computing system **130***a* to initiate completion of the transaction. Optionally, conversation platform controller **115** may generate a confirmation electronic message **122***a* for transmission to user computing device **152***a*. An example of such a confirmatory message is as follows: "Your order has successfully been placed. Thank you. You'll receive another text once your order has been shipped. In case of questions or problems, please call 1-800-555-1234." Control message **121** may include financial data (e.g., credit card information) associated with user **144** to initiate authorization at merchant computing system **130***a*, which, in turn, ships the item and optionally sends shipping confirmation to user computing device **152***a* to notify user **144** of an item in transit. Merchant computing system **130***a* may be configured to generate an order, charge the credit card, ship the item, and optionally send shipping confirmation.

[0066] User-initiate replenishment may be implemented as follows, at least in some examples. Destination account identifier ("774169") **154***a* may be displayed in advertising media (e.g., including printed ads, such as in newspapers and magazines, billboards, and the like), product packing, etc. so a user can review a package of, for example, Brand V protein powder to identify shortcode "774169" (or phone number) and the text to be entered (entry "V powder") to initiate a replenishment of Brand V protein powder (based on linking data related to the mobile phone number of user **144**, such as shipping address, billing information, etc.). Alternatively, destination account identifier **154***a* may encode the product to replenish. For example, a package or other media (e.g., printed or online advertisements) may include the following: "Reorder Brand V protein powder by texting 'NOW' to **7741**," whereby shortcode **7741** may be reserved to order Brand V protein powder at a merchant computing system **130**. Other examples include According to various other examples, short codes, phone numbers (to text replenishment requests), etc. may encode any type of information to, for example, uniquely identify one or more of the following: a specific product, a specific merchant, and a specifically-configured shipment date and time, among other

things.

[0067] FIG. **2** is a diagram depicting an example of a conversation platform controller, according to some embodiments. Diagram **200** depicts a conversation platform controller **215** including a data interface **217**, which, in turn, may include any number of specific interfaces **217***a* to **217***n*, and a transaction controller **280**. Each of specific interfaces **217***a* to **217***n* may be configured to facilitate differently formatted exchanges of data via network **220***a* (e.g., the Internet) among conversation platform controller **215**, other components of an adaptive distribution platform (not shown), and a computing device. In this example, conversation platform controller **215** may be configured to automatically facilitate optimal replenishment and distribution of items, which may include goods or services, based on an adaptive schedule using text messages or any other communication medium. Thus, electronic messages may be text messages, electronic mail messages, audio messages, web page messages, or any other messaging technique that provide sufficient information and data in a message to initiate and complete replenishment of an item. According to some examples, elements depicted in diagram **200** of FIG. **2** may include structures and/or functions as similarly-named or similarly-numbered elements depicted in other drawings.

[0068] Specific interfaces **217***a* to **217***n* may be implemented in hardware or software, or a combination thereof. In some cases, one of specific interfaces **217***a* to **217***n* may be implemented as an applications programming interface ("API"). For example, interface **217***a* may be configured to exchange data via HTML, HTTPS, or any other communication service/protocol between conversation platform controller **215** and web page **210**. As another example, interface **217***b* may be configured to exchange data via POP, SMTP, IMAP, or any other communication service/protocol between conversation platform controller **215** and electronic mail message **220**. Interface **217***n* may be configured to exchange data via SMS, EMS, MMS ("Multimedia Messaging Service") services, or any other communication service/protocol between conversation platform controller **215** and text message application in computing device **242***b* or a proprietary fulfillment application **241** disposed, for example, in computing device **242***a*. Thus, conversation platform controller **215** may be agnostic regarding the various forms of communication channels or media for which data interface **217** provides specialized interfacing.

[0069] Various structures and/or methods described herein may be applied to web pages **210**, emails **220**, multi-media text messages **248***a* and **248***b*, among other forms of communicating request to replenish an item. Web page **210** includes an order or reorder page as a user interface **212** to order or reorder an item (e.g., paper towels) by selecting in interface portion **214** either immediate delivery via input **211** or delayed delivery via input **213** and input **219** (a pull-down menu to select an amount of delay). Data received into interface **212** via inputs **211**, **213**, and **219** may be stored until input ("send") **218** is activated, after which the data may be transmitted contemporaneously (or substantially contemporaneously) to conversation platform controller **215** to initiate an order.

[0070] An electronic message to remind a user of imminent exhaustion of an item may be communicated as an email **220**, which is shown to include an item characteristic 222 in a subject line so a user readily may discern the action required for such a communication. In email body **224**, various delivery options may be embedded as hypertext links to enable a user to order or reorder an "Product P" "now," by selecting link **275***a*, or postponing shipment by 7 days with the selection of link **275***b*. According to some embodiments, the presentation of a link for a "7 day" delay, as a first link, may be due to its relatively high degree of compatibility with user **144** (based on probabilistic determinations at a distribution predictor, which is not shown). The presentation of a link **275***c* for a "3 day" delay, as a yet another link, may be due to its second-highest degree of compatibility. Thus, an adaptive distribution platform including conversation platform controller **215** may adapt presentation of user inputs to accommodate user purchasing and scheduling patterns and preferences to enhance, among other things, users' experiences.

[0071] User computing device **242***a* may include any messaging application **243** configured to

transmit electronic messages based on, for example, SMS, MMS, or any other type of messaging service application. For example, FACEBOOK™ Messenger, TWITTER™, TWILIO™, WHATSAPP™, or any other like application may be suitable for implementation as messaging application **243**, or in support of fulfillment application **241**. In some examples, user computing device **242a** may include executable instructions constituting a fulfillment application **241**, which may be integrated with, or disposed on (e.g., built on), a messaging application layer (including messaging application **243**) to provide enhanced functionality.

[0072] Further to user computing device **242a**, consider that a user may initiate distribution of an item by capturing an image **248a** of product label or code (e.g., UPC), such as by using a camera of user computing device **242a**, to import into interface **246a**. User computer device **242a** may transmit image **248a** as an electronic message to an adaptive distribution platform using shortcode ("774169") **244a**, whereby the adaptive distribution platform may implement image processing, such as optical character recognition or other similar processes to identify an item to replenish based on an image. In some cases, transmitting image **248a** from a known mobile phone number may be sufficient to complete the transaction to ensure that a supply of an item is replenished.

[0073] An adaptive distribution platform may initiate distribution of an item by transmitting message **248b** for presentation in user interface **246b** of user computing device **242b**. As shown, multiple user inputs **249a** and **249b** are presented to receive different user inputs to activate a transaction. Selection of link **249a** generates an electronic message requesting an immediate order for transmission to a destination account identifier **244b**, whereas selection of link **249b** generates an electronic message that requests an order at a delayed time, as defined by the link (e.g., 7 days). According to various embodiments, certain amounts of delay may be presented in descending order from highest probability or likelihood (e.g., 7 days) to a lowest probability (e.g., 5 days), whereby the probabilities may be determined based on a user's preferences and purchasing patterns. Thus, a user likely can find its top three most probable preferences for the amounts of postponement (e.g., 7, 4, and 5 days) with less expended time than otherwise might be the case.

[0074] Transaction controller **280** may include logic configured to control the exchange of data to identify items for replenishment and other actions associated with an order. In text-based requests, transaction controller **280** may operate to parse text submitted as an order to determine a requested product. According to some examples, transaction controller **280** may operate in accordance with a predictive model (e.g., decision tree) that operates on XML formatted messages to generate control messages to replenish an item. Transaction controller **280** may implement deep learning, machine learning, neural networks, fuzzy logic, regression techniques, or other computer-based artificial intelligence techniques to identify a user's request from various types of electronic messages. Note that the above-described implementation for FIG. **2**, as well as other figures, may be applicable to services in accordance with some examples. For example, a user may, as an SMS text messaging service, receive a curated or personalized recommendation as to, for example, a particular shirt or clothing. Personalization may be based on user characteristics and preferences, including item characteristics of past purchases (e.g., shirt motifs, such as Hawaiian shirts, colors, sizes, etc.). A user need only reply "Yes" to order apparel from the curated SMS service. As another example, a user may receive an SMS text message asking whether the user is interested in delivery of a food item for lunch by responding to a text to a food delivery service, a food truck, or any other source.

[0075] FIG. **3** is a diagram depicting an example of operation of a distribution predictor, according to some embodiments. As shown, diagram **300** includes a distribution predictor **314** configured to predict a point in time (or a range of time) at which an item may be exhausted or otherwise ought to be distributed to replenish a supply of an item, which may be any good or service. A good may be a durable good (e.g., goods that do not wear out quickly or are not depletable per use, such as vehicles, jewelry, appliances, etc.) or disposable goods (e.g., goods that may be used up after purchase, such as food, toiletries, clothes, and the like). A prediction may be determined periodically, aperiodically, in real-time, substantially in real-time, at any time, etc. In some

examples, distribution predictor **314** may include a distribution calculator **316**, a distribution optimizer **318**, and a zone generator **319**. In other examples, such as that shown and described in connection with FIG. **13** may be configured functionally and structurally differently and is not limited to the examples shown and described here. According to some examples, elements depicted in diagram **300** of FIG. **3** may include structures and/or functions as similarly-named or similarly-numbered elements depicted in other drawings.

[0076] In the example shown, distribution calculator **316** is shown configured to generate predicted times of distribution subsequent to, for example, an initial order and distribution (i.e., shipment) at time ("D1") **363***a*. Examples of predicted times of distribution, as shown shipment rate implementation 360, may include a predicted time ("D.sub.2") **363***b* of distribution, a predicted time ("D.sub.3") **363***c* of distribution, predicted time ("D.sub.4") **363***d* of distribution. Predicted times **363***b*, **363***c*, and **363***d* of distribution are predicted distribution events that may be a function of a user **331** (e.g., a user's usage rates and consumption patterns) or an item **333** and its characteristics (e.g., based on usage rates and consumption patterns of a group of users over one or more merchant computer systems). Note that predicted times **363***b*, **363***c*, and **363***d* of distribution need not be predicted as if under a subscription. That is, the depiction of predicted times **363***b*, **363***c*, and **363***d* of distribution is for purposes of discussion, and a predicted time of distribution need not be predicted beyond a next shipment that replenishes an item nearing exhaustion.

[0077] Predicted times **363***b*, **363***c*, and **363***d* of distribution may be correlated to a period of time, such as periods of time p1 and p2, based a rate of depletion of an item. For example, a period of time, p, may define an amount of time (e.g., a time interval) between an initial supply level (e.g., a full supply on date of initial purchase, such as time ("D1") **363***a*) and a predicted date of exhaustion, such as time ("D.sub.2") **363***b*, which may coincide with a predicted time of distribution (e.g., time of delivery). To illustrate, a distribution event at time ("D.sub.2") **363***b* may be timed to occur at the 30th day after a user has purchased at time ("D1") **363***a* a bottle of vitamin supplements having 30 tablets that are taken once a day. Thus, distribution predictor **314** may generate data **322** representing periods **323** of time, such as periods of time ("p.sub.1") **362***a* and **362***b*, both of which are depicted as 1.5 units of time, and period of time ("p.sub.2") **362***c* is depicted as 1 unit of time. In some examples, distribution optimizer **318** may receive feedback relating to ordering patterns of user **331** (e.g., user **331** typically requests shipments prior to a date of exhaustion). Based on the feedback, distribution optimizer **318** may be configured to adjust a predicted distribution event at time **363***d* and a period **362***c* of time, which is shorter than periods **362***a* and **362***b* of time. In other examples, distribution optimizer may receive, gather, request, call, or otherwise electronically obtain, either as digital data or analog signal input, data indicative of a predicted distribution event and generate distribution options using techniques such as those shown and described below.

[0078] Zone generator **319** may be configured to determine a zone of time in which depletion of an item is predicted. A zone of time, and its duration, may be adapted relative to a distribution event or a period of time since, for example, a known supply level of an item (e.g., a full supply at a previous purchase). As shown, zone generator **319** may be configured to determine a zone **368***a* of time associated with time **363***b*, a zone **368***b* of time associated with time **363***c*, and a zone **368***c* of time associated with time **363***d*, each of which may be a range of time preceding a distribution event. In some cases, zone generator **319** may be configured to determine a zone **368***d* of time that succeeds a distribution event at time **363***d*. Zone **368***c* of time may be different (e.g., shorter) than zones **368***a* and **368***b* of time based on respective periods of time, according to some examples.

[0079] Distribution predictor **314** also may be configured to associate a point in time with a zone of time, the point in time defining a moment at which an electronic message may be transmitted to a computing device (e.g., a mobile phone) to inform a user of the pending exhaustion of an item and to provide an opportunity to replenish the item in a configurable manner. As shown, distribution predictor **314** may associate a point **370***a* to zone **368***a* of time, a point **370***b* of time to a zone **368***b*

of time, and a point **370c** to zone **368c** of time, whereby an adaptive distribution platform (not shown) may generate electronic reminder messages at points **370a**, **370b**, and **370c** of time. Thus, an electronic reminder message transmitted at, for example, point **370a** of time is associated with a zone **368a** of time. Consider an example in which an electronic message is sent at point **370a** of time, which may be eight (8) days prior to time **363b**. Thus, zone **368a** of time may be subdivided into, or otherwise include, various times at which to delay initiation of an order. For example, an electronic reminder message may be sent to a user eight (8) days prior to time **363b**, whereby the electronic reminder message may provide user inputs to delay distribution by "7," "6," "4," "2," days, or any other amount of delay, within zone **368a** of time.

[0080] According to some embodiments, distribution predictor **314** may be configured to receive and/or determine data for one or more item characteristics that may include, but are not limited to, data representing one or more characteristics of an item, shipment rate-related data **302**, indicator-related data **304**, and usage-related data **308**, and the like. Note that data **302**, **304**, and **308** may be referred to as examples of item characteristics, according to various examples. Examples of some item characteristics may include a product or product type, a service or service type, SKU data, UPC data, etc. for the same or similar items, or complementary and different items (e.g., complementary or correlatable products may be predicted to have similar predicted times of distribution or rates of consumption and/or depletion). Examples of shipment rate-related data **302** may include a number of purchases or orders per user, per group of users, or per item, a number of shipments, etc. Examples of indicator-related data **304** may include data representing items characteristics that may be correlatable to, for example, order and shipment rate-related data (e.g., a "take rate," a "cancellation rate," etc., or any other data type, such as an "adoption rate" of platform-initiated or user-initiated reordering, a "conversion rate" of responding to reminder messages as a function of user and item, etc.), which, in turn, may be used to derive a predicted time of distribution. The term "take rate" may include data representing a rate at which users "take" or implement a presented value of delay (e.g., delay by "7" days) as a default amount of delay, according to some examples. The term "cancellation rate" may include data representing a rate at which users "cancel" an order (e.g., based on, for example, frustrations of over-supplied or under-supplied amounts), according to some examples.

[0081] Examples of usage-related data **308** may include data representing attributes specifying contextual-related information associated with an item, such as, but not limited to, user-related characteristics, such as demographic information, purchasing-related data (e.g., purchase patterns), and the like. In some cases, usage-related data may include attributes **340** describing items historically purchased by a user **341** (e.g., patterns of a parent), as well as attributes **344** describing items historically purchased by associated users **345** (e.g., patterns of a grandparent) or a subpopulation or a population of which a user belongs. Also, usage-related data may include sale-related and shipment-related attributes **348** provided by merchant computer systems **349**. Data representing attributes **340**, **344**, and **348** may be stored in repositories **342**, **346**, and **350**, according to some examples.

[0082] FIG. **4** is a diagram depicting an example of a flow, according to some embodiments. At **402** of flow **400**, data representing a zone of time in which depletion of an item (e.g., a consumable item) may be predicted. In some examples, the zone of time may be associated with a predicted distribution event (e.g., a predicted time of distribution), which may be based on a calculated usage rate related to any of a user, a group of users, and one or merchant computer systems. At **404**, a predicted time of distribution may be monitored relative to a time at which to replenish a consumable item, for example, prior to exhaustion of an item, which may be any good or service. At **406**, a first electronic message may be transmitted via a network to a user computing device. The first electronic message may include one or more item characteristics associated with a consumable item to be replenished. Further, data representing the first electronic message may be configured to present at least one item characteristic (e.g., a product type or brand, a product

classification (e.g., paper towels), a price, an indication to delay an order, etc.) at a display portion of a user interface. According to various examples, the first electronic message may be a reminder message if replenishment is platform-initiated, or a confirmatory message if user-initiated. At **408**, a second electronic message from the user computing device may be received into, for example, an adaptive distribution platform. In some examples, the second electronic message may be sufficient to initiate an order, with or without a delay, including payment and shipment. At **410**, a control message may be transmitted to a merchant computing system to initiate distribution of a replenishing consumable item. For example, the distribution of an item may be to a geographic location (e.g., address) associated with an account (e.g., a user account having, for example, data representing a shipping address).

[0083] FIG. **5** depicts an example of another flow, according to some embodiments. Flow **500** may apply to platform-initiated replenishment, according to various examples. At **502**, a point of time coinciding (or substantially coinciding) with a zone of time may be determined. For example, data representing a point of time may represent a date (e.g., as defined by year, month, day and time) that may be compared against a date range associated with a zone of time. When the point of time falls within the zone of time, replenishment may be initiated by, for example, and an adaptive distribution platform. At **504**, an electronic message reminding a user may be transmitted. The electronic message may include data representing one or more item characteristics. Further, the electronic message may include one or more control user inputs to adapt scheduling of distribution of the item. A control user input, or user input, may include specifying ordering "NOW," or at any number of delayed units of time (e.g., delay by 3 days). At **506**, an electronic message that includes a request for replenishment may be received into, for example, an adaptive distribution platform.

[0084] At **508**, a determination is made whether replenishment may be adjusted.

[0085] If no adjustment is detected, flow **500** continues to **512**, otherwise flow **500** continues to **510**. For example, if no delay in replenishment is detected at **508**, then flow **500** continues to **512**, at which a control signal may be transmitted (e.g., to a merchant computing system) to initiate scheduled delivery of an item, which may be any good or service. For example, a confirmation electronic message may be optionally generated at **512** for transmission to a user computing device to confirm acceptance of order. The control message may include financial data (e.g., credit card information) to initiate authorization of payment at a merchant computing system. If delay in replenishment is detected at **508**, then flow **500** continues to **510**, at which transmission of the control signal may be recalibrated. For example, a control signal may be generated for transmission to a merchant computing system to initiate authorization of the transaction with a hold on shipment. Thus, the recalibrated control signal may provide financial data for authorization of payment, but may postpone or withhold authorization to complete the transaction, including shipment. After an amount of delay has elapsed (e.g., 7 days), as determined at **510**, another control message may be released for transmission to cause the merchant computing system to generate an order, charge the credit card, ship the item, and optionally send shipping confirmation.

[0086] At **514**, a predicted distribution event may be adjusted, which, in turn, may modify a zone of time. For example, a predicted distribution event may be optimized based on feedback or analysis of data trends associated with users and merchants. A value representing a predicted distribution event or date may be optimized by including a user's monitored shipment delay preference, whereby the optimized predicted time of distribution may be a modified distribution event. For example, a particular user may prefer to deviate from a predicted distribution event by delaying or expediting shipping (e.g., repeatedly). Thus, a reminder message may be generated in accordance with the user's preference, which may be embodied in presented amounts of delay or in a modified date of predicted exhaustion.

[0087] According to various examples described herein, the structures and/or processes set forth to replenish items may apply to one or more items (e.g., a single item, or multiple items). In some examples, a point of time at **502** may be determined that substantially coincides with a zone of time

for multiple items, such as a vitamin regimen in which a user consumes different vitamin supplement tablets (e.g., vitamins A, B, D, E, etc.) at a daily rate. In some examples, a user may set up via a user computing device a list of vitamins to be shipped at a recurring date, or predicted dates based on predicted dates of depletion or exhaustion (e.g., a time of distribution). The list may be entered via mobile phone, email, phone, webpage, etc., whereby and adaptive distribution platform may manage the tracking and delivering of multiple bottles of vitamins either in accordance with a list, or by calculating predicted times of distribution or delivery (e.g., based on computed or projected usage rates for each of the vitamins). For example, bottles of 30 vitamin tablets may be included in a list every month, whereas bottles of 60 vitamin tablets may be included in the list every other month.

[0088] At **504**, an electronic message, such as a text message, and may be transmitted from adaptive distribution platform to a user computing device, whereby the electronic message may include a list of items associated with a predicted optimal point in time at which one or more items in the list are depleted or substantially depleted. For example, the electronic message may indicate: "The following is a list of items that you may wish to replenish. Reply 'Yes' if you wish to replenish each item in the list, or reply with a corresponding number for those items you wish to replenish. For vitamin A enter '1,' for vitamin B enter '2,' for vitamin Center '3,' for vitamin E enter '4,' and cod liver oil tablets enter '5' (separated by space or comma)." A user desiring to replenish vitamins C and E then would enter and text "3 4" in reply at **506**. At **508**, one or more items (e.g., bottles of vitamins) may be delayed by any amount of time. For example, a user may enter "1p7d," "2p1m," and "5p1y," where "p" indicates an instruction to "postpone" delivery by an amount of time expressed by "d" (day), "m" (month), or "y" (year). In this example, the user is requesting to postpone delivery of vitamin A by 7 days ("1p7d, where 1=vitamin A, p=postpone, 7=number of time units to delay, and d=time units), postpone delivery of vitamin B for one month, and postpone delivery of cod liver oil tablets by one year. The delivery of vitamins A and B, as well as cod liver oil, may be recalibrated at **510** to comply with the user's requested delivery postponements. At **512**, a control signal to ship vitamins C and E may be transmitted to, for example, a merchant computing system.

[0089] FIG. **6** depicts an example of yet another flow, according to some embodiments. Flow **600** may apply to user-initiated replenishment, according to various examples. At **602**, multiple requests for replenishment for various items may be monitored by, for example, an adaptive distribution platform. Such requests may be associated with various zones of time associated with various items. At **604**, a request associated with a user computing system account for a particular item may be detected. In some examples, data encapsulated in an electronic request message at **604** may be sufficient to complete an order for item replenishment. At **606**, data from electronic messages including a request for item replenishment may specify, for example, data representing an item characteristic (e.g., a classification, such as "paper towels," or product type, such as a brand name). For example, a request for replenishment may include the text "paper towels." Thus, the text "paper towels" may be extracted for analysis to determine or confirm that the text entered correlates to a specific item requested for stored item representations associated with a user computing system account. For example, an account identifier, such as a mobile phone number (or email address, etc.), may be associated with a user computing device. A merchant computing system may include data representing mobile phone number, which may be accessible by an adaptive distribution platform. Thus, logic in the adaptive distributions platform may be configured to link the mobile phone number to data representing a consumer profile, including, but not limited to, a default shipping address, payment instrument, etc. The mobile phone number may also be used to identify the user's past order history to identify past items that may be relevant to the item identified in the extracted data. At **610**, a control signal may be transmitted to a merchant computing system (e.g., via a commerce platform controller) to initiate scheduled delivery.

[0090] FIG. **7** is a diagram depicting an example of operation for a distribution predictor to

generate predictive times of distribution based on derived usage data, according to some embodiments. Diagram **700** depicts a distribution predictor **714** including an item characteristic correlator **717**, which may be configured to identify one or more item characteristics **744** with which to correlate to determine or derive data that may be further used to derive or predict distribution events, times of distribution, zones of time, and associated points of time, any of which may as encapsulated in predictive distribution data **790**. In some examples, item characteristic correlator **717** may be configured to generate (or characterize) an aggregated item characteristic **729** that may specify attributes of a particular aggregated item characteristic aggregated for a number of users **740** (over users **742***a*, **742***b*, and **742***c*).

[0091] To illustrate, consider that item characteristic correlator **717** is configured to identify usage rates **752***a* to **752***c* (e.g., a rate at which a product or service is reordered, or consumed or depleted) for corresponding user accounts **742***a* to **742***c* (e.g., associated with user phone numbers). In this example, consider that users **742***a* to **742***c* purchase a "laundry detergent" having usage rates **752***a* to **752***c*. Usage rates between "0" and "1" (e.g., usage amounts during a spring season), usage rates between "1" and "2" (e.g., usage amounts during a summer season), and usage rates between "2" and "3" (e.g., usage amounts during a fall season). It may be that users **742***a* to **742***c* play football during the fall, and consequently use more laundry detergent due to football practices and games in inclement weather (e.g., due to muddy fields, etc.) Thus, distribution predictor **714** may be able to discern patterns **750** of usage. Further, distribution predictor **714** may aggregate the usage rates to form an aggregated usage rate pattern **730** for a group of users **740**. Based on aggregated usage rate pattern **730**, distribution predictor **714** may be able to generate or predict an aggregated distribution event or an aggregated time of distribution **790**.

[0092] Distribution predictor **714** may also use other types of data with which to evaluate when calculating a predicted time of distribution. Examples of such data are shown in diagram **700** and may include activity characteristics data **781** (e.g., characteristics indicative of participation in a sport or task), geographic characteristic data **782**, demographic characteristic data **783** (e.g., aggregated user data), user-specific characteristic data **784** (e.g., history of purchases by a user, etc.), product characteristics data **785**, complementary product characteristics data **786**, and other item characteristics data **787**.

[0093] Based on the above, distribution predictor **714** may be configured to identify a usage rate **720** of a new user **799**, and further configured to match the new usage rate **720** against aggregated usage rate **729** of aggregated usage rate pattern **730** to predict, for example, that user **799** "plays football," as well as other characteristics of the user with which to derive an optimized predicted time of distribution. According to some examples, distribution predictor **714** may predict future participation in an activity or an increase in usage rate during interval **728**. Thus, distribution predictor **714** may adapt a predicted time of distribution so as to prepare a user for increased usage rates by adjusting the periods of time prior to a modified time of distribution to reflect an increased laundry detergent amount or a decreased amount of time between shipments. Note that the example described in diagram **700** is not intended to be limiting to laundry detergent, but may be applicable to any characteristic of an item or other items.

[0094] FIG. **8** illustrates examples of various computing platforms configured to provide various functionalities to predict a time of distribution of an item relative to an adaptive schedule, according to various embodiments. In some examples, computing platform **800** may be used to implement computer programs, systems, platforms, applications, methods, processes, algorithms, or other software, as well as any firmware or hardware implementation thereof, to perform the described techniques.

[0095] In some examples, "system" may refer to or include the description of a computer network system or topology associated with a map, network, layout, environment, or the like of computing resources that are used to implement a feature, function, process, element, component, part, or multiple instances thereof, without any particular limitation as to the type, configuration,

programming or formatting language, service, class, resource, specification, protocol, or other attributes thereof. As used herein, "application" may also be used interchangeably or synonymously with, or refer to a computer program, software, program, firmware, or any other term that may be used to describe, reference, or refer to a logical set of instructions that, when executed, performs a function or set of functions within a computing system or machine, regardless of whether physical, logical, or virtual and without restriction or limitation to any particular implementation, design, configuration, instance, or state. Also as used below, "platform" may refer to any type of computer hardware (hereafter "hardware") and/or software environment using one or more local, remote, distributed, networked, or computing cloud (hereafter "cloud")-based computing resources (e.g., computers, clients, servers, tablets, notebooks, smart phones, cell phones, mobile computing platforms or tablets, and the like) to execute an application, such as those described above, without restriction or limitation to any particular implementation, design, configuration, instance, or state. Distributed resources such as cloud networks (also referred to interchangeably as "computing clouds," "storage clouds," "cloud networks," or, simply, "clouds," without restriction or limitation to any particular implementation, design, configuration, instance, or state) may be used for processing and/or storage computing resources, without restriction or limitation to any particular implementation, design, configuration, instance, or state of a device or machine, physical, virtual, logical, or otherwise. As used herein, data may be refer to any data type configured to be received by a system, platform, application, or other computing device or processor, which may include, but is not limited to, digital and/or analog (e.g., binary) data in any type of format or schema, including, but not limited to files, packets, segments, frames, partitions, containers, jar files, characters, strings, text, integers, real numbers, Boolean, alphanumeric, ASCII, RSS, or any other type beyond those listed here), or others, without limitation or restriction.

[0096] In some examples, data may be processed from various sources, including, but not limited to local, remote, distributed, networked, or cloud-based systems, applications, platforms, programs, databases, or other data sources such as data streams or sources of data that are generated from various types of applications or clients, without limitation to language, format, or protocol. As used herein, data may be stored in various types of data structures including, but not limited to databases, data repositories, data warehouses, data stores, or other data structures configured to store data in various computer programming languages and formats in accordance with various types of data schemas such as SQL, MySQL, NoSQL, DynamoDB™ from Amazon® Web Services, Inc. of Seattle, Washington, FMP, Oracle®, relational or unstructured, or others, without limitation or restriction to any particular instance or implementation. Further, references to databases, data structures, or any type of data storage facility may include any embodiment as a local, remote, distributed, networked, cloud-based, or combined implementation thereof. For example, social networking applications being used on different types of devices may be generating data in different forms, formats, and data storage schema on different types of data storage devices and databases that are configured to store data generated for text messaging, image, audio or video streams, blog (i.e., World Wide Web-posted log) or vlog (i.e., video log) entries, instant messages, disappearing messages (e.g. snaps using Snapchat™, simple message system (i.e., SMS, IRC, and the like) messages, and the like, without limitation or restriction. Data may be generated from "tweets" or messages from applications such as Twitter® of San Francisco, California, "snaps" using the Snapchat® application such as those developed by Snap® of Venice, California, or "messenger" posts using applications such as Facebook® of Menlo Park, California. In some examples, data may be formatted using simple messaging data communication and transmission protocols such as Internet Relay Chat (IRC), SMS, instant messaging (IM), or others, without limitation. In other examples, data may be generated, transmitted, received, transformed, or otherwise operated on in other forms and formats using programming and formatting languages intended to transmit, transfer, or transport data at different levels of an application architecture (as described in greater detail below). For example, Java®, JavaScript®, JSON, Python™, XML,

HTML, SQL, MySQL, R, SPARQL, Hadoop, and other data formats and programs may be used in conjunction with the techniques described herein by application **102**, which may be implemented to provide messaging functionality at the application layer of a layered "stack" application architecture following a standard such as the Open Systems Interconnect (OSI) model or others.

[0097] In some cases, computing platform **800** or any portion (e.g., any structural or functional portion) can be disposed in any device, such as a computing device **890***a*, mobile computing device **890***b*, and/or a processing circuit in association with implementing any of the various examples described herein.

[0098] Computing platform **800** includes a bus **802** or other communication mechanism for communicating information, which interconnects subsystems and devices, such as processor **804**, system memory **806** (e.g., RAM, etc.), storage device **808** (e.g., ROM, etc.), an in-memory cache (which may be implemented in RAM **806** or other portions of computing platform **800**), a communication interface **813** (e.g., an Ethernet or wireless controller, a Bluetooth controller, NFC logic, etc.) to facilitate communications via a port on communication link **821** to communicate, for example, with a computing device, including mobile computing and/or communication devices with processors, including database devices (e.g., storage devices configured to store any types of data, etc.). Processor **804** can be implemented as one or more graphics processing units ("GPUs"), as one or more central processing units ("CPUs"), such as those manufactured by Intel® Corporation, or as one or more virtual processors, as well as any combination of CPUs and virtual processors. Computing platform **800** exchanges data representing inputs and outputs via input-and-output devices **801**, including, but not limited to, keyboards, mice, audio inputs (e.g., speech-to-text driven devices), user interfaces, displays, monitors, cursors, touch-sensitive displays, LCD or LED displays, and other I/O-related devices.

[0099] Note that in some examples, input-and-output devices **801** may be implemented as, or otherwise substituted with, a user interface in a computing device associated with a subscriber or user account identifier in accordance with the various examples described herein.

[0100] According to some examples, computing platform **800** performs specific operations by processor **804** executing one or more sequences of one or more instructions stored in system memory **806**, and computing platform **800** can be implemented in a client-server arrangement, peer-to-peer arrangement, or as any mobile computing device, including smart phones and the like. Such instructions or data may be read into system memory **806** from another computer readable medium, such as storage device **808**. In some examples, hard-wired circuitry may be used in place of or in combination with software instructions for implementation. Instructions may be embedded in software or firmware. The term "computer readable medium" refers to any tangible medium that participates in providing instructions to processor **804** for execution. Such a medium may take many forms, including but not limited to, non-volatile media and volatile media. Non-volatile media includes, for example, optical or magnetic disks and the like. Volatile media includes dynamic memory, such as system memory **806**.

[0101] Known forms of computer readable media includes, for example, floppy disk, flexible disk, hard disk, magnetic tape, any other magnetic medium, CD-ROM, any other optical medium, punch cards, paper tape, any other physical medium with patterns of holes, RAM, PROM, EPROM, FLASH-EPROM, any other memory chip or cartridge, or any other medium from which a computer can access data. Instructions may further be transmitted or received using a transmission medium. The term "transmission medium" may include any tangible or intangible medium that is capable of storing, encoding or carrying instructions for execution by the machine, and includes digital or analog communications signals or other intangible medium to facilitate communication of such instructions. Transmission media includes coaxial cables, copper wire, and fiber optics, including wires that comprise bus **802** for transmitting a computer data signal.

[0102] In some examples, execution of the sequences of instructions may be performed by computing platform **800**. According to some examples, computing platform **800** can be coupled by

communication link **821** (e.g., a wired network, such as LAN, PSTN, or any wireless network, including WiFi of various standards and protocols, Bluetooth®, NFC, Zig-Bee, etc.) to any other processor to perform the sequence of instructions in coordination with (or asynchronous to) one another. Computing platform **800** may transmit and receive messages, data, and instructions, including program code (e.g., application code) through communication link **821** and communication interface **813**. Received program code may be executed by processor **804** as it is received, and/or stored in memory **806** or other non-volatile storage for later execution.

[0103] In the example shown, system memory **806** can include various modules that include executable instructions to implement functionalities described herein. System memory **806** may include an operating system ("O/S") **832**, as well as an application **836** and/or logic module(s) **859**. One or more logic modules **859** may each be configured to perform at least one function as described herein.

[0104] The structures and/or functions of any of the above-described features can be implemented in software, hardware, firmware, circuitry, or a combination thereof. Note that the structures and constituent elements above, as well as their functionality, may be aggregated with one or more other structures or elements. Alternatively, the elements and their functionality may be subdivided into constituent sub-elements, if any. As software, the above-described techniques may be implemented using various types of programming or formatting languages, frameworks, syntax, applications, protocols, objects, or techniques. As hardware and/or firmware, the above-described techniques may be implemented using various types of programming or integrated circuit design languages, including hardware description languages, such as any register transfer language ("RTL") configured to design field-programmable gate arrays ("FPGAs"), application-specific integrated circuits ("ASICs"), or any other type of integrated circuit. According to some embodiments, the term "module" can refer, for example, to an algorithm or a portion thereof, and/or logic implemented in either hardware circuitry or software, or a combination thereof. These can be varied and are not limited to the examples or descriptions provided.

[0105] In some embodiments, modules **859** of FIG. **8**, or one or more of their components, or any process or device described herein, can be in communication (e.g., wired or wirelessly) with a mobile device, such as a mobile phone or computing device, or can be disposed therein.

[0106] In some cases, a mobile device, or any networked computing device (not shown) in communication with one or more modules **859** or one or more of its/their components (or any process or device described herein), can provide at least some of the structures and/or functions of any of the features described herein. As depicted in the above-described figures, the structures and/or functions of any of the above-described features can be implemented in software, hardware, firmware, circuitry, or any combination thereof. Note that the structures and constituent elements above, as well as their functionality, may be aggregated or combined with one or more other structures or elements. Alternatively, the elements and their functionality may be subdivided into constituent sub-elements, if any. As software, at least some of the above-described techniques may be implemented using various types of programming or formatting languages, frameworks, syntax, applications, protocols, objects, or techniques. For example, at least one of the elements depicted in any of the figures can represent one or more algorithms. Or, at least one of the elements can represent a portion of logic including a portion of hardware configured to provide constituent structures and/or functionalities.

[0107] For example, modules **859** of FIG. **8** or one or more of its/their components, or any process or device described herein, can be implemented in one or more computing devices (i.e., any mobile computing device, such as a wearable device, such as a hat or headband, or mobile phone, whether worn or carried) that include one or more processors configured to execute one or more algorithms in memory. Thus, at least some of the elements in the above-described figures can represent one or more algorithms. Or, at least one of the elements can represent a portion of logic including a portion of hardware configured to provide constituent structures and/or functionalities. These can

be varied and are not limited to the examples or descriptions provided.

[0108] As hardware and/or firmware, the above-described structures and techniques can be implemented using various types of programming or integrated circuit design languages, including hardware description languages, such as any register transfer language ("RTL") configured to design field-programmable gate arrays ("FPGAs"), application-specific integrated circuits ("ASICs"), multi-chip modules, or any other type of integrated circuit.

[0109] For example, modules **859** of FIG. **8**, or one or more of its/their components, or any process or device described herein, can be implemented in one or more computing devices that include one or more circuits. Thus, at least one of the elements in the above-described figures can represent one or more components of hardware. Or, at least one of the elements can represent a portion of logic including a portion of a circuit configured to provide constituent structures and/or functionalities.

[0110] According to some embodiments, the term "circuit" can refer, for example, to any system including a number of components through which current flows to perform one or more functions, the components including discrete and complex components. Examples of discrete components include transistors, resistors, capacitors, inductors, diodes, and the like, and examples of complex components include memory, processors, analog circuits, digital circuits, and the like, including field-programmable gate arrays ("FPGAs"), application-specific integrated circuits ("ASICs"). Therefore, a circuit can include a system of electronic components and logic components (e.g., logic configured to execute instructions, such that a group of executable instructions of an algorithm, for example, and, thus, is a component of a circuit). According to some embodiments, the term "module" can refer, for example, to an algorithm or a portion thereof, and/or logic implemented in either hardware circuitry or software, or a combination thereof (i.e., a module can be implemented as a circuit). In some embodiments, algorithms and/or the memory in which the algorithms are stored are "components" of a circuit. Thus, the term "circuit" can also refer, for example, to a system of components, including algorithms. These can be varied and are not limited to the examples or descriptions provided.

[0111] FIG. **9** is a diagram depicting another example of an adaptive distribution platform, according to some embodiments. Diagram **900** depicts an example of adaptive distribution platform **910** that may be configured to facilitate automatic distribution of items in accordance with an adaptive schedule. Adaptive distribution platform **910** may be configured to exchange one or more electronic messages via networks **920***a* and **920***b* with one or more of computing devices **942** and **952***b* for users **944**, which may be a consumer. In the example shown, adaptive distribution platform **910** may include a distribution predictor **914** as well as other elements (not shown), any of which may include logic, whether implemented in hardware or software, or a combination thereof. Distribution predictor **914** is shown to include a distribution calculator **916**, a distribution optimizer **918**, and a zone generator **919**. Further, adaptive distribution platform **910** may also be configured to access one or more of a user repository **970** configured to store at least data describing user characteristics, a platform repository **972** configured to store platform-related characteristics in data, including item characteristic data **902**, and a merchant repository **974** configured to store user-identification data as well as merchant-related information (e.g., production information, inventory information, etc.). User-identification data may be based on, for example, a unique identifier including on one or more of a location (e.g., a consumer's shipping address), a payment instrument identifier (e.g., a credit card number, etc.) and an electronic account identifier (e.g., identified by a mobile phone number or the like), according to some embodiments. According to some examples, elements depicted in diagram **900** of FIG. **9** may include structures and/or functions as similarly-named or similarly-numbered elements depicted in other drawings, such as FIGS. **1** to **3** and FIG. **8**, among others.

[0112] Adaptive distribution platform **910**, as described herein, may be configured to facilitate "adaptive" scheduling services, as described herein, via a computing system platform for multiple online or Internet-based retailers and service providers, both of which may be referred to as

merchants. In this example, a merchant may be associated with a corresponding one of merchant computing systems **930***a*, **930***b*, or **930***n* that includes one or more computing devices (e.g., processors, servers, etc.), one or more memory storage devices (e.g., databases, data stores, etc.), and one or more applications (e.g., executable instructions for performing adaptive subscription services, etc.). Examples of merchant computing systems **930***a*, **930***b*, or **930***n* may be implemented by any other online merchant.

[0113] Distribution predictor **914** is further shown to include an information feedback predictor **914***a*, which may be configured to predict a date of consumption with which to solicit feedback regarding a replica of an item, the replica being a portion or "sample" of an item. A replica, therefore, may be one or more units of an item configured to provide a recipient an opportunity to experience the item, whereby a recipient may learn information regarding the item (e.g., learning information regarding the benefits of using the item, such as the health-related benefits of "Omega-3" fatty acid-based health supplements). Units of an item may describe a serving size, such as a number of Omega-3 tablets, a volumetric amount (e.g., a number of milliliters or ounces of shampoo), and the like.

[0114] According to various examples, information feedback predictor **914***a* may be configured identify one or more samples of items to transmit to a location associated with an electronic account for consumer **944**. Further, information feedback predictor **914***a* may be configured to automatically generate a communication channel **926** to facilitate communication via one or more electronic messages **924***a* and **924***b* to identify whether a sample, for example, is consumed and the results therefrom. In at least one example, electronic message may be formatted and transmitted as a short message service ("SMS") message or equivalents thereof. In at least some embodiments, information feedback predictor **914***a* may be configured to generate data automatically at a determined point in time (or time interval) that may be optimized to solicit feedback by transmitting an electronic message requesting feedback of a consumed sample. For example, data representing a request for feedback may be transmitted as electronic message **924***a* at a point in time at which a particular consumer **944** may likely have predictively consumed at least one unit of consumption to render a position for generating feedback information and data.

[0115] Diagram **900** depicts information feedback predictor **914***a* as including a consumption calculator **916***a*, a feedback optimizer **918***a*, and a feedback zone generator **919***a*, each of which may include logic, whether implemented in hardware or software, or a combination thereof, similar or equivalent to that in distribution calculator **916**, distribution optimizer **918**, and zone generator **919**, respectively. Logic in one or more of distribution calculator **916**, distribution optimizer **918**, and zone generator **919** may be modified or supplemented to facilitate the functionality of consumption calculator **916***a*, feedback optimizer **918***a*, and feedback zone generator **919***a*, according to at least some examples. In one example, consumption calculator **916***a* may be configured to calculate a time (e.g., a time interval) at which one or more units of consumption of a sample may be consumed. Responsive to the calculated time, information feedback predictor **914***a* may generate an electronic message requesting feedback at this point.

[0116] In another example, feedback optimizer **918***a* may be configured to optimize a determination of a time at which one or more units of consumption of a sample may be consumed. Hence, feedback optimizer **918***a* may optimize a calculated time of consumption as determined by consumption calculator **916***a*. In particular, feedback optimizer **918***a* may be configured to adapt a computed time interval in which consumption is likely to predict a date of consumption by user **944** based on, for example, user characteristics, such as, but not limited to, a consumer's usage rate (or "consumption rate") of an item, demographic characteristics of consumer **944**, data representing patterns of historic purchasing and/or consumption behaviors, and the like. For example, consumer **944** may historically consume vitamins or supplements at a rate less than recommended (e.g., a user may consume 1 tablet a day rather than the recommended 2 tablets a day), and, thus, consumer **944** may consume an item at a different rate. Hence, feedback optimizer **918***a* may be configured to

adapt optimally data representing consumption rates (and dates) to conform to consumption (e.g., usage) patterns of a particular user **944**. Responsive to data representing characteristics of a user and/or item, information feedback predictor **914***a* may generate an electronic message requesting feedback at this point.

[0117] In yet another example, feedback zone generator **919***a* may be configured to adjust an adapted consumption date or range of dates, responsive to data generated at a user computing device, such as computing device **952***b*. For example, a user computing system **942** and/or associated electronic account for consumer **944** may include data indicating whether a unit of consumption may have been consumed or may be pending (e.g., a user **944** may yet to sample a portion of an item during an interval of time). Thus, an input may be received as data signals representing user input into interface **956***b* to initiate, for example, an adjusted interval of time in which to solicit feedback. Consider that user **944** may have returned from a two (2) week vacation and received a package containing a sample. The two week delay may be accommodated or addressed by enabling mobile computing device **952***b* (and/or adaptive distribution platform **910**) and associated software applications to adjust the period in which to provide feedback.

[0118] To illustrate operation of information feedback predictor **914***a*, consider an example in which at least one sample **927***a* is included in a shipment of a purchased item transmitted via, for example, U.S. Postal Service or any other carrier. Information feedback predictor **914***a* may be configured to predict a date of consumption of at least a part of a replica or sample **927***a*. Note that sample **927***a* can be shipped or obtained independently from a purchased item. According to various examples, a predicted date of consumption may be based on one or more user characteristics and/or one or more item characteristics, for example. Examples of user characteristics include data representing attributes specifying contextual-related information associated with user **944**, such as, but not limited to, user-related characteristics, such as demographic information, purchasing-related data (e.g., purchase patterns), and the like. In some cases, usage-related data may include attributes describing items historically purchased by a user, as well as an electronic account identifier, a payment instrument identifier (e.g., a credit card number), a location (e.g., an address), and other user-related information. User characteristics may also be mapped or otherwise associated with one or more item characteristics. For example, a usage rate of an item may be associated with a particular user (e.g., consumer **944** consumes or uses a product, such as shampoo, at a particular rate of consumption or depletion). Also, user characteristics may also include aggregated user characteristics that represent user-related information of a subpopulation from which predictions regarding, for example, selection of sample **927***a* or a consumption date may be determined. Examples of item characteristics include, but are not limited to, one or more other item characteristics **102** of FIG. **1**.

[0119] Referring back to FIG. **9**, information feedback predictor **914***a* may be configured to receive data representing a time of disposition or shipment of sample **927***a*, which may be used as a reference with which to predict consumption, and, in turn, predict a time to generate an electronic message **924***a* to solicit feedback. In at least one example, data representing a time of disposition or shipment of sample **927***a* may be generated by one or more of merchant computing systems **930***a*, **930***c*, and **930***n*. For example, data may be generated at any of merchant computing systems **930***a*, **930***c*, and **930***n*, or at adaptive distribution platform **910** or any other computing device, whereby the data may be configured to cause shipment of a replica **927***a* or sample to a location associated with an electronic account. As such, printed material or information regarding the samples may be viewed as superfluous, and need not be included in a shipment (e.g., excluded from a container or box including a sample), according to at least some implementations.

[0120] Information feedback predictor **914***a* may be configured to generate a subset of data **924***a* representing an electronic message (or a portion thereof) that may be transmitted to mobile computing device **952***b* to cause or otherwise initiate, for example, execution of instructions to generate feedback regarding sample **927***a*. As shown, subset of data **924***a* may cause user interface

956*b* to generate a message **958***b* with user inputs **959** and **961**, among others, to determine a status of sample **927***a* (e.g., whether a sample has been received and consumed, which may be a basis from which to render feedback). In the example shown, user interface **956***b* displays the following: "How do you like SAMPLES x, y, z, . . . ? Reply X to order product for $X.XX, or Reply Y to order product Y for $Y.YY, or Reply ALL to order all." Also, user interface **956***b* may also display the following: "If additional time is needed to provide feedback, please respond with "#" (i.e., a number) of days at which to check back." Subset of data **924***a* may also include data representing a destination account identifier ("324178") **954***b*, to which a feedback response may be transmitted as electronic message **924***b*. According to some examples, user **944** may initiate generation of electronic message **924***b*, which includes feedback, via destination account identifier ("324178") **954***b* (or by any mode of communication) to indicate a sample has been consumed and feedback (e.g., including a purchase) may be available.

[0121] According to some examples, consumer **944** may cause generation of an input signal via user input **959** to order item "X" (e.g., based on sample **927***a*), order item "Y" (e.g., based on sample **927***b*), order other items (not shown), or order "All." Adaptive distributive platform **910** and/or merchant computing systems **930***a*, **930***b*, and **930***n* may assign product identifiers (e.g., SKUs) to a sample for treatment by platform **910** as any item, according to a specific implementation. Data representing user input **959** may be transmitted via electronic message **924***b*. Thus, a response may be interpreted positively, according to at least some embodiments, when a response confirms an interest in acquiring or purchasing an item (e.g., in accordance with a subscription or other distribution and online sales arrangements as described herein). According to some examples, a lack of response to electronic message **924***a* may be viewed as negative or a lack of interest related to samples **927***a* and **927***b*.

[0122] In at least one example, user **944** may have yet to consume either sample **927***a* or **927***b*, and may further request additional time (e.g., additional number of days) via user input **961** to provide feedback. Data representing a delayed request may be transmitted as electronic message **924***b*. Accordingly, information feedback predictor **914***a* may include logic configured to predict an adapted time or timing to provide feedback to enable consumer **944** to sufficiently enjoy or experience a sample **927***a* or **927***b* to provide meaningful feedback. Thus, an input **961** ("#") may be received as data signals representing user input into interface **956***b* to initiate, for example, an adjusted interval of time in which to solicit feedback in situations, for example, when user **944** has yet to open a package containing a sample. The delay may be addressed by enabling mobile computing device **952***b* (and/or adaptive distribution platform **910**) and associated software applications to adjust the period in which to provide feedback. User **944** may select a particular units of time (e.g., days) with which to postpone providing feedback so as to consume a sample, such as sample **927***a*.

[0123] According to some examples, information feedback predictor **914***a* may be configured to analyze user characteristics associated with, for example, user **944** to match or align types and attributes of samples that user **944** may be likely to consume and provide feedback. For example, consider that information feedback predictor **914***a* may identify user characteristics that indicate user **944** likely is (1) a young parent (e.g., based on historic purchases of baby formula, diapers, baby powder, etc.), is (2) likely a pet owner (e.g., based on past purchases of dog food, puppy treats, rawhide bones, etc.), and (3) may be a vegetarian (e.g., based on previously-stored grocery purchases that exclude meat, meat-related items, or the like). Based on such exemplary user characteristics, information feedback predictor **914***a* may be configured to select a replica of an item as a sample. For example, information feedback predictor **914***a* may select a sample **927***a* as a sample of "diaper cream," a sample of a "bacon-flavored dog treat," or a sample of spices, herbs, or vegetables, any of which may be selected to enhance accuracies in predicting an invoked response (e.g., feedback) via electronic message **924***b*. By contrast, and further to the above example, information feedback predictor **914***a* may be configured to deemphasize "cat-related" items,

"geriatric-related" items, or "meat-related" items as sample **927***a* for user **944**.

[0124] In at least some examples, information feedback predictor **914***a* may be configured to determine one or more other samples **927***b* based on, for example, sample **927***a*. For instance, consider sample **927***a* may be any of the followings items: "catsup," "shampoo," or a "first product" of Brand "X." Information feedback predictor **914***a* may be configured to determine sample **927***b* as a complementary item that, for example, may have a relatively high correlation of synchronous usage and consumption, and, thereby, a likelihood of sampling by user **944**. Thus, sample **927***b* may be one of "mustard" and "conditioner," which are respective compliments of "catsup" and shampoo." A "second product" of Brand "X" may be selected as sample **927***b* based on, for example, determining a likelihood or degree of similarity between items or predicting brand loyalty based on past purchases of Brand X products, whereby user **944** may be likely to sample the first product of Brand X and provide feedback.

[0125] In at least one example, information feedback predictor **914***a* may be configured to analyze data representing user-related characteristics associated with the electronic account (e.g., for user **944**) against other user-related characteristics associated with other electronic accounts (e.g., for users other than user **944**). In this example, information feedback predictor **914***a* may be configured to identify attributes of users and items common with user **944** to identify a universe of items having a relatively high likelihood of being consumed or purchased by a group of users including user **944**. For example, a group of users residing in a northwest portion of the United States (e.g., the state of Maine, which experiences cold, wintery seasons) may have previously purchased "snow boots" having sizes associated with "elementary-aged" children. Thus, a common other item, such as "mittens," may be identified as being previously purchased by the other users for weather activities except user **944** (at least in this example). Therefore, information feedback predictor **914***a* may be configured to determine "mittens" as sample **927***b* (e.g., either at a discounted cost or without charge). "Mittens" may be viewed as a target item for sampling by user **944** based on data associated with the other electronic accounts.

[0126] Information feedback predictor **914***a* may be configured to implement any analytical determination to correlate and classify users and/or items for predicting samples, according to various examples. According to some embodiments, information feedback predictor **914***a* may be configured to classify and/or quantify various user and item attributes by, for example, applying machine learning or deep learning techniques, or the like. In one example, information feedback predictor **914***a* may be configured to segregate, separate, or distinguish a number of data points representing similar (or statistically similar) attributes, thereby forming one or more clusters or groups of data (not shown). The clustered data may be grouped or clustered about a particular attribute of the data, such as a source of data (e.g., a channel of data), a type of language, a degree of similarity with synonyms or other words, etc., or any other attribute, characteristic, parameter or the like. While any number of techniques may be implemented, information feedback predictor **914***a* may apply "k-means clustering," or any other known clustering data identification techniques. In some examples, information feedback predictor **914***a* may be configured to detect patterns or classifications among datasets and other data through the use of Bayesian networks, clustering analysis, as well as other known machine learning techniques or deep-learning techniques (e.g., including any known artificial intelligence techniques, or any of k-NN algorithms, regression, Bayesian inferences and the like, including classification algorithms, such as Naïve Bayes classifiers, or any other statistical or empirical technique).

[0127] In view of the foregoing, the structures and/or functionalities depicted in FIG. **9** may illustrate an example of adaptive scheduling for electronic messages to automatically facilitate feedback at optimal intervals of time during which a user may likely have consumed a sample to provide an assessment on whether to, for example, order or subscribe for delivery of an item based on the sample. Should a user desire not to provide feedback or generates negative feedback (e.g., does not wish to purchase an item), data representing the sample may be stored for improving

accuracy in predicting which samples a user may likely consume and purchase in the future. According to some examples, optimal intervals of time in which to transmit a request for feedback may be based on predicted dates of consumption with which to enhance accuracy of soliciting feedback relatively close to consumption so a user may provide precise feedback while being "most receptive" to purchasing while the experience from the sample is "fresh" in one's mind. According to at least one implementation, an electronic message or application may include executable instructions to enable a user to adjust a date at which to provide feedback, which, in turn, enables a user to accommodate or plan consumption of a sample for purposes of rendering accurate feedback timely.

[0128] By enhancing accuracy of relevant information pertaining to a sample, information feedback predictor **914a** may generate additional analytic information and insights into whether a particular sample is, for example, enhancing a "sample-to-purchase" conversion metric that describes, for example, a ratio of a number of items purchased against a number of samples sent. With improvements in said metric, fewer resources may be consumed or expended unnecessarily without a return on investment. According to various examples, adaptive distributive platform **910** and/or information feedback predictor **914a**, or any other element, may be configured to store data memorializing electronic transactions and messages associated with predicting consumption of samples and feedback about the samples. Therefore, stored electronic transaction and electronic message data may be used to further refine a predicted date of consumption, as well as refinements in selecting a sample and modifying a feedback response interval of time, according to various examples. Logic, including hardware or software, or a combination thereof, may facilitate one or more structures or functions of adaptive distributive platform **910** and/or information feedback predictor **914a**, or any other element to effectuate enhanced prediction of consumption of a sample for generating adaptively-scheduled electronic messages.

[0129] FIG. **10** is a diagram depicting an example of operation of an information feedback predictor, according to some embodiments. As shown, diagram **1000** includes a distribution predictor **1014** implementing an information feedback predictor **1014a** that may be configured to predict a point in time (or a range of time) at which a sample of an item (e.g., any good or service) may be exhausted or depleted, or a point in time (or a range of time) at which a sample is consumed prior to depletion. Distribution predictor **1014** may include an information feedback predictor **1014a**, which, in turn, may include a consumption calculator **1016a**, a feedback optimizer **1018a**, and a feedback zone generator **1019a**. Optionally, information feedback predictor **1014a** may be configured to include an item characteristic correlator **1017**, which may be structurally and/or functionally similar to that of FIG. **7**, whereby item characteristic correlator **1017** may be configured to identify one or more item characteristics with which to correlate to determine or derive data that may be further used to derive or predict consumption events (e.g., units of consumption), times of distribution or shipping, times of delivery, a feedback commencement time (e.g., a point in time or a range of time in which feedback may commence), and the like, similar to described in FIG. **7**. According to some examples, elements depicted in diagram **1000** of FIG. **10** may include structures and/or functions as similarly-named or similarly-numbered elements depicted in other drawings.

[0130] Diagram **1000** also depicts distribution predictor **1014** and information feedback predictor **1014a** being configured receive item characteristic data **1004** and user characteristic data **1008** from, for example, repositories **1042**, **1046**, and **1050**. In some cases, user-related and/or usage-related data **1008** may include data representing attributes **1040** that, for example, describe demographic characteristics (e.g., location, age, gender, familial status, etc.) for items historically purchased by a user **341** (e.g., data representing patterns of a parent, patterns of a pet owner, patterns of a particular sports fan, etc.). Data representing attributes **1044** may describe items historically purchased by other users **1045** (e.g., patterns of a group of grandparents, patterns of a group of pet owners, patterns of a group of sports fan for a particular team, etc.). Attributes **1044**

may represent an aggregation of a subpopulation or a population of which a user belongs. Also, usage-related data may include sale-related and shipment-related attributes **1048** provided by merchant computer systems **1049**. Data representing attributes **1040**, **1044**, and **1048** may be stored in repositories **1042**, **1046**, and **1050**, according to some examples. Examples of some item characteristics in data **1004** may include a product or product type, a service or service type, SKU data, UPC data, etc. for the same or similar items, or complementary or different items (e.g., different items that may have correlatable samples of products that can be predicted to have similar predicted rates of consumption and/or depletion, and may be have a likelihood of a feedback response by a recipient).

[0131] Information feedback predictor **1014***a* may be configured to generated data **1022** to predict, among other things, a date of consumption with which to solicit feedback regarding a replica of an item. A date of consumption may be predicted to occur (e.g., statistically) in a feedback commencement interval or time **1090** during which user **1031** may be predicted to have received a sample **1033** of item **1034**. Thus, predicted points in time **1063***c*, **1063***d*, and **1063***e* of consumption (e.g., a predicted time of consumption of a sample) may be a function of a user **1031** (e.g., a user's usage rates and consumption patterns) and/or an item **1034** and its characteristics (e.g., based on usage rates and consumption patterns of a group of users over one or more merchant computer systems). Sample **1033** may be representative of item **1034** and, hence, may include its characteristics. Note that feedback commencement interval **1090** may represent a single point in time, or any number of points in time, according to some examples.

[0132] Information feedback predictor **1014***a* may be configured to receive data from a merchant computing system **1049** that a sample **1033** has shipped to a location at a time ("S") **1063***a*. Further, information feedback predictor **1014***a* may be configured to receive data representing that sample **1033** has been delivered to a location at time ("R") **1063***b*. As such, information feedback predictor **1014***a* may identify time **1063***b* as a beginning of feedback commencement time **1090**. Consumption calculator **1016***a* may be configured to calculate a time ("C.sub.1") **1063***c*, time ("C.sub.2") **1063***d*, or time ("C.sub.3") **1063***e* (or a time interval) at which one or more units of consumption of a sample may be consumed. According to some examples, times **1063***c*, **1063***d*, and **1063***e*, as well as interval **1090**, may be based on usage rates or rates of depletion.

[0133] Feedback optimizer **1018***a* may be configured to adapt a computed time interval **1090** in which consumption is likely to predict a date of consumption by user **1031** based on, for example, user characteristics. Hence, feedback optimizer **1018***a* may be configured to extend or reduce a size of interval **1090** by adjusting one or more points by modifying beginning or an ending time (e.g., shifting the interval in directions **1081** or **1083**). Feedback zone generator **1019***a* may be configured to adjust an adapted consumption date or range of dates, responsive to data **1024** generated at a user computing device. For example, a user may request to extend a feedback response time to point of time ("F") **1063***f*. Thus, feedback zone generator **1019***a* may be configured to receive adjustment data responsive to data **1022** to generate feedback, the adjustment data configured to modify a predicted date of consumption to time **1063***f* (or another time). As such, feedback zone generator **1019***a* can be configured to cause generation of another subset of data to ask or solicit feedback at later date by generating ancillary data representative of another request for a feedback response from user **1031**. User **1031** may generate feedback data **1024** including, for example, a request to purchase or subscribe to item **1034** at time ("D1") **1063***f*. Feedback other than a purchase, whether positive or negative, may also be included in data **1024** (e.g., a request for an additional sample). At time **1063***f*, data representing a feedback response to accept a unit of the item in an online purchase may be received, whereby scheduling of transmission of a unit of the item to the location (associated with electronic account) may be generated to initiate successive shipments of the item to user **1031**.

[0134] Information feedback predictor **1014***a* may be configured to transmit a request of feedback via electronic message data **1022** at any time in feedback commencement time **1090**. For example,

information feedback predictor **1014***a* may transmit electronic message data **1022** to user **1031** at time ("C.sub.1") **1063***c*, time ("C.sub.2") **1063***d*, or time ("C.sub.3") **1063***e*, any of which may be selected based on user characteristics and/or item characteristics. For example, user **1031** may be likely to render feedback after a first unit of consumption at time **1063***c* for "shampoo," whereas user **1031** may likely require additional time to render feedback for a sample of a "health supplement," which may take several days to experience (e.g., two tablets per day for a two weeks). Thus, an item characteristic of "product classification" (e.g., classification of "shampoo" in contrast to "health supplements") may be used to determine or predict a point in time to transmit a request for feedback during time interval **1090**. In some cases, user characteristics of user **1031** may also be used to select one or time ("C.sub.1") **1063***c*, time ("C.sub.2") **1063***d*, or time ("C.sub.3") **1063***e*. If user **1031** is determined or predicted to belong to a household of two to four persons (e.g., a family), then additional time may be provided to ensure multiple persons may experience sample **1033**. Thus, a subsequent time **1063***e* may be selected rather than a first time **1063***c*. Other user characteristics and item characteristics may be used to select an optimal time at which to solicit feedback, according to various examples.

[0135] FIG. **11** is a diagram depicting an example of a flow to facilitate predictive consumption of a sample for an item that implements an automatically adaptive schedule, according to some embodiments. At **1102** of flow **1100**, data representing a replica of an item, as a sample, may be identified for transmission to a location associated with an electronic account. For example, a selected sample may be included in a container being shipped with purchased goods, or may be shipped separately, to a residential address associated with an electronic account (e.g., an online account with which to purchase items online from a merchant).

[0136] At **1104**, a characteristic of a user or an item, or both, may be identified. For example, an item characteristic may be identified, such as a product classification (e.g., generic product name, such as shampoo), a product type (e.g., a brand name), etc., any of which may be used to describe a sample. Further, user characteristics (e.g., past usage or consumption patterns, including past purchasing patterns), and the like, may be used to predict a date of consumption for providing a timely acquisition of a response from a recipient of a sample.

[0137] At **1106**, a date of consumption of a replica may be predicted to form a predicted date of consumption as a function of, for example, one or more characteristics (e.g., one or more user characteristics and/or one or more item characteristics). According to some examples, a usage rate of an item may be calculated at **1104**, whereby a sample may be a replica of the item (e.g., a consumable item). In some cases, a usage rate may be determined as a function of a depletion rate of the consumable item. A time for a unit of consumption may be computed (e.g., predicted) based on a calculated usage rate. Also, a unit of consumption may be selected as a feedback commencement time during which to solicit feedback. In one example, an interval of time for a predicted unit of consumption may be determined similarly to a zone of time as described herein.

[0138] In some examples, a subset of the data (e.g., included in an electronic message) may be transmitted to generate feedback from a user computing device. Data representing a command to delay a feedback commencement time may be received via, for instance, a merchant computing system. Further, transmission of another subset of the data (e.g., another electronic message including feedback) may be postponed by an amount of time. For example, a recipient may request a certain number of additional days to provide feedback. Or, a second electronic message to delay feedback may be transmitted based on predicted or empirical data. Further, a predicted date of consumption may be adapted to form an adapted predicted date of consumption. For example, data representing a feedback commencement time (e.g., a point in time or an interval in which feedback may be solicited) may be modified based on an adapted predicted distribution date to form a modified feedback commencement time.

[0139] At **1108**, data to cause shipment of a replica may be generated to initiate shipment of the replica or sample to a location associated with the electronic account. For example, an application

or software module may include executable instructions to modify or control a shipping application (e.g., an enterprise-level application configured to coordinate shipping of online purchases) to ship a purchased item in a container. In some cases, the selection of the sample may be based on the above-described characteristic. At **1110**, a subset of data disposed in an electronic message may be generated to cause initiation of executable instructions to perform a process in which feedback may be generated relative to a date of consumption.

[0140] FIG. **12** is a diagram depicting examples of integrated interfaces to facilitate predictions of sample consumption, according to some embodiments. Diagram **1200** depicts merchant computing systems **1230***a*, **1230***b*, and **1230***n*, each of which may be configured to host or generate (via network **1220***a*) user interfaces **1209** and **1220** that are integrated with interface portions **1215** and **1224**, respectively. Interface portions **1215** and **1224** may generated by adaptive distribution platform **1210**, which includes information feedback predictor **1214***a*. Thus, information feedback predictor **1214***a* may be configured to inject interface portions **1215** and **1224** into user interfaces **1209** and **1220**, respectively, via network **1220***b* to form hybrid interfaces. Thus, web [[pate]] page **1209** and email **1220** are hybrid electronic pages or messages and may include graphical elements having a "look and feel" originating from a source of origin (e.g., a merchant computing system as host). According to some examples, elements depicted in diagram **1200** of FIG. **12** may include structures and/or functions as similarly-named or similarly-numbered elements depicted in other drawings.

[0141] Various structures and/or methods described herein may be applied to web pages **1209**, emails **1220**, among other forms of communicating requests for acquiring feedback for a sample. Web page **1209** includes a feedback page as a user interface **1212** to provide feedback of a sample (e.g., a shampoo sample) by selecting in interface portion **1215** either immediate feedback via input **1211** (e.g., including an order) or delayed feedback via input **1213**. Input **1219** (a pull-down menu to select an amount of delay) may be used to delay a feedback response by "t" units (e.g., any time units, such as units of days). Data received into interface **1212** via inputs **1211**, **1213**, and **1219** may be stored until input ("send") **1218** is activated, after which the data may be transmitted contemporaneously (or substantially contemporaneously) to information feedback predictor **1214***a* and adaptive distribution platform **1210**.

[0142] An electronic message to request feedback of the sample may be communicated as an email **1220**, which is shown to include an item characteristic **1222** in a subject line may be display so a user readily may discern the action required for such a communication. In email body **1224**, various delivery options may be embedded as hypertext links to enable a user to provide feedback for a sample of a "Product P" "now," by selecting link **1275***a*, or postponing feedback by 7 days with the selection of link **1275***b*. According to some embodiments, the presentation of a link for a "7 day" delay, as a first link, may be due to its relatively high degree of certainty that a user may experience the sample within another 7 days (based on probabilistic determinations). Thus, adaptive distribution platform **1210** including information feedback predictor **1214***a* may adapt presentation of user inputs to accommodate user purchasing and scheduling patterns and preferences to enhance, among other things, users' experiences when sampling a good or service.

[0143] In view of the foregoing, webpages **1209** and emails **1220** may be formed as integrated electronic messages that are a hybrid of different formatted data originating from different sources, whereby a user may perceive webpages **1210** and emails **1220** as originating from a single source (e.g., a merchant).

[0144] FIG. **13** is an exemplary system configured to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment. Here, system **1300** includes input data **1302**, network **1304**, account data **1306**, order/subscription data **1308**, data management platform (hereafter "platform") **1310**, network **1312**, inventory management systems (hereafter IMS) **1314-1318**, and IMS data **1320-1322**. The quantity and configuration of the above-listed elements may be varied and are not

limited to the descriptions provided herein, which are examples of implementations that are provided for purposes of illustration. As used herein and throughout the accompanying descriptions to the drawings, "system" may refer to or include the description of a computer network system or topology associated with a map, network, layout, environment, or the like of computing resources that are used to implement a feature, function, process, element, component, part, or multiple instances thereof, without any particular limitation as to the type, configuration, programming or formatting language, service, class, resource, specification, protocol, or other attributes thereof. As used herein and throughout the accompanying descriptions to the drawings, "application" may also be used interchangeably or synonymously with, or refer to a computer program, software, firmware, hardware, circuitry, or any combination thereof that may be configured to implement a logical set of instructions that, when executed, performs a function or set of functions within a computing system or machine, regardless of whether physical, logical, or virtual and without restriction or limitation to any particular implementation, design, configuration, instance, or state. Any type of programming or formatting language, framework, or data schema including, but not limited to, binary, machine assembly, object oriented, C, Objective C, C++, C#, Java®, JavaScript®, Python®, Swift™, Ruby, Ruby on Rails®, Rust™, Elixir™, HTML, XML, R, SQL®, MySQL®, DynamoDB™, R, Scala Also as used below, "platform" may refer to any type of computer hardware (hereafter "hardware") and/or software environment using one or more local, remote, distributed, networked, or computing cloud (hereafter "cloud")-based computing resources (e.g., computers, clients, servers, tablets, notebooks, smart phones, cell phones, mobile computing platforms or tablets, and the like) to execute an application, such as those described above, without restriction or limitation to any particular implementation, design, configuration, instance, or state. Distributed resources such as cloud networks (also referred to interchangeably as "computing clouds," "storage clouds," "cloud networks," or, simply, "clouds," without restriction or limitation to any particular implementation, design, configuration, instance, or state) may be used for processing and/or storage computing resources, without restriction or limitation to any particular implementation, design, configuration, instance, or state of a device or machine, physical, virtual, logical, or otherwise.

[0145] As shown, input data **1302** may be data or signals that are transmitted to system **1300** from, for example, a client device (e.g., mobile or smart phone, tablet computer, laptop, desktop, "smart" appliance, sensor, or any other type of apparatus or process configured to transmit analog or digital data, regardless of whether initiated by a user or other machine-related process, software, firmware, or hardware) or another computing element, such as those shown and described below. As shown, input data **1302** may be transmitted directly or indirectly over a local or distributed data network (e.g., local area network (LAN), wide area network (WAN), computing cloud (i.e., "cloud"), or the like). Alternatively, input data **1302** may be transmitted directly to subscription management platform **1310**. Here, network **1304** may be used to transmit input data **1302** to data management platform **1310**, which is in data communication with various databases (e.g., account data **1306**, order/subscription data **1308**, or others not shown or described). Databases **1306**-**1308** may be implemented using various programming languages and formats, including, but not limited to SQL, MySQL, R, DynamoDB™ from Amazon® Web Services, Inc. of Seattle, Washington, FMP, Oracle®, relational, structured, or unstructured databases and database management systems, without limitation. Account data **1306** may, in some examples, be configured to store data related to a given user's subscription(s) including items (e.g., those items being purchased using a subscription that are sent on a replenishing schedule, which may be regular or irregular in response to either a user-specified rule for a given periodicity or which may be fulfilled when a given item requires replenishment and an order is initiated by either a user or, for example, a sensor that detects when a given item has been depleted to an extent, which may be specified by a user, manufacturer, retailer, distributor, or wholesaler of the item to be replenished), payment data (e.g., credit card, bank, automated clearing house (ACH) or wire transfer information, or the like), user

data (e.g., location to which subscribed items are to be shipped or delivered, account-related computing devices such as mobile phones, laptops, or computers that can be identified by unique identifiers (i.e., IDs) such as cellular phone numbers, phone numbers, MAC IDs, IP ("Internet Protocol") addresses, physical street addresses, user-specified or rule-generated preferences such as types or brands of items preferred for subscription or limitations or restrictions placed on a given user's account (e.g., a tiered account structure that may permit a greater population of items for subscription based on a recurring fee or a smaller pool of items that may be permitted for a lower or "no-fee" arrangement, or the like. Other data, characteristics, criteria, rules, preferences, or the like such as those described herein, but without limitation, may be specified in account data **1306** without restriction and is not limited to the examples shown and described.

[0146] In some examples, data management platform **1310** (i.e., platform **1310**) may be an application or multi-stack application that is configured to transmit, receive, and process data at different levels of a programming stack. For example, data transmitted between platform **1310** and databases **1306-1308** may be transmitted in, for example, a programming language such as SQL, MySQL, R, or others that are configured for data operations between databases, data repositories, data warehouses, or other types of data storage facilities. Additionally, platform **1310** may also be coded using various types of object-oriented programming and formatting languages such as Java®, JavaScript®, Python®, HTML, XML, and others, to provide user interfaces and displays that, at a presentation level of an application stack architecture, enable a user to interact with, input, and perceive data and information. Still further, other stack levels such as the transport level of a stack architecture may be used to transfer and communicate data between various elements of the described techniques, such as those shown below in connection with FIG. **14**, in order to facilitate and improve interoperability between the elements shown and described as well as those shown here in connection with system **1300**.

[0147] Referring back to FIG. **13**, platform **1312** may also be implemented to communicate over network **1312**. As shown, networks **1304** and **1312** may be data networks of various types and numbers, without restriction, that are configured to transfer data between endpoints such as client devices (not shown), platform **1310**, databases **1306-1308**, or other systems such as inventory management systems (hereafter "IMS") **1314-1318**. Here, IMS **1314-1318** may be inventory management systems for various manufacturers, retailers, distributors, wholesalers, importers, or other types of sellers or resellers (including the manufacturer itself) of items that data management platform **1310** may exchange data in order to fulfill an order for an item, regardless of whether the item was ordered pursuant to a subscription or an ad hoc, one-time order. While "items" may refer to items ordered without a subscription, "subscribed item" may refer to items that are purchased subsequent to a subscription for an account (i.e., a user, using her account, has created a subscription to purchase an item on a periodic, scheduled, frequent, infrequent, non-periodic, unscheduled, random, or ad hoc basis). In some examples, data management platform **1310** may be coupled, directly or indirectly, to a seller, manufacturer, warehouse/distribution system (e.g., IMS **1314-1318**) using, for example, an application programming interface (i.e., API) that may be in data communication with one or more data networks in order to transfer data related to an order received for an item, regardless of whether purchased as an item of a subscription or a one-time, ad hoc, or random purchase. In some examples, IMS **1314-1318** may be used to track items held in inventory in a warehouse, storage facility, store location (e.g., "location"), or any other type of location where items may be assembled or otherwise collected and prepared for fulfillment. Fulfillment may occur when an item is shipped and/or delivered to a location specified in account data **1306** or order/subscription data **1308**, picked up or retrieved from a location by a user or by platform **1310**. With regard to the latter, techniques are described herein for platform **1310**, without user input or the need for additional user entered data, may be configured to automatically detect and prepare for fulfillment, by either shipment or local pickup at a location in convenient proximity to a user, an item. Convenient proximity for a user may be input by a user, for example, as

locations within a 5 mile radius (for example) or other specified distance from his home. Convenient proximity may also be implemented as a relative geographic distance from a user, her home, or her client devices such as those described above. Convenient proximity may also be used interchangeably with the term "proximate" to express the descriptions provided herein. Convenient proximity may also be expressed as a proximate location based on a data relationship between account data **1306** and/or order/subscription data **1308**. For example, convenient proximity to a location where a user can retrieve an item can also be those locations for a given seller of an item that share the same zip code, city, state, nation, or street name as that of the user. In still other examples, convenient proximity may be determined using geolocation data (e.g., data that may be retrieved from any type of data network that is configured to generate localized coordinates for a given client device, such as a cellular communication network, global positioning system (hereafter "GPS"), IMMARSAT, or other ground or satellite-based data communication or positioning system, without limitation or restriction. For example, geolocation data from a constellation of low earth orbit (LEO) GPS satellites may provide a set of coordinates (e.g., Cartesian, Mercator, or others, without limitation or restriction) from which a boundary or bounding box or other shape may be determined in which items may be indicated for retrieval by a user. As used herein, "retrieval" may refer to retrieving, picking up, getting, or otherwise obtaining an item in lieu of fulfillment occurring by shipment to a location or address specified by a user. In other words, system **1300** and the elements shown and described may be configured to detect when an item of a subscription is to be fulfilled (or within a temporal proximity to a fulfillment date for a given subscription) and automatically determine and generate one or more retrieval options, with or without any type of user-specified input or rule, to permit a user to instead pick up or retrieve the item from, for example, a nearby store that, using an IMS (e.g., IMS **1314**-**1318**) may have the item type and quantity within its local inventory. Further, platform **1310** may be implemented and configured to automatically determine retrieval options that are convenient or proximate to a user based on determining her location or, in some examples, if a user is visiting a physical location, she may also wish to pickup the item, regardless of whether a transaction is occurring, which can lead to improved subscription and/or general purchasing activity using the techniques described herein. [0148] As an example, when an item to be fulfilled is detected by platform **1310** to be held in inventory at a given location (e.g., as determined by IMS **1314**-**1318**, which may be configured to poll store, inventory, or item data from one or more of databases **1320**-**1330**, the number, type, configuration, function, and quantity of which may be varied without limitation), an automatic determination may be made to generate retrieval options that may be sent, for example, at a data or application layer of an application stack to one or more client devices indicated by a given account. When a client device receives a message (e.g., SMS, email (i.e., SMTP, POP, or others), Internet Relay Chat ("IRC"), Messenger® (such as that provided by Facebook® of Menlo Park, California), iMessage® (such as that provided by Apple Corporation of Cupertino, California), or others) including a retrieval option (which may be implemented as a data query), if a response is sent, platform **1310** may receive it as input data **1302** and, using constraints, rules, preferences, or other account or subscription data stored in databases **1306**-**1308**, prepare an item for in-store pickup or local retrieval without the need for shipment or shipment preparation. In other examples, system **1300** and the elements shown and described may be implemented differently and is not limited to those shown and described herein.

[0149] FIG. **14** is an exemplary application architecture for a data management platform configured to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment. Here, application architecture **1400** includes, as an example, application **1402**, which includes data bus (hereafter "bus") **1404**, logic module **1406**, order manager **1408**, protocol handler **1410**, auto dynamic location resolution engine **1412**, device targeting module **1414**, geo data analysis engine **1416**, local databases **1418**-**1420**, format engine **1422**, IMS interface module **1424**, and communication interface/application

programming interface ("API") **1426**. One, some or all of application **1402** and elements **1404-1436** may be implemented as software, hardware, firmware, circuitry, or a combination thereof using programming or formatting languages, frameworks, and schema such as those described above, but without limitation. Application **1402**, in some examples, may also be in data communication and transfer data with remote database **1430** (which may be in direct or indirect data communication with application **1402**), client **1432**, network **1434**, and IMS **1436**. The number, type, configuration, and function or application architecture **1400** and the elements shown and described may be varied without limitation or restriction. In some examples, application **1402** may be implemented as platform **1310** (FIG. **13**) and additional detail is provided with regard thereto. For example, logic module **1406** may implemented using any type of computing facility, computer, processor, or other type logic or sets of logical process that may be configured to compile and execute various types of computer programs or program code, regardless of programming or formatting language. Examples of computer software, programming, or formatting languages may include Java®, JavaScript®, JSON, R, SQL, MySQL, HTML, XHTML, XML, Python, Hadoop, or others, and may be implemented on any type of operating system for a computing device, mobile or otherwise, such as Windows®, MacOS®, iOS®, Android®, Linux®, or others, without limitation or restriction.

[0150] In some examples, order manager **1408** is configured to manage orders (regardless of whether placed as a single, standalone, group, ad hoc, random, or subscription-based order) for items using account data (e.g., account data **1306** (FIG. **13**)) and/or subscription data (e.g., order/subscription data **1308** (FIG. **13**)), which may be stored in one or more of databases **1418-1420** or **1430**. For example, order manager **1408** may be configured to automatically execute an order or subscription for an item or set of items once a user has input order data (e.g., order/subscription data **1308** (FIG. **13**)) using a display interface (not shown) provided by platform **1310**. Further, order manager **1408** may also be configured to transfer data with auto dynamic location resolution engine **1412** in order to automatically generate and provide retrieval options, as shown and described herein.

[0151] In some examples, auto dynamic resolution engine **1412** may be configured to determine whether retrieval options for an item or set of items may be automatically generated and offered to a user for retrieving in item in lieu of performing a default or "first option," which may be implemented by fulfillment using a shipping service. In other words, order/subscription data **1308** may indicate a default option or set of data that is used to fulfill or ship an item or set of items at periodicities or frequencies also specified in account data **1306** (FIG. **13**) and/or order/subscription data **1308**. In some examples, this option for shipping an item to a location (i.e., delivery destination or simply "destination") may be input by a user at the time of subscribing to a service to purchase an item or set of items at a given interval, periodicity, frequency, or level of depletion of the item or set of items. However, order manager **1408** may also receive data from auto dynamic location resolution engine **1412** that automatically generates retrieval options using account, purchase, user, and/or history data as well as geolocation data such as geographic coordinates from a ground or satellite-based location service (e.g., cellular communication network, data network, GPS constellation, MILSTAR, IMMARSAT, or the like) that can be compared to account data **1306** and/or order/subscription data **1308** to determine whether proximate retrieval options are available (e.g., picking up an item or set of items from a nearby location from which the item was recently purchased. As an example, geolocation data in the form of GPS coordinates may be provided by geolocation data analysis engine **1416** working cooperatively with device targeting module to determine a device ID from a header, payload, or footer portion of a data packet, segment, or frame coming from a device (e.g., mobile or smart phone, laptop, computer, or others (i.e., client **1432**)) associated with an account identified in account data **1306** and which also has a subscription for an item in order/subscription data **1308**. As an example, auto dynamic location resolution engine **1412** is configured to transform the geolocation data (e.g., GPS coordinates) from geo data analysis

engine **1416** and device ID or other characteristics from device targeting module **1414** to generate a proximity of said devices to one or more locations specified by IMS **1436**, which may be configured to transfer data with application **1402** over network **1434** or, alternatively, using a direct data transfer connection (not shown). Using account data and/or subscription data stored in one or more of databases **1418-1420** and/or **1430**, auto dynamic location resolution engine is configured to determine, by comparing analyzed geolocation data from geo data analysis engine **1416** whether the item or set of items can be retrieved from locations identified in data stored by IMS **1436** in one or more other databases managing item inventory data (not shown). If auto dynamic location resolution engine **1412** determines one or more locations have item(s) for a given subscription in inventory prior to preparing the items for shipment, in some examples, data may be sent to protocol handler **1410**, format engine **1422**, and communication interface/API **1426** by logic module **1406** and auto dynamic location resolution engine **1412** to generate and send a message to client **1432** with retrieval option(s) and a query for responsive data. If responsive data is generated that indicates a retrieval option other than a default or first option (i.e., a default option) have been selected for obtaining the item(s), then responsive data from client **1432** is received by communication interface/API **1426** and processed by logic module **1406** and order manager **1408** to generate and send additional data to IMS **1436** to override the default option and instead prepare the item(s) for pickup at the location specified in the responsive data. In other examples, if client **1432** is detected being at a location identified by GPS coordinates, for example, by geo data analysis engine, device targeting module **1414** may be configured to work with logic module **1406**, auto dynamic location resolution engine **1412**, and communication interface/API **1426** to automatically generate and send (i.e., not requiring manual or user intervention and independently operative without requiring invocation of user-specified rules or criteria to initiate communication with client **1436**) data in a messaging format (e.g., SMS, iMessage®, messenger, or others) to client **1436** offering a retrieval option for obtaining the item(s) from the location at which client **1432** is resident (as determined by geo data analysis engine **1416**) and which is identified as having inventory of the item(s) by IMS **1436**. In some examples, protocol handler **1410** may be configured to transform data for transmission from a one protocol to another (e.g., transmission control protocol/Internet protocol (i.e., TCP/IP) to send mail transfer protocol, simple messaging service (SMS), Internet relay chat (IRC), Messenger®, or the like), without limitation or restriction. Message data may also be transmitted from application **402** to various social media, social networks, social applications using native messaging tools or applications provided by social media developers such as Facebook®, Instagram®, Twitter®, Snapchat®, Yelp®, Pinterest®, Amazon.com®, and others.

[0152] In some examples, protocol handler **1410** may be configured to transform data from one protocol format to another for transmission between elements of application **1402**. Further, format engine **1422** may be implemented to provide functionality to format data for transmission to various endpoints (e.g., client **1432**). For example, format engine **1422** may be implemented to generate message data in HTML or text format while, in other examples, other message data may be generated in SMS for transmission to a mobile device (e.g., client **1432**). In still other examples, format engine **1422** may generate messaging data in scripting formats such as JavaScript® or Java® to generate and send messages via communication interface/API **1426** to other third party applications or platforms that can convert or transform messaging data for presentation using in-media, native social media, social networks, or social applications, without limitation or restriction. In other examples, application **1402** and the above-described elements may be implemented and configured differently in function and/or structure and are not limited to the descriptions provided above.

[0153] FIG. **15** illustrates exemplary data types operated upon in an exemplary system configured to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment. Here, input data **1502** may be

similar to input data **1302** (FIG. **13**) as described herein. Input data **1502** may include different types of data that, when parsed by application **1402** (FIG. **14**) using logic module **1406** (FIG. **14**) and communication interface/API **1426** (FIG. **14**) resolve (i.e., parsing to determine and identify) different types, formats, sections/segments/frames/elements, protocols, and structures of data such as those shown and described. Here, input data **1502** may include various sub-types of data including item data **1504**, event data **1506**, geo data (i.e., geolocation data such as that described above; for all purposes herein, "geo data," "geolocation data," "geolocation site data," and "geographic data" may be used interchangeably and are not intended to have individually different meanings) **1508**, order data **1510** (e.g., order/subscription data **1308** (FIG. **13**), or databases **1418-1420**, or **1430** (FIG. **14**)), and account data **1512**.

[0154] As an example, event data **1506** may have sub-types of data including, but not limited to, temporal data **1518**, shipment data **1520**, and location data **1522**. In some examples, geo data **1508** may have sub-types of data including, but not limited to, coordinate data **1514** and geolocation site data **1516**. Order data **1510** may, in some examples, include any type, format, category, or structure of data and/or information associated with the order of a given item. In some examples, order data **1510** may include data or information based on a subscription that invokes a recurring order to be replaced for a given item or as a standalone, one-time, ad hoc, random, or otherwise, non-recurring or non-subscription based order. In other examples, order data **1510** may include other types of data. Further, account data **1512** may have sub-types of data including, but not limited to, user data **1524**, device data **1526**, and financial data **1528**.

[0155] Here, item data **1504** may include any type or quantity of data (subject to any particular data structure requirements or limitations) used to describe a given item, such as a product code (e.g., SKU), internal or external product identifier, category, price, unit size, weight, dimensions, specifications, or others, without limitation or restriction. Event data **1506** is a data structure, in some examples, including temporal data **1518**, shipment data **1520**, and location data **1522**. As used herein, temporal data **1518** may be data that describes a frequency, periodicity, or other temporal criteria or threshold for determining when an item(s) is required to be shipped, delivered, or otherwise made available for retrieval using the techniques described herein. Temporal data **1518**, for example, may be describe a pre-set or default schedule on which item(s) are to be shipped to a destination or location as indicated by location data **1522**. Temporal data **1518** may also include rules for determining when to ship an item, including using sensory input to determine when an item needs to be replenished. In still other examples, temporal data **1518** may include other data that is used to describe when an item(s) is to be shipped or otherwise retrieved using the techniques described herein.

[0156] As shown, event data **1506** may also include sub-types of data directed to shipment data **1520** and location data **1522**. In some examples, shipment data **1520** may include various types of data related to shipping item(s) ranging from destination locations (i.e., specified by either a street address, store identifier (i.e., store ID), coordinates (e.g., map, GPS, Cartesian, Mercator, latitude/longitude, or others) linked to an account to shipping service types ranging from ground transport to air delivery services. Alternatively, stores from which an item was purchased could also be found in purchase history data (e.g., history data), but which is not linked to an account. In some examples, location data **1522** may include any type of data used to describe a location to which an item(s) is to be shipped, regardless of physical locale (e.g., land and/or sea). In other examples, location data **1522** may also include user-specified location data for nearby sites from which an item(s) may be retrieved or otherwise obtained.

[0157] In some examples, geo data or geolocation data **1508** may also include sub-types of data such as coordinate data **1514** and/or geographic site data **1516**. The former, in some examples, may describe various types of coordinates for identifying a given location. This may include data and information ranging from street addresses to GPS coordinates to GIS (i.e., geographic information systems) data. Coordinate data **1514** may be retrieved, in some examples, from various types of

systems such as GPS or similar satellite-positioning systems and constellations to ground-based location systems utilize cellular, microwave, or other types of radio frequency systems ranging from near-field communication (NFC) to radio frequency identification tags (RFID) to Wi-Fi to Bluetooth® to others, without limitation or restriction. Geographic or geolocation site data **1516** may be data that is used to locate a given site from which an item(s) may be retrieved, shipped, packaged, or is otherwise found in inventory. In other examples, geographic site data **1516** may be retrieved from an inventory management system such as IMS **1314**-**1318** (FIG. **13**) or IMS **1436** (FIG. **14**) and may include information such as a store number, store location, address, internal address, facility identifier, zip code, sector, zone, or others, without limitation or restriction. Geo data **1508** and the described sub-types of coordinate data **1514** and geographic site data **1516** may be retrieved from any type of system configured to generate and provide, for example, via communication interface/API **1426**, geographic or geolocation data.

[0158] As shown and described, account data **1512** may include sub-types of data such as user data **1524**, device data **1526**, and financial data **1528**, all of which were previously described above. As used herein, "financial data" and "payment data" may be used interchangeably and are not intended to be distinguished in the lexicon of the present description. In other examples, financial data **1528** may also include data related to the financial or payment history of a given account or item. The former may refer to the payment or financial history of a given user across one or multiple items while the latter may refer to data retrieved from IMS **1314**-**1318** (FIG. **13**) or **1436** (FIG. **14**) and which may include public or privately-available financial data such as the financial performance of a given item, pricing, discounting, shipping charges, freight charges, and the like. In still other examples, more or different types and sub-types of data may be included as input data **1502**, which may be used to refer generally to any type, amount, or structure of data provided to application **1402** (FIG. **14**) or system **1300** (FIG. **13**), without limitation or restriction.

[0159] FIG. **16** is an exemplary algorithmic flow diagram to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment. Here, process **1600** starts by receiving input data to convert from a first data format to a second data format (**1602**). As an example, data transferred from auto dynamic location resolution engine **1412** (FIG. **14**) in C, C++, Java®, or the like may be converted, transformed, or otherwise modified into a database schema, format, and language such as R or SQL. Next, the input data is processed in the second data format in order to identify respective components of the input data structure, which may include a header, footer, payload, checksum, or the like (**1604**). The input data (e.g., input data **1302** (FIG. **13**)), once parsed, is then evaluated by, for example, logic module **1406**, auto dynamic resolution engine **1412**, geo data analysis engine **1416**, and other modules of application **1402**, as invoked, to identify event data and shipment data contained within the input data (**1606**). Next, input data is compared to a threshold (e.g., 5 miles from a home address specified in account data **1306** (FIG. **13**), comparison run against zip codes for store locations against the zip code for a user home address as indicated in account data or a delivery address as indicated in subscription data, and others), the results of which may be configured to initiate auto dynamic location resolution engine **1412** to generate one or more retrieval options as alternatives to fulfilling a default option (i.e., a "first option") shipment to a user's home or shipping address (as indicated in order/subscription data **1308** (FIG. **13**)) (**1608**). Analysis may be performed, in some examples, by geo data analysis engine **1416** (FIG. **14**) and auto dynamic location resolution engine **1412** (FIG. **14**) by generating and sending a service call to one or more data networks to retrieve location data for a given device or user (**1610**) or to retrieve other data including data and information as to where prior in-store purchases or "pick ups" (i.e., retrievals) occurred, regardless of whether said addresses are linked to an account. In other words, items may be retrieved from a location (e.g., address) that is not linked to account, but was instead selected as a retrieval location for a past purchase while, for example, traveling outside of a regularly frequented geographic area (e.g., vacation destination, business trip, or the like).

[0160] Next, a determination is made as to whether, based on the location of a device associated with a given user's account, to generate a retrieval option to provide an alternative to physically pick up, obtain, or otherwise retrieve an item from a physical location instead of fulfillment through shipping (**1612**). Alternatively, in some examples, a service call or query may be periodically sent to update the location of a device associated with a user's account. In still other examples, a routine, scheduled, or periodically transmitted call to a service may result in responsive data indicating a device (e.g., mobile or smart phone or tablet computer) is within relatively close proximity to a store location based on comparing geolocation data included in input data **1302**. As an example, "close proximity" may be determined by specifying a spatial or distance range or offset to a set of coordinates or other geolocation data to indicate whether a device is located near or within a site that, based on data received from IMS **1314-1318**, has a given item(s) in inventory and is available for "in-store pickup" or retrieval. In still other examples, a retrieval option may be generated upon detecting that a given account is involved in a transaction at a location at which the item(s) is in inventory and, because of a threshold comparison (**1608**), an impending subscription shipment is detected and an alternative retrieval option is presented by generating and sending to a mobile device associated with an account, a query requesting additional input data as to whether to retrieve (i.e., pick up) the item while at a location, if a device associated with the account is determined by geo data analysis engine **1416** (FIG. **14**) to be proximate to a stored location identified by IMS **1314-1318** (FIG. **13**) or during the course of a transaction at the location as detected by application **1402** (FIG. **14**). In other examples, different retrieval options apart from those shown or described may be generated by application **402** and auto dynamic location resolution engine **1412** without limitation or restriction. Process **1600** may be varied in step, order, function, or description, and the above-described example is provided for purposes of illustrating the described techniques.

[0161] FIG. **17** is an alternative exemplary algorithmic flow diagram to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment. Here, alternative process **1700** starts by converting input data (e.g., input data **1302** (FIG. **13**), input data **1502** (FIG. **15**)) from a first data format to a second data format (**1702**). Input data in the first data format (i.e., native) may be loaded or stored in a database (e.g., account data **1306** (FIG. **13**), order/subscription data **1308** (FIG. **13**), databases **1418-1420**, **1430** (FIG. **14**)) or other data storage facility/repository (**1704**). Once converted, input data in a second data format may also be stored (**1706**). Once loaded, an ETL (i.e., extract, transform, load) operation may be performed to parse input data in the first or second data formats to extract components (e.g., header, payload, end bit, footer, checksum, or the like) of the data to be input to logic module **1406** (FIG. **14**), geo data analysis engine **1416** (FIG. **14**), auto dynamic location resolution engine **1412** (FIG. **14**), and other elements of application **1402** (FIG. **14**) (**1708**). Evaluated (i.e., analyzed) input data is then returned to application **1402** and the above-described elements for further evaluation (**1710**). Process **1700** may be varied in step, order, function, or description, and the above-described example is provided for purposes of illustrating the described techniques.

[0162] FIG. **18**A is another exemplary algorithmic flow diagram to dynamically process electronic messaging data to automatically generate location predictive retrieval using a networked, multi-stack computing environment. Here, evaluated data from input data **1302**/**1502** (FIGS. **13**, **15**) is compared to a threshold to determine whether alternative retrieval options to a default or first option are available for generation (**1802**). For example, if location data extracted from input data indicates a device associated with an account is outside a threshold distance from any nearby stores that have in inventory a given item, then a default or first option for fulfillment (e.g., shipment) is executed. If a threshold is not exceeded (**1804**), then user-specified rules are invoked to perform a first option for fulfillment (**1806**). In other examples, a different type or structure of threshold may be used and is not limited to a comparison in which a determination is made as to whether the

threshold is exceeded, but instead whether a comparison results in a determination that input data is below the threshold. Likewise, a comparison of input data to a threshold may be performed using data other than location data. For example, a comparison of input data to determine temporal proximity to an impending shipment date may be performed to determine when, within a given threshold from a shipment data (e.g., 72 hours from shipment of a next order of a subscribed item) to generate an alternative retrieval option for, in some examples, picking up or retrieving an item in-store.

[0163] Referring back to FIG. **18**A, parsed account data from input data **1302/1502** is evaluated to identify an item that, when referenced against a lookup table, spreadsheet, record, or other type of database structure, indicates a corresponding IMS (**1808**). Once an IMS has been determined, data may be transmitted from application **1402** using communication interface/API **1426** to IMS **1436** (FIG. **14**) (**1810**).

[0164] Alternatively, if a threshold is exceeded, a call to a service (i.e., a data-based query to a computing service, application, or platform) on a data network, telecommunications network, cellular communications network, or the like is made (**1812**). Calling a service on these networks is performed, in some examples, to request geolocation data for a device associated with an account. Upon receiving a response to a service call, responsive data is evaluated further to determine, for example, geolocation data of a device associated with an account (**1814**). In some examples, geolocation data may include a current location of a device using GPS coordinates, Cartesian coordinates, or cellular network coordinates. Using geolocation data returned in response to a service call, retrieval option(s) are generated (**1816**). However, in other examples, service calls to query and retrieve geolocation data are not required and retrieval options may be generated based on other factors such as temporal proximity to a shipment date. For example, when an item for a subscription approaches a shipment date, a retrieval option may be generated using geolocation data from IMS **1314**-**1318** (FIG. **13**) to determine whether any locations proximate to a user's home address as specified in account data **1306** (FIG. **13**) have the item in inventory. Other alternative retrieval options may be generated and are not limited to those shown and described here. Further, process **1800** may be varied in step, order, function, or description, and the above-described example is provided for purposes of illustrating the described techniques.

[0165] FIG. **18**B is an algorithmic flow diagram of an exemplary process to automatically generate location predictive retrieval using a networked, multi-stack computing environment. Here, a determination is made as to whether item data (e.g., item data **1504** (FIG. **15**)) included in input data (e.g., input data **1302** (FIG. **13**)/**1502** (FIG. **15**)) includes data that, when parsed and evaluated, indicates a first option is to be executed (**1832**). As an example, a first option may be a default option to ship an item of a subscription to a home address specified in account data **1306** (FIG. **13**). However, as described herein in, alternative or retrieval options may be generated, for example, by auto dynamic location resolution engine **1412** (FIG. **14**) that transfer data to client **1432** (FIG. **14**) and IMS **1436** (FIG. **14**). If evaluated input data (e.g., from FIG. **18**A) indicates a first option is required to be executed, the first option is executed by IMS **1436** and process **1830** ends (**1834**). However, if evaluated input data including item data indicates a first option is not required to be executed, then another determination is made as to whether data sent in response to a service call includes geolocation data that, when evaluated, indicates a device associated with an account is proximate to a location stored in an IMS-managed database (e.g., databases **1320-1330** (FIG. **13**)) (**1836**). If not, then process **1830** ends. However, if a device associated with an account is proximate to a location indicated by IMS **1436**, then message data is generated by logic module **1406**, protocol handler **1410**, format engine **1422**, and transferred/transmitted over communication interface/API **1426** and, subsequently, a data command to override the first option is generated and processed, thus preventing shipment in favor of retrieval of the item from a store, warehouse, or other physical location (**1838**). In other examples, process **1830** may be varied in step, order, function, or description, and the above-described example is provided for purposes of illustrating

the described techniques.

[0166] FIG. **18**C is an alternative algorithmic flow diagram of an exemplary process to automatically generate location predictive retrieval using a networked, multi-stack computing environment. Here, a determination is made as to whether item data (e.g., item data **1504** (FIG. **15**)) includes data that indicates a first option is required to be executed (**1842**). If required, the first option is executed and process **1840** ends (**1844**). Alternatively, if item data **1502** does not include data that requires a first option to be executed, then another determination is made as to whether an IMS (e.g., IMS **1436** (FIG. **14**)) has detected an in-process electronic transaction (i.e., received data indicating an electronic data transaction is being performed at a location indicated by location data stored in one or more databases managed and accessed by an IMS (e.g., databases **1320-1330**) (FIG. **13**)) (**1846**). In some examples, a detected in-process electronic transaction may be transmitting data to IMS **1436** (FIG. **14**) identifying an account that has matching data (e.g., payment data, location data, subscription data, or other account data) to that of a record or file stored in account data **1306** (FIG. **13**), subscription data (**1308** (FIG. **13**), or IMS databases **1320-1330** (FIG. **13**). In other examples, a detected in-process electronic transaction may include transmission of item data for items other than an impending subscription fulfillment, but for which potential retrieval options may be generated. If detected, then message data may be generated and transmitted to client **1432** (FIG. **14**) with data indicating one or more retrieval options that, if invoked, would override the first option (**1848**). Process **1840** may be varied in step, order, function, or description, and the above-described example is provided for purposes of illustrating the described techniques.

[0167] FIG. **18**D is another alternative algorithmic flow diagram of an exemplary process to automatically generate location predictive retrieval using a networked, multi-stack computing environment. Here, process **1850** starts by making a determination as to whether item data (e.g., item data **1502** (FIG. **15**)) indicates a requirement to execute a first option (**1852**). If a first option is required, then the option is executed and process **1850** ends (**1854**). If the first option is not required, then a query is sent to IMS requesting inventory data on a given item (**1856**). Responsive data, in some examples, is received from an IMS (e.g., IMS **1314-1318** (FIG. **13**), IMS **1436** (FIG. **14**)) (**1858**). Next, a determination is made as to whether the responsive data indicates the item is available or in inventory at a location proximate to that of a device associated with an account identified in account data **1306** (**1860**). If the item is available, then a message is generated and sent to a device associated with the account including a query requesting input data as to whether to override a first option (i.e., a default option to ship an item for a subscription to an address specified in account data **1306** (FIG. **13**) and/or order/subscription data **1308** (FIG. **13**)) (**1862**). Alternatively, if an item is not available at a location proximate to that of a device associated with an identified account (i.e., an account identified by evaluating account data **1306** (FIG. **13**)), then a further determination is made as to whether application **1402** has detected an in-process electronic data transaction associated with an account identified as being stored in account data **1306** (FIG. **13**) (**1864**). If no in-process electronic data transaction is detected, then process **1850** ends. However, if an in-process electronic data transaction is detected, then message data is generated and sent to a device associated with an account identified in account data **1306** (**1866**) and then process **1850** ends. In other examples, process **1850** may be varied in step, order, function, or description, and the above-described example is provided for purposes of illustrating the described techniques.

[0168] FIG. **18**E is yet another alternative algorithmic flow diagram of an exemplary process to automatically generate location predictive retrieval using a networked, multi-stack computing environment. Here, alternative process **1870** starts by receiving message data from an account identified in account data **1306** (FIG. **13**) indicating a retrieval option has been selected (**1872**). In some examples, process **1870** may be an extended process of those shown and described above in connection with FIGS. **18**A-**18**D that occurs when a response is received to a query included in

message data sent with retrieval option data (i.e., data underlying a query or request to a user to select an option to retrieve an item from a physical location thus overriding a default shipping option). As shown, received message data is evaluated by application **1402** (FIG. **14**) to determine whether there is included data indicating a first option (as described above) has been selected (**1874**). If not, a first option (e.g., a default option to ship an item that is subject to a subscription) is then executed (**1876**). If the message data includes data to override the first option (i.e., the received and evaluated message data includes data responsive to a query presenting retrieval options), then other data is sent to IMS **1436** (FIG. **14**) to prepare the item(s) for retrieval from a location indicated by the selected retrieval option (**1878**). Next, message data is generated and sent to one or more devices associated with an account identified in account data **1306** to confirm the retrieval option and provide item data from IMS **1436** (FIG. **14**) once the item has been prepared for retrieval (**1880**). The message data is prepared and sent in the data format native to the original message data received as input data **1302** (FIG. **13**)/**1502** (FIG. **15**) and using the same data transmission protocol (e.g., TCP/IP, SMTP, SMS, or others). Process **1870** may be varied in step, order, function, or description, and the above-described example is provided for purposes of illustrating the described techniques.

[0169] Although the foregoing examples have been described in some detail for purposes of clarity of understanding, the above-described inventive techniques are not limited to the details provided. There are many alternative ways of implementing the above-described invention techniques. The disclosed examples are illustrative and not restrictive.

Claims

1. A method, comprising: processing data received at an adaptive distribution platform implementing a multi-stack application configured to identify a point of time at one or more levels of a programming stack of the multi-stack application, the point of time being evaluated against a date range associated with a zone of time, the point of time being a function of a usage rate based on a rate of consumption; initiating automatic replenishment of the item by the adaptive distribution platform if the point of time is substantially within the date range; after the initiating, transmitting a message to a client associated with a first location via a transport level of the programming stack, the message including a characteristic of the item and a control user input configured to adapt a scheduled delivery to replenish the item; receiving a response to the message at the adaptive distribution platform; classifying the item based on application of a machine learning application or a deep learning application to automatically predict consumption of the item as a function of the point of time; determining automatically one or more retrieval options proximate to the client at the first location to select a message format protocol associated with the transport level of the programming stack; implementing a portion of the multi-stack application to generate automatically location predictive retrieval data using a networked multi-stack computing environment to determine available inventory at a second location proximate to that of a third location associated with a mobile device associated with an account identified in account data, the available inventory associated with other locations associated with one or more inventory management systems; processing the response to determine whether to automatically adjust the scheduled delivery to replenish the item based on the proximate location that is predicted automatically relative to the device associated with the account identified to form an adjusted scheduled delivery; generating a confirmation message to the client, the confirmation message comprising other data configured, when parsed, to confirm a scheduled delivery of the item; transmitting a control signal from the adaptive distribution platform to a system, the control signal being configured to initiate the scheduled delivery of the item; adapting a predicted distribution event associated with the item and another scheduled delivery by modifying the zone of time based on evaluating the response and the confirmation message to form an adapted predicted distribution

event; using a geo data analysis engine to generate geographic data associated with the mobile device to detect proximity to the other locations associated with the available inventory; detecting a threshold distance between the second location proximate to that of a third location to determine whether to automatically generate an alternate retrieval option to pick up the item rather than delivery; preventing delivery of the item to the first location in favor of the alternate retrieval option the other locations, thereby canceling the scheduled delivery; implementing the machine learning application in the networked multi-stack computing environment to access stored data representing a predictive model to automatically modify model data as function of the adapted predicted distribution event to optimize accuracy of predicting future scheduled deliveries, the machine learning application further configured to adjust the model data to include the second location and at least one of the other locations to predict whether to generate future messages to the mobile device of based on implementation of the alternate retrieval option.