

(43) International Publication Date
18 September 2014 (18.09.2014)(51) International Patent Classification:
C10L 5/40 (2006.01)(21) International Application Number:
PCT/US2014/030811(22) International Filing Date:
17 March 2014 (17.03.2014)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/801,062 15 March 2013 (15.03.2013) US(71) Applicant: PROXIMITY CONCEPTS LLC [US/US];
4938 Rainbow Gulch Trail, Colorado Springs, CO 80924 (US).

(72) Inventors: HAVER, Joe; 4938 Rainbow Gulch Trail, Colorado Springs, CO 80924 (US). HAVER, Tammy; 4938 Rainbow Gulch Trail, Colorado Springs, CO 80924 (US).

(74) Agent: SCHWAAB, Andrew, B.; Dla Piper LLP (US),
2000 University Avenue, East Palo Alto, CA 94303 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report (Rule 48.2(g))

(54) Title: SYSTEMS AND METHODS INVOLVING PROXIMITY, MAPPING, INDEXING, MOBILE, ADVERTISING AND/OR OTHER FEATURES

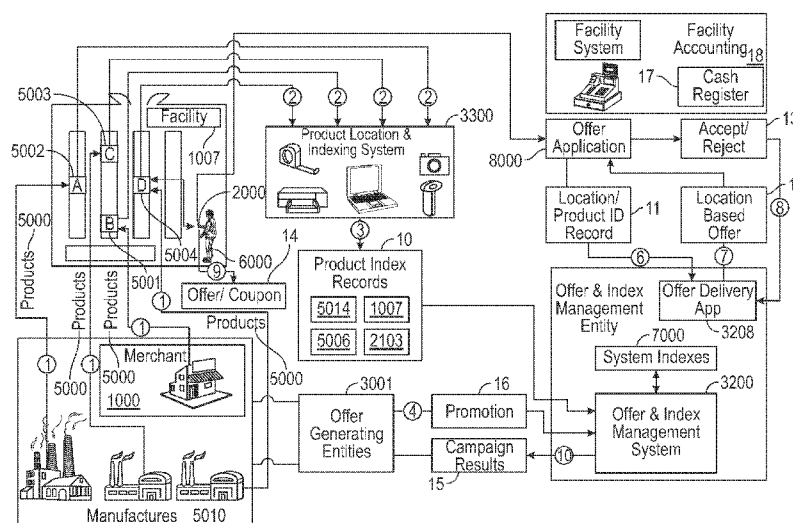


FIG. 1A

(57) Abstract: The present innovations relate to systems and methods involving proximity, mapping, indexing, mobile, advertising, such as contextual product offer implementations based on consumer location and purchasing modes, index-based mobile integrated indoor location processing and mapping, integrated index and location-based offer determination/processing, and mobile integrated offer redemption, among other features.

Systems and Methods Involving Proximity, Mapping, Indexing, Mobile, Advertising and/or Other Features

CROSS-REFERENCE TO RELATED APPLICATION(S)

This application claims benefit of and priority to U.S. provisional patent application No. 61/801,062, filed March 15, 2013, which is incorporated herein by reference in entirety.

BACKGROUND

Field:

The present innovations relate to systems and methods involving proximity, mapping, indexing, mobile, advertising, such as contextual product offer implementations based on consumer location and purchasing modes, index-based mobile integrated indoor location processing and mapping, integrated index and location-based offer determination/processing, and mobile integrated offer redemption, among other features.

Description of Related Information:

Product manufacturers and advertisers provide advertisements in different forms in order to attract or incent consumers to purchase their products. An advertisement is a component of a product promotion and is a form of communication, designed to be used in whole or part, to persuade an audience (consumers, viewers, readers or listeners) to take some action with respect to products, ideas, or services. Examples of traditional advertisements include promotions that are printed and delivered to consumers through the mail or within a newspaper, magazine, flier or other form of printed and distributed media. The advent of wireline and wireless communications networks, including the Internet, has provided advertisers, manufacturers and merchants with new channels and electronic methods for reaching customers and providing information, advertising and offers related to their goods and/or services. Examples of electronically delivered and online advertising include contextual ads on search engine results pages, banner ads, blogs, rich media ads, social network advertising, interstitial ads, online classified advertising, advertising networks and e-mail marketing, including e-mail spam. Many of these types of ads are delivered by an ad server and are based on demographic and consumer information collected by the advertising entity.

An advertisement may include a promotional offer or incentive (e.g., a coupon, rebate, time sensitive discount, cross selling discount or other discount, etc.) to encourage the consumer to purchase a

particular product or service or not purchase a competitive product or service. The presentation of an advertisement to a consumer, or simply the inclusion of a promotion through some form of physical or electronic media can be called an impression. If the consumer purchases the advertised product or service or decides not to purchase a competitive product in response to the advertisement, it can be called a conversion. A conversion is said to occur when a user consummates a transaction related to a current or previously served advertisement. What constitutes a conversion may vary from case to case and can be determined in a variety of ways. The greater the number of conversions relative to the number of advertisement impressions, the more effective the advertisement or promotion is.

In addition to contextual targeting, advertising can be targeted based on a consumer's behavior. This practice is known as behavioral targeting. For example, if a user is known to have recently visited a number of automotive shopping / comparison sites based on analysis enabled by cookies stored on the user's computer, that user can then be served auto-related ads when they visit other, non-automotive sites. However, both traditional and electronic, sales and marketing campaigns are often not as effective as they might be, because they often provide the consumer with advertisements or offers that the consumer is not interested in, or alternatively provide the consumer with advertisements or offers for products they are interested in, but at the wrong time to convert the interest to a sale.

In many cases, a merchant or manufacturer spends resources to send advertisements or promotions to a wide range of recipients without the ability to specifically target consumers interested in the specific products or services they are offering. A good example of this would be a coupon circular in a newspaper or a coupon pack mailed to a particular market. These traditional methods have many disadvantages including, but not limited to, the inability to specifically target end consumers and/or the exact product or service, low conversion rates, significant overhead and high costs.

Additionally, many advertisements and promotional offers are received by the consumer when they are not in an active purchasing mode or cannot take action with regards to the advertisement or offer. Offers such as coupons or rebates often require the consumer to plan ahead and/or collect physical or electronic media in order to take advantage of the offer when they are in an active purchasing mode. Furthermore, consumers may physically receive, through traditional means, or locate merchant or manufacturer's offers on the Internet for goods or services they intend to purchase, but fail to locate desired products at the specific merchant location, hereinafter "facility", within which they are shopping; even when the goods or products desired may be located in close proximity to them. These

scenarios result in discounts or promotions that are not utilized and in consumers, merchants and manufacturers not receiving the benefit of such discounts or promotions.

It is generally accepted that the best time to deliver an advertisement or promotional offer for a product or service is when the consumer is in an active purchasing mode for that specific, alternative or related products (e.g., cross-ruff, competitive, etc). Industry data shows that conversions during the active shopping mode are 5 to 10 times more effective than indirect methods. Additionally, a consumer is also more likely to be influenced by an advertisement or promotion when the product or service is in immediate proximity to them and convenient to purchase or take action on.

Current methods for delivering advertising and offers based on a consumer's interests and location are mainly limited to macro locations (i.e. a mall, store or outdoor location determined by GPS or other methods available on a mobile device). Existing methods do not exist to narrow the customer's location down to an actual row, position in a row, or specific product in a row while shopping. Additionally existing methods do not work in indoor locations with enough granulation to provide meaningful location information for proximity marketing.

There is a need to develop apparatuses and methods to facilitate advertisers in providing targeted sales advertisements and marketing offers to consumers based on the exact consumers' location, including precise indoor locations within a merchant facility, the products and alternative products of immediate interest to the consumer, the consumers active shopping or purchasing mode and historical, demographic and product preferences of the consumer. There is also a need to provide consumers' the ability to easily and quickly find products within a merchant that they are or have previously expressed interest in purchasing or receiving promotions for.

Brief Description of the Drawings

The foregoing brief description as well as further objects, features, and advantages of the present innovations will be understood more completely from the following detailed descriptions of illustrative and non-limiting implementations, with reference being had to the accompanying drawings, which are not necessarily drawn to scale or inclusive of all embodiments.

Figure 1A provides a diagram illustrating the basic processes for a location and product based offer system, in accordance with one or more aspects consistent with the innovations herein.

Figure **1B** provides a block diagram of an offer delivery process flow, in accordance with one or more aspects consistent with the innovations herein.

Figure **2** illustrates macro location determination of a merchant facility and precise locations within such facility, in accordance with one or more aspects consistent with the innovations herein.

Figure **2B** provides a block diagram illustrating an offer delivery process, in accordance with one or more aspects consistent with the innovations herein.

Figure **3A** provides a block diagram illustrating the operating environment of a location and product based offer system, in accordance with one or more aspects consistent with the innovations herein.

Figure **3B** provides a continuation of the a block diagram illustrating the operating environment of a location and product based offer system, in accordance with one or more aspects consistent with the innovations herein.

Figure **4** illustrates a general mobile computing and communication device as used, in accordance with one or more aspects consistent with the innovations herein.

Figure **5** illustrates the important characteristics of a product as used, in accordance with one or more aspects consistent with the innovations herein.

Figure **6A** provides the format of a location ID message describing/defining a precise location for an element/product/tag in a facility, in accordance with one or more aspects consistent with the innovations herein.

Figure **6B** further illustrates how of precise locations are determined and related to each other, in accordance with one or more aspects consistent with the innovations herein.

Figure **6C** illustrates how product precise locations are communicated to a consumer using a mobile offer application running on a mobile communication and computing device, in accordance with one or more aspects consistent with the innovations herein.

Figure **7A** provides a block diagram illustrating the relationship between a consumer's current location, precise location, and movement with offer selection, delivery, notification and acceptance, in accordance with one or more aspects consistent with the innovations herein.

Figure **7B** provides a block diagram illustrating the calculation and maintenance of a current location, beginning from a known precise location, through incorporation of movement data provided an inertial navigation system, in accordance with one or more aspects consistent with the innovations herein.

Figure **7C** provides a block diagram illustrating a process to determine consumer interest in a product location, in accordance with one or more aspects consistent with the innovations herein.

Figure **7D** illustrates a consumer's motions, as detected by a mobile device, which indicate interest in a product location, in accordance with one or more aspects consistent with the innovations herein.

Figure **7E** illustrates a consumer's mobile computing device capturing digital imagery, which indicates interest in a product location, in accordance with one or more aspects consistent with the innovations herein.

Figure **8A** provides a block diagram illustrating a bid and offer parameter process for location based offers, in accordance with one or more aspects consistent with the innovations herein.

Figure **8B** illustrates the presentation of a location based offer, in accordance with one or more aspects consistent with the innovations herein.

Figure **8C** illustrates embodiments associated with a shopper's grocery list being processed and mapped on a GUI, in accordance with one or more aspects consistent with the innovations herein.

Figure **9A** illustrates the use of a product location and index system to "index" a facility, in accordance with one or more aspects consistent with the innovations herein.

Figure **9B** illustrates a representation of a product indexing image, in accordance with one or more aspects consistent with the innovations herein.

Figure **9C** is a flow diagram further describing illustrative product indexing processing, in accordance with one or more aspects consistent with the innovations herein.

Figure **10A** is a diagram illustrating exemplary scanning or obtaining of coupons and/or advertising, in accordance with one or more aspects consistent with the innovations herein.

Figure **10B** is a diagram further illustrating exemplary GUI aspects of scanning or obtaining of coupons and/or advertising, in accordance with one or more aspects consistent with the innovations herein.

Figure 11 is a diagram illustrating various systems and methods for utilization of scanned or obtained coupons or codes, in accordance with one or more aspects consistent with the innovations herein.

Overview of Some Aspects

One advantage/feature of aspects of the systems and methods herein is to sell the delivery of (manufacturer and/or merchant) advertising and/or offers (for a plurality of products) to end consumers on a contextual basis; determined by a consumer's exact location in a store/business/mall and the products they are currently buying, and/or products they are near, the consumer's location specific and/or historical purchasing habits, contextual/demographic information and competitive or cross reference products related to the products the consumer scans to show interest in buying. A core piece and enabling factor of certain implementations, here, may be a location vs. product index/database created for a plurality of stores. This location based index may be utilized to provide a variety of innovative aspects over existing methodologies. For example, other existing methods may involve scanning a product and getting offers for that product from the merchant the consumer is shopping in or from alternate merchants online or nearby. However, such methods do not cover/address the manufacturer of the products. In contrast, systems and methods herein that involve location based index offer innovations allow both merchants and manufacturers to present marketing information and offers to consumers based on their location and related goods etc. at their location. This enables a manufacturer or merchant to present offers that are related to or nearby the consumer. Without the location information, such targeting would not be possible.

Indexing and associated processing herein may utilize the same technologies that search engines use to index the Internet or large and complex databases use to provide fast contextual lookups of specific and interrelated data. Further, the index/database may be continually updated with the specific locations of all products in a particular store(s) (i.e. their exact location(s) in different rows and areas) and the products identifying information. Examples of information in the index would include UPC codes, other scan-able codes, product specific information, manufacturer/merchant information, product offers, product relationships, marketing information, etc. The index information for a particular store can be maintained/updated by the store or a third party that is indexing the store.

An exemplary indexing process of a store may include, but is not limited to, gathering the following information: the physical location of the store (i.e. address, GPS coordinates, building, floor, etc.), the interior dimensions of the store, the location(s)/layout(s) of rows and/or product displays within the

store, the dimensions of the rows and displays throughout the store, row/display specific information (i.e. row number, store directory information for the row, row/display type, etc.), product locations within a specific row/display (i.e. distance from beginning/end of the row, shelf location, end cap, etc.), amount of space taken by the product (e.g. 3 feet long on 2 shelves or 3 products long on shelf #4), product identification information (UPC, other product identification data, etc.), product price, "Row View" (Picture of the product on the shelf/display – similar to "street view" in mapping applications on the Internet) and date/time. Additionally scan-able codes or tags can be placed throughout a store and used to identify a specific location in a store.

In some implementations, the indexing process may use a customized computing and communication device, such as one that is built into a shopping cart or carried by an individual indexing a store/location. This device may incorporate elements such as a processing/computing device, product scanner(s), camera(s), a communication device, batteries, memory/storage, a measurement device that optionally keeps track of where the scanned product is relative to the measurement start point, a user interface, and/or a display.

Exemplary indexing processes may also use manual customer input to create the index. Here, for example, such manual input may involve entering or updating information in the index such as: row number, shelf number, length from start of row, product ID (UPC), length of product space, product price, date/time, etc. Such processes may entail having the store's layout and logistical information entered previously providing the indexer the ability to create/modify a layout manually.

Various other innovative implementations herein involve aspects that provide for manufacturers and/or merchants to enter or bid for offers/promotions to be served to the consumers through the various interface mechanisms. According to various embodiments herein, manufacturers/merchants may use an application provided by the system to enter information for promotions, advertisements, coupons, etc. for their products. Certain embodiments may also allow them to enter in competitive products, complimentary products, or locations in a store where special offers, advertisements or competitive offers are presented. In some implementations, the manufacturers/merchants may bid amounts, impressions and/or conversions they want per product or store or etc. based on a plurality of factors (i.e. cost per impression, cost per conversion, cost per competitive churn conversion, cost per day, impressions per day, etc.) Here, for example, such bidding processes may be similar to technologies used today in search engines and on the internet for providing adwords, banners, popups, etc. Further,

the associated offer database may be incorporated in the same database as the product location index or may be a separate database that is relationally connected to the product location index.

A central component of various product location index implementations is the consumer's mobile computing device which is used to determine the products that a consumer is near in an indoor location. Alternatively, a consumer may checkout a mobile location device at the store. Such device may be used by the consumer to scan the products they are interested in purchasing, which are then used to identify their location in the store, product preferences and shopping habits. If the device has other indoor location capabilities, this can be used instead of product scanning. The mobile computing device can be a consumer provided device (i.e. smart phone, iPad, laptop, tablet, etc.) capable of identifying a product with its camera or a built-in or external product scanner. In some implementations, the identified product is then referenced against the product location index and other factors to identify the consumer's location in the store. The consumer mobile device may also connect to an external product scanner used to identify a product and the subsequent location of the consumer based on the product location index. Other implementations to determine the consumer location may involve a mobile communication and product identification device that is purchased or checked out at the store and used by the consumer while shopping. Alternatively this functionality could be built into a shopping cart. If equipped, the mobile computing devices accelerometer or other motion and acceleration sensing capabilities can be used to estimate movement from a previously identified location. This allows offers to be presented, even when a product hasn't been scanned to update a consumer's location. It also allows the consumer's progress through a store to be mapped.

Additional components of the above systems and methods may include the consumer database, offer delivery application & device(s), and offer redemption process and device(s).

In some implementations, a consumer will sign up for an account with the system/service in order to use it and receive merchant and manufacturer offers while shopping. When a consumer signs up for an account, specific information about them is stored in the consumer database and may be used, in part, to deliver offers to them while they are shopping. This consumer database may be incorporated in the same database as the product location index and/or offer database or may be a separate database that is relationally connected to the other indexes and databases. Here, for example, the system may collect demographic information about the consumer, their product preferences, shopping lists, frequented stores, shopping habits, product savings, etc.

Systems and methods herein may include or involve a mobile offer deliver application, which may be a program that is downloaded and installed on the consumer's mobile computing device. This is the application and GUI that allows the consumer to interface with the system and receive offers as well as scan products (or codes placed within rows) to determine their location. While a consumer is shopping they scan items as they place them into their cart or to indicate their location. Scanning could consist of using the devices camera, a bar code reader, RFID, etc. If there are offers near them that meet their product preferences or are targeted to them by the manufacturers or merchant, they will be presented with offers and/or marketing information. If they choose to accept or reject an offer, they may select the appropriate indicator in the user interface GUI. The user interface GUI will also show their location in the store and even allow the consumer to manually select their location in the store.

In addition to the application features used while shopping, system and methods herein may include additional features that allow the consumers to see their savings, choose their offer and marketing preferences, select "favorite" products so they can be notified when offers exist for those products, enter shopping lists, select recipes that will populate their shopping list with the required ingredients, scan product as they are consumed so they are added to their shopping list and marked on the offer watch list, see and edit their inventory of products/groceries on-hand, share and compete with their 'friends' through social networking, win prizes and incentives based on their product savings, etc. The consumer features of the system can be accessed through the application loaded on their online device or via a web interface on any compatible device connected to the Internet.

A unique feature of embodiments of the user interface is the indoor mapping and routing feature of the application. Here, when the consumer is shopping the application will map out a suggested course through the store to get the products on their shopping list. Their location is updated based on the products they scan and the motion and acceleration detection features of their mobile device. The device could also use wireless signals such as Bluetooth or WiFi to find and maintain their indoor location. There may also be audio and visual indicators when the consumer is close to the products on their shopping list or ones that were added based on offers while shopping or for offers targeting them from the merchant or manufacturers. The application can display a picture of the product the consumer is looking for related to the offer they accepted. The picture can be the "Aisle View" and or a picture of the product.

While shopping a consumer may enter a specific product they intend to purchase or search the store for a product with key words similar to using a search engine on the Internet. Additionally the consumer

can get a list of the 'best' deals available in the merchant facility at that time and get a list of the general or targeted offers for them. These impressions can be selected and added to the consumers shopping list. The application may also use its indoor mapping feature to direct the consumer to the selected offers.

Another element of certain systems and methods herein is the offer redemption component or process. Here, there are several mechanisms for the consumer to cash in the offers they accepted. While shopping, if they accepted an offer, the consumer may choose the appropriate acceptance indicator in the GUI, scan and place the product in their cart. If the merchant has a consumer loyalty program that allows coupons to be electronically loaded to their systems, the offers would be automatically loaded into the merchant's loyalty program and deducted during checkout automatically. If this is not possible, the offers will be displayed on the screen of the mobile computing device and scanned individually by the checker during checkout like a typical coupon. If the merchant or manufacture requires a hard copy of the coupon there are a few methods to accommodate this. The system can transmit the coupons to the store where they are manually printed to be cashed in with the manufacturer. The merchant can have a coupon printing station in the store where the consumer will go to print their coupons. The consumer would login to the station and choose to print their offers. The offers will print much like select coupons are printed today during checkout. Finally if the offer is a rebate or mail in type of offer the consumer will have the ability to print it at home to then manually send it to the manufacturer for redemption.

Systems and methods herein may also have a "competitive" aspect with ties to Social Media. Here, for example modules may facilitate friendly competition between friends, e.g., for most savings, most % of savings, and the like. Such applications may include news feeds about how much you saved, etc. Further, they may be configured such that an advertiser pays to have their products mentioned in a news feed.

To encourage use, the application may include kickbacks to the consumer. For example, a consumer may get money back after using X coupons for Y shopping trips, or for referring friends. Additionally, implementations may randomly select X number of shoppers every day and they get a refund on all scanned items they bought during a qualifying shopping trip. Here, for example, every scanned item gets an entry in such random drawing.

Additionally, various implementations may include or involve information about “coupon codes” that a person can enter into their app. Such implementations may include the ability to scan a code from a commercial or advertisement or get an alpha-numeric code that can be entered manually. These coupon codes may be used like QR codes in magazines, and tie in with the coupon functionality set forth elsewhere herein.

Systems and methods herein may also allow consumers to load traditional or electronic coupons into the application. Such systems and methods may be tied to advertisers, as well; here, for example, implementations may provide a “per customer” service to advertisers for coupon distribution. Embodiments, here, may link to Twitter and other Social Media sources, and gives advertisers real feedback as to the effectiveness of an advertising campaign.

Various implementations herein may utilize specialized user interfaces and GUIs. Here, for example the application display space may be divided or organized according to the functionality in use or desired by the user, e.g., part of the display for shopping, part of the display for offered deals, etc. In some implementations, another part of the display may for advertisements with delivery of advertisements based on a “ranking” determined by known data, such as targets demographics, habits, appeal, relevance, interest, etc.

Systems and methods herein may also include or involve recipe aspects, such as features that also tie back to the advertisers. Here, for example, advertisers may pay for a service where recipes that use their products are delivered/served to the consumers based on their requests, purchasing habits, favorite foods, etc. Additionally, meal ideas can be advertised to consumers while shopping, while using the online application and/or by email.

One illustrative shopping implementation is described below. A set of products in a merchant store are indexed. Indexing is performed by the store or by the institution offering the offer redemption service. Indexing may be automated by using a video or picture based system that also tracks movement through a store and uses image recognition of products.

Various manufacturers may bid amounts against each other for the display of their product offers to the consumers while shopping. Multiple bid methods may be employed and are not limited. The manufacturer may choose a multitude of factors to determine to whom and under which conditions their offers are presented to a consumer

Next, a consumer may load the product offer application on their mobile computing device and enter their product and marketing preferences. The consumer may optionally enter a shopping list or track the products consumed within their households to add to their shopping list. A consumer may also use a web application on their home PC to enter preferences, shopping lists and select recipes.

When the consumer launches the shopping application, the application will receive the store location from the mobile computing devices location information. If a location isn't available, the consumer may choose the merchant for a list or scan an indicator in the merchant facility to identify it.

While shopping, the consumer may scan products as they add them to their cart for purchase. This information is used to determine the consumers location while shopping based on the product location index of the store. Scanned products are used to track a consumers product preferences and shopping habits. As the consumer moves without scanning products, their location is estimated using the motion and acceleration functionality of the mobile computing device. A consumer can also periodically scan a location's unique visual characteristics in a store to update their location.

Based on the consumers location, product preferences, shopping habits, as well as the marketing and offer information and bids from the merchant and manufacturers, the consumer may be presented an offer while they are shopping (referred to hereinafter as an impression).

The consumer will determine if they accept the offer or reject it. The accepted offer may be for the product they just added to their cart (referred to hereinafter as a conversion). The accepted offer may be for a cross-sell or related product which they can add to their cart at a later time to receive the offer. If the additional product is in another area of the store, the consumer may be provided directions to the accepted offers product location and may receive a visual and/or audio indication when they are near the product location. The accepted offer may be for a product that competes with the product just added to their cart. The consumer may choose to remove the recently added item (referred to hereinafter as a competitive churn offer acceptance) or the consumer may choose to purchase the competitive product without removing the original product (referred to hereinafter as a competitive conversion).

The offer may be marketing or advertising information. If the consumer views the information presented it is an impression. If the consumer subsequently adds one or more products related to the information presented it is referred to as a conversion.

When the consumer is done shopping they may redeem their offers via the following methods: automatically adding them to their merchant loyalty card; printing them locally in the store; and, scanning them from the display of their mobile computing device during checkout.

After shopping, the consumer may be presented with their total savings and the potential savings they could have achieved if they accepted all offers. The consumer may compete with their friends via a social network for the greatest savings and savings percentage and for the number of products scanned during shopping. The consumer may enter their information into prize competitions based on their savings and saving percentages and for the number of products scanned during shopping.

Detailed Description of Illustrative Implementations

Embodiments of the present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all, embodiments of the invention are shown. Indeed, the invention may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout. Although some embodiments of the invention described herein are generally described as involving a marketing and advertising institution, one of ordinary skill in the art will appreciate that the invention may be utilized by other businesses that take the place of or work in conjunction with marketing institutions to perform one or more of the processes or steps described herein. For instance, in some embodiments an entity that acts as a clearing house for offers could take the place of the marketing and advertising institution in whole or in part throughout this application.

Figure 1A illustrates a location and product based offer system in accordance with one exemplary embodiment of the present invention. Figure 1A illustrates steps involved in delivering location based offers to a consumer 6000. As illustrated in figure 1A, the first step in the process is the production of and delivery of products 5000 from manufactures 5010 or merchants 1000 to a merchant facility 1007 where they are offered for sale to consumers 6000. A merchant sales facility 1007 is typically stocked with products 5000 from a plurality of manufacturers 5010, which are logically distributed throughout facility 1007 in a hierarchical order based on product type and category and depicted by products 5001, 5002, 5003 & 5004.

The second step, as depicted in figure 1A, is to index the location of all the products **5000** in facility **1007**. This is done by or for the offer and index management entity **3002** by utilizing a product location and index system **3300**. The product location and index system **3300** creates product index records **10** which are communicated to an offer and index management system **3200** managed by the offer and index management entity **3002**. A product index record **10** may be communicated over a network **3003**, using industry standard protocols as described throughout this disclosure, and may include information elements communicating the facility location **1007**, unique product code **5006**, precise product location **2103**, product characteristics **5014** and additional metadata. Step 2 of figure 1A depicts utilizing product location and index system **3300** to create product index records **10**. This active indexing process is not the only method that can be employed to create product index records **10**, therefore, systems outside of what is described herein may be utilized to extract, create, extrapolate and/or communicate all or portions of a product index record **10**.

The offer and index management system **3200** is operatively coupled to system indexes **7000**. As product index records are received and processed by the offer and index management system **3200** they are stored, modified and/or updated in the system indices **7000**.

As further depicted in figure 1A, manufacturers **5010** and merchants **1000** utilize internal or external marketing and advertising firms, referred to as offer generating entities **3001**, to produce and distribute marketing materials, offers and advertisements for their products **5000**. Step 4 of the process involves the offer generating entities creating offers, promotions and or advertisements for their products **5000**. The offer generating entities **3001** interface with the offer and index management system **3200** and create promotions **16** for select products **5000**. According to some embodiments of the present inventions, the promotions created may include one or more digital coupons **8201** and/or location based advertisements **8202**, herein referred to as "offers".

Figure 1A additionally illustrates a consumer **6000** shopping in a merchant **1000** facility **1007** while using a mobile communication and computing device **2000**. As illustrated, consumer **6000** operates an offer application **8000** on their mobile communication and computing device **2000** to communicate location determining information to the offer and index management entity **3002**. In the embodiment depicted in figure 1A, step 5 shows the consumer **6000** scanning a barcode **5012** on product "B" **5001** with the offer application **8000** to identify the product **5000** and check to see if any offers exist in their immediate proximity. The unique product code **5006**, extracted from the barcode **5012**, and is communicated in a location / product ID record **11**, step 6, to the offer delivery application **3208**

managed by the offer and index delivery entity **3002**. Alternately, in another embodiment the consumer **6000** may visually identify the product by using unique characteristics of the product **5000** packaging **5011** to identify it instead of electronically reading its barcode **5012**.

The offer delivery application **3208** is operatively coupled to the system indexes **7000** and offer management applications **3207** within the offer and index management systems **3200**. The offer delivery application **3208** uses the location / product ID record **11** to determine the consumer's **6000** precise location **2103** in the merchant **1000** facility **1007**. The offer and index management systems **3200** use the consumer's precise location **2103** in combination with hierarchical relationship logic **3026**, offer parameters **3013**, and/or consumer **6000** demographics to determine location based offers **12** or advertisements to serve to the offer application **8000**, as depicted in step 7 of figure 1A. Offers **12** or advertisements received in the offer application **8000** may be for the scanned product "B" **5001**, a nearby "competitive" product "A" **5002**, a cross-ruff product "C" **5003**, or another unrelated product "D" **5004** targeted for consumer **6000**.

As illustrated in figure 1A, step 8 depicts a preferred embodiment of the present invention where the consumer **6000** "accepts", "rejects", or "converts" a location based offer **12** or advertisement with the offer application **8000**. The consumer's actions are communicated back to the offer delivery application **3208** by the offer application **8000**. The offer delivery application **3208** communicates the results to the offer and index management system **3200** where it is stored in the various system indices **7000** and analyzed by the hierarchical relationship logic **3026** and made available via the analytics / analysis application **3213**.

Figure 1A, step 9, illustrates one embodiment where the consumer **6000** proceeds to the checkout counter at the merchant **1000** facility **1007** with a product "B" **5001** and "accepted" location based offer **12** associated with product "B" **5001**. During checkout the consumer **6000** presents the offer / coupon **14** associated with the "accepted" location based offer **12** to the cashier. In one embodiment the coupon is scanned into the cash register like a typical paper coupon by scanning the display of the consumers **6000** mobile computing and communication device **2000** while the offer application **8000** is displaying the offer / coupon **14**. This active offer redemption process is not the only method that can be employed to redeem offers, therefore, systems outside of what is described herein may be utilized to extract, create, extrapolate and/or communicate all or portions of a plurality of location based offers **12** and or offer / coupons **14**. Other embodiments include but are not limited to, the location based offer

12 associated with product "B" **5001** is automatically added to the consumer **6000** loyalty card/program with merchant **1000**, the location based offer **12** associated with product "B" **5001** is printed at an offer print station within merchant **1000** facility **1007**, the location based offer **12** associated with product "B" **5001** is electronically fulfilled at time of checkout through communications with the offer and index management entity **3002** and offer and index management system **3200**.

The final step illustrated in figure **1A** is step 10, where campaign results **15** are communicated to the offer generating entities **3001** from the offer and index management system **3200**. Campaign results **15** include information elements on the success of various offer campaigns. Example of these information elements include but are not limited to, conversion rates, display attempts, demographic analytics, revenue, competitive analytics, page/visits, advertisement displays, etc.

The embodiments in Figure **1A** describe embodiments where network **3003** connectivity exists for all of the various communication steps. This active real time offer creation, delivery and redemption process is not the only method that can be employed to realize a location and product based offer system, therefore, systems outside of what is described herein, including offline data stores, cached systems, cached information and cloud systems may be utilized to extract, create, extrapolate and/or communicate all or portions of the location and product based offer system.

Figure **1B** provides a block diagram of one embodiment of an offer delivery process flow **4000**. As illustrated in block **4001**, the first step of this general embodiment involves offer and index management entity **3002** indexing products **5000** at a merchant **1000** facility **1007**. For example, as discussed later in greater detail, a product location and indexing system **3300** is operated to gather product tag unique IDs **5006** and/or location unique visual characteristics **1011** and determine the precise location **2103** of these items/characteristics within a facility **1007**. This data is subsequently loaded into the system indices **7000** of the product offer and index management system **3200**.

Block **4002** of figure **1B** illustrates the offer generation process and involves one embodiment where an offer generating entity **3101** submits offers for products **5000** in a centralized mobile advertising and offer system **3**. For example, as discussed later in greater detail, an offer generating entity **3101** uses an offer generation and redemption system **3100** to define offers, which in one embodiment, contain a product **5000** unique ID **5006**, offer parameters **3013** and offer details **3012**, which are communicated to an offer and index management system **3200**, where they are processed and stored in system indices **7000**.

Block **4003 and 4004** of figure **1B** illustrates an embodiment where a consumer **6000** loads a mobile offer application **8000** on their mobile computing and communication device **2000** and goes shopping at a merchant **1000** facility **1007**, where they use the scanning capabilities of their mobile computing and communication device **2000** and the operatively coupled mobile offer application **8000** to identify product **5000** or unique ID **5006**; which are then communicated via network **3003** to a product offer and index management system **3200**.

Block **4005** of figure **1B** further illustrates the embodiment where the product **5000** and or tag level information **5006** is processed by applications on the product offer and index management system **3200** which is operatively coupled to system indices **7000**, and, in turn, determines the consumer's **6000** precise location, in part, based on the communicated unique IDs **5006**, unique product visual characteristics and/or location's unique visual characteristics **1011**.

Block **4006** of figure **1B** illustrates an embodiment of the offer selection/determination phase of the offer delivery process flow **4000**. In this step, offer and index management system **3200** uses a plurality of information at its disposal to select an appropriate offer or choose not to send an offer. For example, in one embodiment, system indices **7000** contain precise locations **2103** of products **5000** with offers, offer parameters **3013**, consumer **6000** demographics/preferences/interests, and/or other information elements useful for determining relevant location based offers. The applications running on the product offer and index management system use hierarchical relationship logic **3026** in addition to the products unique ID **5006** and/or location's unique visual characteristics **1011** communicated by the mobile offer application **8000** to determine one or more offers or advertisements the consumer **6000** may be interested in receiving. These offers are then communicated via network **3003** to the mobile computing and communication device **2000** and mobile offer application **8000**.

The final step of one embodiment of the offer delivery process flow **4000** is illustrated in block **4007** of figure **1B**. In this embodiment, consumer **6000** accepts or rejects an offer by indicating their desire to the mobile offer application **8000** through the use of a human interface feature available on their mobile computing and communication device **2000** and continues shopping and/or scanning product and/or collecting a location's unique visual characteristics **1011** as described in box **4004**.

Figure **2** provides a diagram illustrating macro location determination of a merchant facility and micro location determination within a merchant facility, in accordance with embodiments of the present invention. Depicted in figure **2** is a merchant **1000** facility with an address or location **1007**, the physical

location or address of a facility **1007** is an example of a macro location. There are several prior art references that describe macro location determination as used by embodiments of the present invention. In order for a location and product based offer system to operate, a macro location or facility **1007** is first determined and communicated to the offer application **8000**. In an embodiment, consumer **6000** uses features of their mobile computing and communication device **2000** to receive signals from GPS satellites **4003**, which are subsequently used to determine the consumer **6000**'s location at facility **1007**.

In other embodiments, consumer **6000**'s location **1007** may be determined from the mobile computing and communication device **2000** through triangulation with RF signals from cell towers **4001** or identification of SSIDs associated with WiFi hotspots **4002** at or near facility **1007**, or by merely inputting or selecting, either audibly or tactically, facility **1007**; it's address / location in the mobile computing and communication device **2000**.

As depicted in figure **2**, a merchant **1000** facility **1007** possesses certain physical traits and characteristics including, but not limited to, number of stories or floors, interior dimensions of length **1009** and width **1010** of a floor, numbered aisles or rows **1001**, **1002**, **1003**, common areas **1004**, shelving units **1005** for holding products **5000** and cases/racks **1006** for holding products **5000**. Additionally, the shelves cases and racks have characteristics such as but not limited to a number of shelves, rows, length, depth and direction of travel. Every product **5000** in a facility **1007** has a precise location **2103**.

Figure **2** depicts the precise location **2103** of product "D" **5004**. In an embodiment of the present invention, precise location **2103** of product "D" **5004** is defined similarly to longitude and latitude, such as "facility **1007**, floor **z**, **x** feet South along dimension **1009**, **y** feet East along dimension **1010**." In another embodiment, additional location information is given such as "aisle '3' **1003**, shelf **1005** with ID **1014** and shelf number **w**." Wherein **w**, **x**, **y** & **z** are variables associated with the various products **5000**. These embodiments, describing a precise location **2103**, are not the only methods that can be employed to describe a precise location **2103** of a product **5000** within a facility **1007**, therefore, methods outside of what is described herein, that adequately describe a products relative location within the 3-dimensional space of a facility **1007**, could be utilized to create precise locations **2103** for a location and product based offer system and are considered potential embodiments of the present invention.

The precise location **2103** of products **5000** depicted in figure **2** are communicated over network **3003** to an offer and index management system **3200** which is operatively coupled to system indices **7000**, which store, organize and make available the precise location **2103** for specific products **5000** at specific facilities **1007**.

As depicted in figure **2**, one embodiment of the present invention includes additional optional elements deployed throughout a facility **1007** to aid in macro and micro location determination. **1004** is a facility ID tag and includes a barcode that communicates the macro location **1007** of the facility. In another embodiment, a location's unique visual characteristics **1011** are identified at precise locations **2103** throughout the facility **1007**. In yet another embodiment a plurality of Bluetooth **4005** tags are distributed at precise locations **2103** throughout facility **1007**. A Bluetooth tag **4005** transmits a computer readable RF signals which are received by a mobile computing and communications device **2000** when in the immediate vicinity of the Bluetooth tag **4005**. A mobile computing and communications device **2000** is able to read the Bluetooth **4005** tags unique ID through these RF communications.

The precise location **2103** of Bluetooth **4005** tags and/or location's unique visual characteristics **1011** depicted in figure **2** are communicated over network **3003** to an offer and index management system **3200** which is operatively coupled to system indices **7000**, which store, organize and make available the precise location **2103** for specific Bluetooth **4005** tags and/or location's unique visual characteristics **1011** at specific facilities **1007**.

Figure **2** further depicts an embodiment where a consumer's **6000** precise location is determined by the offer and index management system **3200** while shopping in a facility **1007**. A consumer scans **4004** an element that possess a precise location **2103** in the system indexes **7000**, by using their mobile computing and communication device **2000** and the operatively coupled offer application **8000**. In a preferred embodiment the scanned element is a product **5000** barcode **5012**. In other embodiments, the scanned element is a Bluetooth **4005** tag, location's unique visual characteristics **1011** or electronically readable or manually enterable element with a precise location **2103**. In embodiments of the present invention, location determination elements are read electronically with consumer's **6000** mobile computing and communication device **2000**, but other embodiments allow consumer **6000** to manually enter location identification information into mobile computing and communication device **2000** using any supported data entry method such as audible voice entry, tactical data entry or

gesture/motion recognition. Offer application **8000** uses the mobile computing and communication device's **6000** network **3003** connection to communicate the scanned elements unique ID information to the offer and index management system **3200**. The offer and index management system **3200** uses the information in the system indexes **7000** to extract the consumer's **6000** location in facility **1007**. In an embodiment of the present invention, once a consumer's **6000** precise location **2103** is determined by the offer and index management system **3200**, a location based offer for a product **5000** at or near consumer's **6000** precise location **2103** is communicated to the offer application **8000**, in this embodiment the consumer **6000** is presented with an advertisement for product "A" **5002** with a sale price of **5015**.

The embodiments in Figure 2 describe embodiments where network **3003** connectivity exists for all of the various communication steps. This active real time location creation, location determination, offer creation, and delivery process is not the only method that can be employed to realize a location and product based offer system, therefore, systems outside of what is described herein, including offline data stores, cached systems, cached information, and cloud systems may be utilized to extract, create, extrapolate and/or communicate all or portions of the location and product based offer system.

Figures **3A** and **3B** provide a block diagram illustrating the operating environment of a location and product based offer system, in accordance with an embodiment of the present invention. Figure **3A** illustrates an embodiment of a centralized mobile advertising and offer system **3**, of the present invention. As depicted in the diagrams of figures **3A** and **3B**, an offer and index management entity **3002** operates one or more offer and index management systems **3200** that are operatively coupled, via network **3003**, to one or more computer systems, including offer generation and redemption system **3100**, operated by offer generating entity **3001**, consumer computer systems **6001** and mobile communication and computing devices **2000**, operated by consumer **6000**, product location and indexing systems **3300**, operated by the offer and index management entity **3002** or its subsidiaries or contractors as well as other systems to manage and administer the system and user accounts, which are not shown.

The operational coupling of aforementioned systems, entities, customers, users, and administrators enable a centralized mobile advertising and offer system **3** where a consumer **6000** at a merchant facility **1007** is able to use mobile computing and communication device **2000** to scan and identify product **5000** and transmit product **5000**'s unique product identification code to offer and index

management systems **3200**, which, in turn, identifies consumer **6000**'s precise location **2103**, based in part on the precise location **2103** of product **5000** as provided by the system indices **7000**, within facility **1007**, as well as products within the proximity of consumer **6000** that have offers available from offer generating entities **3001**, based in part on the precise location **2103** of other products **5000** as provided by the system indices **7000** and hierarchical relationship logic **3026**.

As illustrated in figure **3A**, offer index and management systems **3200** operated by offer and index management entity **3002** use hierarchical relationship logic **3026** and offer parameters **3013** for products **5000** to determine applicable offers to communicate to offer application **3000** running within consumer **6000**'s mobile computing and communications device **2000**.

Network **3003** may include any combination of known or unknown wireless or wireline data connection used for communications, as described above, and may provide communication paths between entities, systems, and devices in the centralized mobile advertising and offer system **3**. In some embodiments of the present invention, the systems associated with the centralized mobile advertising and offer system **3** may be virtualized or used in a cloud computing network or environment. Therefore, systems outside of those specifically described here may be utilized to run, store, pass data to, or receive data from any part of the centralized mobile advertising and offer system **3** elements or functions described herein. It is foreseeable that some connections with network **3003** may not always be active or available. In this event, elements and systems associated with centralized mobile advertising and offer system **3** may use locally stored data or cached information. When network **3003** becomes available again, the systems and elements will transmit any stored offline data and synchronize their caches and data stores with the centralized mobile advertising and offer system **3**.

Communication across network **3003** typically uses standard communication protocols as used by computing systems to communicate on the Internet. Some of these common protocols include Internet Protocol (IP), Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Hypertext Transfer Protocol (HTTP), File Transfer Protocol (FTP), Dynamic Host Configuration Protocol (DHCP), Address Resolution Protocol (ARP), Extensible Markup Language (XML), and Simple Object Access Protocol (SOAP).

Figures **3A** & **3B** illustrate several entities operating computing systems which provide the features or functionality and operation of the centralized mobile advertising and offer **3** system. One such entity, as illustrated in figure **3A**, is the offer generating entity **3001**. Offer generating entity **3001** can be, but is

not limited to, a first entity that wants to distribute offers or advertisements for products **5000** they create, manufacture, manage, sell, advertise market and/or distribute. In an embodiment, offer generating entity **3001** includes a product **5000** manufacturer **5010**, or a merchant **1000** that sells or distributes and combination of its own and/or a plurality of manufacturer **5010** products **5000**.

As further illustrated in figure **3A**, offer generating entity **3001** operates an offer generation and redemption system **3100** which generally includes a communication device **3103**, processing device **3101**, input device **3102**, memory device **3104**, and storage device **3107**, which may be part of or a separate element to the memory device **3104**. The processing device **3101** is operatively coupled to the communication device **3103**, input device **3102** and memory device **3104**.

The processing device **3101** uses the input device **3102** to interface with local users enabling communication of instructions, settings and desires to the offer generation and redemption system **3100**. An input device **3102** is any peripheral (piece of computer hardware equipment) used to provide data and control signals to an information processing system such as a processing device **3103** or other information appliance. Examples of input devices **3102** include but are not limited to keyboards, mice, scanners, digital cameras, microphones, tablets and joysticks.

The processing device **3101** uses the communication device **3103** to interface with network **3003** and a plurality of systems and interconnected applications interfacing with network **3003**, such as, but not limited to, offer and index management system **3200** offer management application **3207**, product management application **3209** analysis / analytics application **3213** and/or other systems or applications of the centralized mobile advertising and offer **3** system not shown. As such, the communication device **3103** generally comprises a network interface card (NIC), modem, wireless network adapter, serial bus connection, parallel bus connection, or any other device known and unknown for connecting to network **3003** and communicating with other elements or devices connected to network **3003**.

As further illustrated in figure **3A**, processing device **3101** executes computer executable code **3105** stored in memory device **3104**, which in one embodiment contains code for an offer generation application **3108** which is visualized for a user through a user interface **3106**, of which code is also stored in memory device **3104**. In another embodiment, memory device **3104** holds computer executable code **3105** for an account management application **3109** and in yet another embodiment, memory device **3104** holds code for web browser **3110**.

Memory device **3104** may contain or be operatively coupled to storage device **3107**. In embodiments of the present invention, storage device **3107** is used by offer generation and redemption system **3100** applications to store information, settings, data, and other storable media required for operation of the system.

As discussed later in greater detail, in one embodiment, the offer generating entity **3001** uses an offer generation application **3108** running on an offer generation and redemption system **3100** and operatively coupled to network **3003** to communicate with an offer and index management system **3200** and create location based offers for products **5000** for the centralized mobile advertising and offer **3** system. In an embodiment, the offers created would be for products **5000** that possess a unique ID **5006** and define offer parameters **3013** and offer details **3012**. In another embodiment, offer generating entity **3001** uses a web browser **3110**, instead of or in conjunction with locally installed applications, to communicate with an offer and index management system **3200** to create location based offers.

As further illustrated in figure **3A**, another entity operating computing systems, which provide some features or functionality and operation of the centralized mobile advertising and offer **3** system, is the offer and index management entity **3002**. Offer and index management entity **3002** is an entity that manages offers for a plurality of entities, with a first entity that wants to distribute offers or advertisements for products **5000** they create, manufacture, manage, sell, advertise, market, and/or distribute.

In an embodiment of the present invention, offer and index management entity **3002** provides a service including but not limited to the hierarchical relationship logic, databases and indexes that enable a centralized mobile advertising and offer system **3**, where a product **5000** manufacturer **5010** or a merchant **1000** creates offers for a plurality of products **5000** that are then served to consumers **6000**, based in part on hierarchical relationship logic **3026**, offer parameters **3013**, precise locations **2103**, and/or other factors.

As further illustrated in figure **3A**, offer index and management entity **3002** operates an offer and index management system **3200** which generally includes a communication device **3203**, processing device **3201**, input device **3102**, memory device **3204**, and storage device **3215**, which may be part of or a separate element to the memory device **3204**. The processing device **3201** is operatively coupled to the communication device **3203**, input device **3202**, and memory device **3204**.

The processing device **3201** uses the input device **3202** to interface with local users enabling communication of instructions, settings and desires to the offer and index management system **3200**. An input device **3202** is any peripheral (piece of computer hardware equipment) used to provide data and control signals to an information processing system such as a processing device **3203** or other information appliance. Examples of input devices **3202** include but are not limited to keyboards, mice, scanners, digital cameras, microphones, tablets, and joysticks.

The processing device **3201** uses the communication device **3103** to interface with network **3003** and a plurality of systems and interconnected applications interfacing with network **3003**, such as, but not limited to, offer generation and redemption system **3100**, offer generation application **3108**, product location and index system **3300**, consumer computer systems **6001**, mobile computing and communication devices **2000**, account management application **3109**, and/or other systems or applications of the centralized mobile advertising and offer **3** system not shown. As such, the communication device **3203** generally comprises a network interface card (NIC), modem, wireless network adapter, serial bus connection, parallel bus connection, or any other device known and unknown for connecting to network **3003** and communicating with other elements or devices connected to network **3003**.

As further illustrated in figure **3A**, processing device **3201** executes computer executable code **3205** stored in memory device **3204**, which in one embodiment contains code for one or more applications such as a management interface **3206**, offer management application **3207**, offer delivery application **3208**, product management application **3209**, consumer management application **3210**, client management application **3211**, location management application **3212**, analysis / analytics application **3213**, web server **3214**, and other applications not shown, of which code is also stored in memory device **3204**.

Memory device **3204** may contain or be operatively coupled to storage device **3215**. In embodiments of the present invention, storage device **3215** is used by offer index and management system **3200** applications to store information, settings, data, and other storable media required for operation of the system. As further depicted in figure **3A**, the applications included in the offer index and management systems **3200**, in whole or in part, make up the logical processing mechanisms that provide the hierarchical relationship logic **3026**, which in turn utilizes information, settings, parameters and or data from the system indices **7000**.

Figure **3A** illustrates an embodiment where system indices **7000** generally include multiple databases and indexes, where system indices **7000** are made up of one or more of these elements which, are operatively stored in memory device **3204** and or storage device **3215**, including but not limited to product characteristic and identification index / database **3020**, product manufacturer database / index **3021**, merchant database / index **3022**, product location database / index **3023**, offer management database / index **3024**, and/or consumer database / index **3025**.

As discussed later in greater detail, in one embodiment, the offer and index management entity **3002** uses a web server **3204** operatively coupled to an offer management application **3209** running on an offer and index management system **3200** and operatively coupled to network **3003** to communicate with a plurality of offer generating and redemption systems **3100** to receive manage and distribute location based offers for products **5000** for a centralized mobile advertising and offer **3** system. In a preferred embodiment, the offers created for products **5000** possess a unique ID **5006**, offer parameters **3013** and offer details **3012** of which information elements are stored in the system indices **7000**. In another embodiment, offer and index management entity **3002** subsequently uses a web server **3214**, in conjunction with locally installed consumer application **3407** or a web browser **3106**, on consumer's **6000** mobile computing and communication device **2000** to communicate location based offers through the offer delivery application **3208**.

Figure **3B** is a continuation of the illustrations in **figure 3A** and, in part, generally depicts a product location and indexing system **3300** operated or managed by the offer and index management entity **3002**, and provides additional features, functionality and/or operation of the centralized mobile advertising and offer **3** system. Offer and index management entity **3002** may directly operate and manage the product and location and indexing system **3300** or it may communicate with another entity providing the functionality and/or information provided by the product location and indexing system **3300**.

In an embodiment of the present invention, product location and index system **3300** reads, identifies measures, receives, calculates and/or determines the unique ID **5006** and precise location **2103** of manufacturer **5010** product **5000** within merchant **1000** facility location **1007**. As depicted in **figure 3B**, product location and indexing system **3300** generally uses a combination operatively coupled peripheral input devices, such as digital camera(s), distance measurement devices, scanners, bar code readers, keyboards, mice, and/or other product and location identification elements not shown, to identify products **5000**, their unique ID **5006** and their precise locations **2103** in a facility **1007** and communicate

such information to an offer and index management system **3200** over an operatively coupled network **3003**.

As further illustrated in figure **3B**, offer index and management entity **3002** operates a product location and indexing system **3300** which generally includes a communication device **3303**, processing device **3301**, input devices **3302**, memory device **3304**, and storage device **3312**, which may be part of or a separate element to the memory device **3304**. The processing device **3301** is operatively coupled to the communication device **3303**, input devices **3302** and memory device **3304**.

The processing device **3301** is operatively coupled to the input devices **3302** and uses them to interface with users and the local 3-dimensional operating environment and generally enables communication of information elements such as instructions, commands, images, settings, computer readable codes, RF data, and measurements that are used to provide data and control signals to an information processing system such as a processing device **3203** or other peripheral appliance. Examples of input devices **3202** include but are not limited to digital camera / video recording devices **3304**, scanner / barcode reader **3305**, distance measurement device **3306** or any other peripheral (piece of computer hardware equipment) keyboards, mice, microphones, tablets, and joysticks.

The processing device **3301** uses the communication device **3303** to interface with network **3003** and a plurality of systems and interconnected applications interfacing with network **3003**, such as, but not limited to, offer and index management system **3200**, location management application **3212**, product management application **3209**, and/or other systems or applications of the centralized mobile advertising and offer **3** system not shown. As such, the communication device **3303** generally comprises a network interface card (NIC), modem, wireless network adapter, serial bus connection, parallel bus connection, or any other device known and unknown for connecting to network **3003** and communicating with other elements or devices connected to network **3003**.

As further illustrated in figure **3B**, processing device **3301** executes computer executable code **3308** stored in memory device **3307**, which in one embodiment contains code for one or more applications such as indexing application **3309**, location application **3310**, mapping application **3314**, web browser **3315**, user interface **3311** and other applications not shown, of which code is also stored in memory device **3204**.

Memory device **3307** may contain or be operatively coupled to storage device **3312**. In embodiments of the present invention, storage device **3312** is used by product location and index system **3300**

applications to store information, settings, data, and other storable media required for operation of the system.

As further depicted in figure **3B**, the product location and index system **3300** may operate with battery / power supply **3313**, which enable portable use of the system throughout a facility **1007**.

Figure **3B** illustrates an embodiment where product location and indexing system **3300** generally communicates information in near real-time with offer and index management system **3200** where the data is subsequently parsed by the various applications and stored in the system indices **7000**. In other embodiments, product location and indexing system **3300** stores the data collected by its input devices **3303** in memory device **3307** and or storage device **3312**, which are operatively coupled through the processing device **3301**. Stored data and information includes but is not limited to product characteristics and identification information, location data, mapping data, store images, product images shelf images and any other data or information collected by the product location and indexing system **3300**. In further embodiments, product location and indexing system **3300** uploads and synchronizes stored data with the offer and index management system **3200** via network **3003** or a direct serial or parallel connection at a later time.

As discussed later in greater detail, in one embodiment, the product location and indexing system **3300** uses a indexing application **3309**, location application **3310**, mapping application **3314**, web browser **3315**, and user interface **3311** operatively coupled to network **3003** to communicate with a plurality of applications operating within the offer and index management system **3200** to receive, process, manage and distribute location and product information to the appropriate system indices **7000**, where they will later be used to determine and deliver location based offers for products **5000** for a centralized mobile advertising and offer **3** system.

Further illustrated in figure **3B** are the general consumer computer systems **6001** and mobile computing and communications device **2000**, which is described in greater detail in figure **4**. In an embodiment of the present invention, the consumer computer system **6001** is a personal computing system operated by the consumer **6000** separately from their mobile computing and communication device. In this embodiment, a personal computer (PC) is any general-purpose computer whose size, capabilities, and original sales price make it useful for individuals, and which is intended to be operated directly by an end-user with no intervening computer operator. Software applications for most personal computers include, but are not limited to, word processing, spreadsheets, databases, Web browsers and e-mail

clients, digital media playback, games, and myriad personal productivity and special-purpose software applications. Modern personal computers often have connections to the Internet, allowing access to the World Wide Web (Internet) and a wide range of other resources. Personal computers may be connected to a local area network (LAN), either by a cable or a wireless connection. A personal computer may be a desktop computer or a laptop, notebook, tablet, netbook, handheld PC or other equivalent system known or unknown.

As further illustrated in figure 3B, consumer computer system 6001 generally includes a communication device 3403, processing device 3401, input devices 3402, memory device 3404 and storage device 3108, which may be part of or a separate element to the memory device 3404. The processing device 3401 is operatively coupled to the communication device 3403, input devices 3402 and memory device 3404.

The processing device 3101 uses the input device 3102 to interface with local users enabling communication of instructions, settings and desires to the offer generation and redemption system 3100. An input device 3102 is any peripheral (piece of computer hardware equipment) used to provide data and control signals to an information processing system such as a processing device 3103 or other information appliance. Examples of input devices 3102 include but are not limited to keyboards, mice, scanners, digital cameras, microphones, tablets, and joysticks.

The processing device 3401 uses the communication device 3403 to interface with network 3003 and a plurality of systems and interconnected applications interfacing with network 3003, such as, but not limited to, offer and index management system 3200, offer delivery application 3208, consumer management application 3210, and/or other systems or applications of the centralized mobile advertising and offer 3 system not shown. As such, the communication device 3403 generally comprises a network interface card (NIC), modem, wireless network adapter, serial bus connection, parallel bus connection, or any other device known and unknown for connecting to network 3003 and communicating with other elements or devices connected to network 3003.

As further illustrated in figure 3B, processing device 3401 executes computer executable code 3405 stored in memory device 3404, which in one embodiment contains code for a consumer offer application 3407, which is visualized for a user through a user interface, of which code is also stored in memory device 3404. In another embodiment, memory device 3404 holds computer executable code 3105 for a web browser 3416.

Memory device **3404** may contain or be operatively coupled to storage device **3408**. In embodiments of the present invention, storage device **3407** is used by consumer computer system **6001** applications to store information, settings, data, and other storable media required for operation of the system. In other embodiments storage device **3408** contains an offline database / index **3409**, which allows mobile offer application **8000** to operate with cached data from the system indices **7000** in the event network **3003** isn't available for real-time transactions or communications.

As discussed later in greater detail, in one embodiment, the consumer **6000** operates a web browser **3406** on their consumer computer system **6001** to interface with an offer and index management system **3200**. Consumer **6000** interfaces with client management application **3211** and configures preferences and settings for their account such as shopping lists, favorite products, product preferences, watch lists, privacy settings, personal settings, loyalty program information, advertising preferences, favorite facility locations **1007** and/or other information relevant to the use and administration of their account and settings/preferences.

Figure **3B** illustrates a general embodiment of the operational environment of the centralized mobile advertising and offer **3** system. As depicted, products **5000** reside in a facility **1007** where their unique ID **5006** and precise location **2103** are determined by a product location and index system **3300** and communicated via network **3003** to an offer and index management system **3200**. A consumer **6000** at facility **1007** uses their mobile computing and communication device **2000** to identify a product **5000**, unique ID **5006** and/or location unique visual characteristics **1011** with a mobile offer application **8000**, which is then communicated via network **3003** to an offer and index management system **3200**. If network **3003** isn't available, mobile offer application **8000** uses an offline database / index **3409**, which allows mobile offer application **8000** to operate with cached data from the system indices **7000** until network **3003** becomes available. Mobile offer application delivers offers to consumer **6000** based on the precise location **2103** of consumer **6000** as determined by precise location **2103** of the scanned identification tag from the system indices **7000**.

Figure **4** illustrates a general mobile computing and communication device **2000** used in accordance with embodiments of the present invention. As further illustrated in figure **4**, mobile computing and communication device **2000** generally includes a communication device **2010**, peripheral/human interface devices **2020**, sensors **2011**, tactical output devices **2017**, memory device **2007** and storage device **2009**, which may be part of or a separate element to the memory device **2007**, of which are all operatively coupled to a processing device **2006**.

The processing device **3301** is operatively coupled to the peripheral/human input devices **3302**, depicted in figure 4, which may include but are not limited to, digital camera **2002**, display **2001**, keyboard **2003**, touchscreen **2018**, microphone **2004**, speaker/sound generator **2005**, and/or button/joystick/mouse/trackball **2019** and, in one embodiment, uses them to interface with consumer **6000** and generally enables communication of information elements such as instructions, commands, images, settings and the local 3-dimensional operating environment, computer readable codes, RF data, measurements and provide data and control signals.

The processing device **2006** uses the communication device **2010** to interface with network **3003** and a plurality of systems and interconnected applications interfacing with the network **3003** and centralized mobile advertising and offer **3** system, such as, but not limited to, offer and index management system **3200**, offer delivery application **3208**, product management application **3209**, and/or other systems or applications of the centralized mobile advertising and offer **3** system not shown. As such, the communication device **3303** generally comprises a network interface adapter (NIC), modem, wireless network adapter, serial bus connection, parallel bus connection, or any other device known and unknown for connecting to network **3003** using either RF signals **4004** or electrical signals and communicating with other elements or devices connected to network **3003**.

As further illustrated in figure 4, processing device **2006** executes computer executable code **2016** stored in memory device **2007**, which in one embodiment contains code for one or more applications **2015** such as mobile offer application **8000**, web browser **2021**, user interface **2008** and other applications not shown, of which code is also stored in memory device **2007**.

Memory device **2007** may contain or be operatively coupled to storage device **2009**. In embodiments of the present invention, storage device **2009** is used by mobile offer application **8000** to store information, settings, data, and other storable media required for operation of the system.

As depicted in figure 4, the mobile computing and communication device **2000**, in one embodiment, contains sensors **2011**, which are operatively coupled to processing device **2006**. Sensors **2011** are used by the mobile computing and communication device to track and measure movements of the device. Examples of sensors **2011** include, but are not limited to, accelerometer **2012**, gyroscope **2013** and optical sensors **2014**, which in one embodiment, are used in whole or in part to monitor, track or measure the mobile computing and communication device's **2000** movement throughout a facility **1007**.

As further depicted in figure 4, the mobile computing and communication device **2000** may operate with battery / power supply **2015**, which enable portable use of the device throughout a facility **1007**. And, in another embodiment, utilize tactile output devices **2017**, which provide physical feedback to consumer **6000** so information can be communicated without the consumer **6000** having to visually look at the display **2001** or listen to the speaker/sound generator **2005** of the mobile computing and communication device **2000**.

Figure 5 illustrates characteristics of a product **5000** as produced by a manufacturer **5010** and offered for sale to a consumer **6000** by a merchant **1000** at a facility **1007** for a price **5015**. When a manufacturer **5010** manufactures a product **5000**, specific characteristics unique to that product **5000** are included on product **5000**'s packaging **5011**. Every product **5000** is given a unique product code **5006** which is typically displayed on the packaging **5011** in the form of a Universal Product Code (UPC) which is typically a barcode **5001** that may be optically read by a computing device with scanner. Additionally, manufacturer **5010** may affix a Radio-frequency identification (RFID) tag **5013** to the packaging **5011**. This allows a product **5000** to be identified electronically without optical or visual scanning by a computing device. As further depicted in Figure 5, a product **5000** has additional characteristics and features that were not intentionally placed on packaging **5011** for product identification by computing devices, but can be used by computing devices with optical capabilities to visually identify product **5000**. These include the shape and size of product **5000**'s packaging **5011**, names and descriptions **5007** as well as pictures and graphics **5008** printed on product **5000**'s packaging **5011**.

As further illustrated in Figure 5, product **5000** is transferred from the manufacturer's **5010** production facility to a merchant facility **1000** for sale to a consumer **6000**. When product **5000** is offered for sale at a merchant facility **1000**, it takes on additional intrinsic characteristics that can be used to determine the location of a consumer **6000**. These characteristics include the merchant **1000**, merchants facilities physical location such as its physical address or longitude and latitude **1007** and the precise location(s) **2103** of the product **5000** within the facility.

The product index system **7000**, described throughout this patent, relies on the identification and location of products **5000** within a merchant **1000**. Figure 6A depicts how products **5001**, **5002** and **5005** are contextually classified within merchant facility **1007**. Products in a facility follow a hierarchical structure similar to that of a library. Figure 6A shows a shelving unit **1005** within facility **1007**. Shelving unit **1005** is associated with a particular aisle **1002** in facility **1007** and has specific characteristics such as

the number of shelves **1008** and length **1009** of the aisle. Every shelving unit is given a unique identification code **1014**. As products **5000** are indexed their precise location **2103** is identified within the facilities **1007** hierarchy. For instance, product A **5001** is indexed in facility **1007** with metadata that includes aisle **1002** (2), shelving unit **1005**, unique ID **1014**, shelf **1008** (3), distance **1012** (5') and direction of aisle travel.

Figure **6A** provides the format of a location ID message describing a precise location for an element in a facility, in accordance with an embodiment of the present invention. As illustrated in figure **4** a location ID message **4000** is a delimited communication message including multiple information elements that describe a precise location **2103**. A preferred embodiment of a location ID message **4000** includes one or more of the following information elements: time and date stamp **4101**, facility ID **4102** (merchant and location code), unique ID **4103** (UPC Code, barcode or ID number), location coordinates **4104** (floor / x distance / direction / y distance / direction / units), supplemental location info **4105** (aisle / row / shelf / length / options), optional flags **4106** and/or metadata **4107**.

Figure **6B** illustrates how precise locations **2103** are determined and related to each other, in accordance with an embodiment of the present invention. As depicted in Figure **6B**, every product **5000** is indexed within a facilities **1007** contextual product hierarchy. Offer index and management system **3200** is able to determine the proximity of products **5000** to each other and consumer **6000**. Every product **5000** possesses a precise location **2103**. In a preferred embodiment of the present invention a precise location **2103** includes location coordinates **4104** and supplemental location information **4105**. By utilizing location coordinates **4104** and supplemental location information **4105**, distances between products **1013**, differences between shelves **1012** differences between aisle and rows can be calculated or determined by the offer index and management system **3200**. Using the information in the system indexes **7000** and hierarchical relationship logic **3026**, the offer index and management system **3200** is able to determine the proximity of products with relevant offers within proximity of the consumer **6000** and subsequently to deliver targeted offers or advertisements to the offer application **8000** and direct consumers **6000** to desired products **5000** associated with the delivered offers or advertisements.

Figure **6C** illustrates how product **5000** precise locations **2103** are communicated to a consumer using a mobile offer application **8000** running on a mobile communication and computing device **2000**, in accordance with an embodiment of the present invention. Depicted in figure **6C** is mobile offer application **8000** displaying a shelf view **8002** of a product "A" **5001** precise location **2103**. In one embodiment, shelf view **8002** shows a digital image of the actual shelving unit **1005** with unique ID **1014**

that was captured by a product location and index system **3300** when product "A" **5001** precise location **2103** was determined. In another embodiment, a digital image of the actual shelving may not be available; in this case shelf view **8002** uses a graphical representation of product "A" **5001** precise location **2103**. In yet another embodiment, product "A" **5001**, or the location of product "A" **5001**, is visually highlighted **8004** so it can be easily distinguished from the other products, such as product "B" **5002**, displayed in the same view/image.

Further depicted in figure **6C** is a location map **8001** showing consumer's **6000** current precise location **2103** within a facility **1007** or portion thereof. In one embodiment, the location map **8001** visually shows the consumers current location **8005** in the location map **8001**. In another embodiment, the location map **8001** includes a visual indication **8006** directing the consumer **6000** from their current location **8005** to the precise location **2103** of a product "A" **5001**. In yet another embodiment, mobile offer application **8000** additionally displays a textual representation **8003** of the precise location **2103** of product "A" **5001** on the display **2001**. For example, a textual representation **8003** of the precise location **2103** of a product "A" **5001** would include a row/aisle indicator, shelf location and distance or section indication.

Figure **7A** provides a block diagram illustrating the relationship between a consumer's **6000** current location **2102**, precise location **2103**, and movement with offer selection, delivery, notification and acceptance; referred to as a consumer location and offer delivery process **7100**.

As depicted in figure **7A**, a consumer location and offer delivery process **7100** begins with block **7101**, where the precise location **2103** of consumer **6000** is determined. In one embodiment, a consumer's **6000** precise location **2103** is determined by scanning scan a product **5000** barcode **5012** and communicating product's **5000** unique ID **5006** to an offer and index management system **3200**, which in turn communicates data with product indices **7000** to determine the consumer's **6000** current precise location **2103**, which is then communicated to consumer's **6000** mobile computing and communication device **2000** and mobile offer application **8000**.

As illustrated in block **7102** of figure **7A**, a consumer moves from their previously known precise location **2103**. Once a consumer **6000** moves, their precise location **2103** is no longer known and becomes an estimated location known as their current location **2102**, which is updated through alternate methods in order to deliver targeted location based offers. Block **7103** in figure **7A** depicts using the motion detecting and measuring sensors **2011** of a consumer's **6000** mobile computing and communication

device **2000** to estimate their movements and update their current location **2102** within a facility **1007**. In a preferred embodiment, a consumer's **6000** precise location **2103** is utilized in conjunction with hierarchical relationship logic **3026**, as depicted in block **7104** of figure **7A** to determine location based offers, which in one embodiment, are determined in real-time by an offer and index management system **3200** and delivered via network **3003** to a mobile offer application **8000**.

In another embodiment, a consumer's **6000** current location **2102** is utilized to determine location based offers, which are determined by a mobile offer application **8000** communicating with an operatively coupled storage device **2009**, which contain cached offers and offer parameters, as well as 'trigger' locations and conditions, as depicted in block **7105** of figure **7A**, that define when and where an offer should be communicated to a consumer's **6000** mobile offer application **8000**.

Block **7107** of figure **7A** depicts a tactical or audible notification being used to notify a consumer **6000** that an offer has been communicated. For example, in one embodiment, a mobile offer application **8000** utilizes the mobile computing and communication device's **2000** tactical output device **2017** to produce a vibration on the mobile computing and communication device **2000**, which can be felt by the consumer **6000**. In another embodiment, a mobile offer application **8000** utilizes the mobile computing and communication device's **2000** speaker / sound generator **2005** to produce an audible tone on the mobile computing and communication device **2000**, which can be heard by the consumer **6000**.

As further illustrated in block **7108** of figure **7A**, after receiving a notification communication an offer in the mobile offer application **8000**, consumer **6000** may choose to interface with the mobile offer application **8000**. If consumer **6000** views mobile offer application **8000**, the offer is displayed as depicted in block **7109** and described in figure **8B**. As further depicted in figure **7A** block **706**, in an embodiment, if a consumer isn't accepting or viewing an offer or scanning a product **5000**, they are moving through facility **1007**, as depicted in block **7106** and their current location **2102** is being updated, as depicted in block **7103** of figure **7A**.

As illustrated in block **7110** of figure **7A**, in one embodiment, if a consumer **6000** accepts an offer; their current location **2102** is updated with a new precise location **2103**, as depicted in block **7101** where process then **7100** continues. As further illustrated in block **7112** of figure **7A**, in one embodiment, at any time after moving from a precise location **2103**, a consumer **6000** may scan a product **5000** and/or location's unique visual characteristics **1011**, after which their current location **2102** is updated with a new precise location **2103**, as depicted in block **7101** where process **7100** then continues.

Figure **7B** provides a block diagram **7200** illustrating the calculation and maintenance of a current location **2102**, beginning from a known precise location **2103**, through incorporation of movement data provided an inertial navigation system. As illustrated in block **7201** of figure **7A**, in one embodiment, a consumer's **6000** precise location **2103** is determined through the use of an offer and index management system **3200** and system indices **7000**, as described in various figures herein.

Once a consumer **6000** moves, their precise location **2103** is no longer known and becomes an estimated location known as a current location **2102**, which is updated in real-time through methods other than those incorporating the location data in the system indices **7000**. Block **7202** in figure **7B** depicts using the motion detecting and measuring sensors **2011** of a consumer's **6000** mobile computing and communication device **2000** to detect and estimate consumer **6000** movements through the use of an inertial navigation system (INS) and data, as illustrated in block **7206** of figure **7B**.

As depicted in block **7230** the INS calculates orientation, direction and acceleration of the mobile computing and communication device **2000**. For example, in one embodiment, motion sensors **2011**, which include accelerometer **2012**, 3-dimensional gyroscope **2013** and compass, of a mobile computing and communication device **2000**, communicate orientation, direction and acceleration of the mobile computing and communication device **2000** to a mobile offer application **8000**, operating inertial navigation algorithms, through an operatively coupled processing device **2006** and memory device **2007**. The orientation, direction and acceleration data is further used to continuously update a consumer's **6000** current location **2102** within a facility **1007** while motion/movement is detected, as illustrated in block **7205** of figure **7B**.

As illustrated in figure **7B**, the processes described in blocks **7203**, **7205** and **7206** are continuously executed to update consumer's **6000** precise location **2103** until a product **5000** or location's unique visual characteristics **1011** are identified, as illustrated in block **7204**, at which time, a new precise location **2103** is determined and process flow **7200** continues from block **7201** with an updated precise location **2103**, as described in the figures herein.

Figure **7C** provides a block diagram **7300** illustrating the calculation and determination of a consumer's interest in a product location **2103** through incorporation of movement data provided an inertial navigation system or digital imaging system. As illustrated in block **7301** of figure **7C**, in one embodiment, a consumer's **6000** precise location **2103** is determined through the use of an offer and index management system **3200** and system indices **7000**, as described in various figures herein.

As a consumer **6000** moves, their movements may indicate interest in products **5000** near a precise location **2103** or current location **2102**. Block **7202** in figure **7C** depicts using the motion detecting and measuring sensors **2011** of a consumer's **6000** mobile computing and communication device **2000** to detect and estimate consumer **6000** movements through the use of an inertial navigation system (INS) and data, as illustrated in block **7206** of figure **7B**.

As depicted in block **7230** the INS calculates orientation, direction, and acceleration of the mobile computing and communication device **2000**. For example, in one embodiment, motion sensors **2011**, which include accelerometer **2012**, 3-dimensional gyroscope **2013** and compass, of a mobile computing and communication device **2000**, communicate orientation, direction and acceleration of the mobile computing and communication device **2000** to a mobile offer application **8000**, operating inertial navigation algorithms, through an operatively coupled processing device **2006** and memory device **2007**. The orientation, direction and acceleration data is further used to continuously update a consumer's **6000** current location **2102** and detect motion/movement that indicate interest in a product location at the consumer current location **2102**, as illustrated in block **7303** of figure **7C**.

As further depicted in block **7306**, the digital imaging camera **2002** of the mobile computing and communication device **2000** is used to capture product **5000** characteristics **5014** such as barcode **5012** ID **5006**, name **5007**, or image **5008**. Barcode **5012** may also be captured from the shelving unit **1005**.

As illustrated in figure **7C**, the processes described in blocks **7301**, **7302**, **7303**, **7304**, **7304** and **7206** are continuously executed to update consumer's **6000** precise location **2103** until a product **5000** location is identified as being associated with a location based offer **8200**, as illustrated in block **7201**, at which time, the offer is presented to the consumer **6000** for their precise location **2103**, as illustrated in block **7109**. The process flow **7300** continues from block **7301** with an updated precise location **2103**, as described in the figures herein.

Figure **7D** provides an illustration **7500** depicting movements that indicate interest in a product **5000** near the consumer's current location **2102**. Consumer **6000** is moving down an aisle **1005** or **1006** and a determined velocity **7502**. The mobile communication and computing device **2000** continuously measures the movements of the consumer through its INS and motion detection functions. The consumer **6000** indicates interest in products near their current location **2102** by rotating toward a product **5000** as depicted by path **7501**, slowing their current velocity **7502** by a determined amount to a slower velocity **7503**, stopping their velocity and/or reversing as depicted in path **7504** for a

determined distance, or moving toward product **5000** as depicted in path **7506**. Product **5001** outside a determined distance to location **2102** may be determined of interest if the hierarchical relationship logic determines it is related to location **2102** and the consumer **6000** follows path **7505**.

Figure **7E** provides an illustration **7600** depicting imagery captured on a mobile computing and communication device **2000** that indicates interest in a product **5000** near the consumer's current location **2102**. As illustrated in figure **7E**, consumer **6000** directs the digital camera **2002** of their mobile computing and communication device **2000** toward a product **5000**. The digital camera **2002** may be part of a wearable computer **7401** or their mobile phone. The consumer **6000** current location **2102** and captured product information **7402** is used to determine the consumer's **6000** interest in product **5000** and update their precise location **2103**.

Figure **8A** provides a block diagram illustrating a bid and offer parameter process for location based offers in accordance with an embodiment of the present invention. As illustrated in figure **8A**, offer generating entities create offer(s) **8001**, which are communicated to an offer index and management system **3200**. In one embodiment, offers **8101** consist of a plurality information elements including, but not limited to product **5000** unique ID **5006**, bid parameters **8102**, offer parameters **8103**, offer details **8104** and performance based advertising parameters **8105**.

As further illustrated in figure **8A**, offer parameters include one or more of, but are not limited to, the following; target demographics **8106**; offer conditions **8107**, such as location parameters, cross-ruff conditions; and/or offer logic **8108**. In one embodiment, target demographics **8106** may include, but are not limited to specific consumer **6000** traits such as sex, age, income class, ethnicity, and/or other demographic metrics. In another embodiment, offer conditions **8107** may include, but are not limited, to purchasing factors such as product preferences, competitive products purchased, consumer's **6000** relationship with the offer generating entity **3001**, and/or other offer limiting or determining conditions. In another embodiment, offer details **8104** may include, but are not limited to; offer value **8109**, which is the monetary value of the offer; offer ID **8110**, which is a unique ID that identifies the offer; barcode **5012**; terms and conditions **8112**; offer type **8114**, such as coupon, advertisement, recipe, etc; and/or an expiration date **8113**. In yet another embodiment, performance based advertising parameters **8105** include but are not limited to an offers monetary factors as they relate to performance based advertising factors such as CPM, CPC, CPL, CPA, and competitive conversion. A competitive conversion is where a consumer **6000** was going to purchase an alternative product, but after receiving the offer decided to purchase the offer product in addition to or instead of the competitive product. For instance,

an offer generating entity **3001**, may determine that they will pay up to \$1.25 CPM for up to \$100 a day and \$0.25 CPA up to \$500 per day and \$0.55 per competitive conversion without a daily limit.

As depicted in figure **8A**, offers **8101** created by the offer generating entity **3001** are communicated to an offer and index management system **3200**, where they are logically classified by the hierarchical relationship logic **3026** and stored in the system indices **7000**.

As further illustrated in figure **8A**, consumer **6000** uses a mobile computing and communication device **2000** operating a mobile offer application **8000** to communicate unique IDs **5006** to an offer and index management system **3200**, which is used to determine the consumer's precise location **2103**. In another embodiment the mobile computing and communication device **2000** operating a mobile offer application **8000** uses an INS to measure movement and calculate a current location **2102**, which is used to determine offers.

As further depicted in figure **8A**, location based offers **8201** and or location based advertisements **8202** are communicated to the mobile offer application **8000** by the offer and index management system **3200**. In another embodiment, the mobile offer application **8000** generates offers based on a cache of the offer index and management systems data/logic contained in its storage device **2009**. Further illustrated in figure **8A**, is a further embodiment where results **8115** are communicated to the offer generating entity **3001**; who then pays performance based advertising fees **8116** to the offer generating entity **3001**.

Figure **8B** illustrates the presentation of a location based offer **8200**, in accordance with an embodiment of the present invention. As depicted in figure **8B**, a location based offer **8200** is presented on the display **2001** of the consumer's **6000** mobile computing and communication device **2000**. A location based offer **8200** consists of multiple interaction options for the consumer **6000**. As depicted in figure **8B** these include the ability to "Accept" **8203** or "Reject" **8204** the location based offer **8200** with the offer details **8201**. As further depicted in figure **8B**, one embodiment allows the consumer **6000** to locate the product **5000** in the offer **8201**, which in one embodiment would result in an output as depicted in figure **6C**.

Figure **8B** further illustrates one embodiment, where a location based advertisement **8202** is presented through the offer application **8000**, which may or may not be related to product **5000** in offer **8200**, in a separate banner advertisement space on the display **2001**.

Figure **8C** illustrates an embodiment where a shopper's grocery list is loaded into the mobile computing device, such as via a consumer computer **6001**. Then, at the store by means of the innovations herein, the shopper will be provided with a map of the store showing the locations of the items on the grocery list, and may even be provided with a rote map illustrating a recommended route through the store to obtain the items most expeditiously.

Figure **9A** illustrates the use of a product location and index system **3312** to "index" a facility **1007**, in accordance with an embodiment of the present invention. One embodiment of the present invention is depicted in figure **9A** and consists of a shelving unit **1005** with a unique ID **1014** residing within a merchant **1000** facility **1007**. In this embodiment, one indexing step is to identify products **5000** and their precise locations **2103** within the macro location **1007**. As depicted in figure **9A**, various products **5000** reside on different shelves **1008** and at different precise locations **2103**, which in one embodiment consist of different distances **9001** from a known point on the shelving unit **1005**.

As further depicted in figure **9A**, the indexing process is conducted by a product location and indexing system **3312**. In one embodiment of the present invention, the product location and indexing system **3312** includes a shopping cart **9003** housing a computing device **3316**, digital camera / video recording device **3304**, measurement device **3306**, barcode scanner **3305**, communication device **3303**, power supply / battery **3313**, display **3316**, and keyboard **3317**. As illustrated in figure **9A**, the various products **5000** possess uniquely identifiable features. In one embodiment, these uniquely identifiable features are captured by the digital camera / video recording device **3304** in the form of a product indexing image **9002**.

Figure **9B** illustrates a representation of a product indexing image **9002** in accordance with an embodiment of the present invention. As depicted in figures **9A** and **9B**, the various products **5000** possess uniquely identifiable features such as the shape **9008** and size **9005** of their packaging **5011**, images **5008** and/or writing such as the products name **5007** and barcodes **5012** on their packaging **5011** and/or the shelves **1008**. In another embodiment, the various distances **9007** of the products **5000** from a known starting point on a shelving unit are used, in part, to determine the product **5000** precise location **2103**, with **9003** possessing a distance of **9001** and **9004** a distance **9006** as depicted in figure **9B**. As further depicted in figures **9A** and **9B**, the measurement device **3306** and/or Bluetooth tags **4005** are used to measure or determine the distance **9007** of each product indexing image **9002** and subsequently captured products **5000**.

Also depicted in figure **9B** is a block diagram outlining product **5000** identification and precise location **2103** determination. The product location and index system **3312** uses edge and characteristic logic **9009** to identify unique product characteristics that are then looked up in a product recognition database **9010**. In another embodiment, if a product **5000** isn't recognized in the product recognition database **9010**, the scanner **3305** can be used to identify the product **5000** by reading the unique ID **5006** contained in its barcode **5012**. In yet another embodiment, once a product **5000** has been identified, environmental logic **9011** taking in to account environmental factors such as, but not limited to, the products distance **9007**, shelf **1008**, presence of Bluetooth tags **4005**, unique visual characteristics **1011** of the area and/or relationship data are used to create the precise location **2103** index information.

Figure **9C** is a flow diagram further describing illustrative product **5000** indexing processing, in accordance with one or more aspects consistent with the innovations herein. According to the illustrative processing set forth in Figure **9C**, an exemplary method for performing indexing processing may comprise: collecting, e.g. via the product location and index system, a product indexing image at a distance "x" along a shelving unit **9100**; storing the image in the product location and index systems storage device **9101**; utilization, via the product location and indexing system, of environmental logic to track location and global characteristics of product indexing image **9102**; using, via the product location and indexing system, edge and characteristic logic to determine product edges **9103**; using, via the product location and indexing system, edge and characteristic logic to extract key product identification features **9104**; using the product identification features to locate product in product recognition database **9105**; utilizing environmental logic to identify a product's precise location **9106**; storing the precise location and product identification information in the mobile computing and communication devices storage device **9107**; and, finally, communicating the precise location, product identification and indexing data to the offer and index management system **9108**.

Figure **10A** is a diagram illustrating exemplary scanning or obtaining of coupons and/or advertising, in accordance with one or more aspects consistent with the innovations herein. Referring to Figure **10A**, an illustrative circular, advertisement or coupon mailer **10001** is shown containing one or more of a variety of coupon or advertising mechanisms, such as standard coupons, barcodes, HCCB codes, QR codes, circular/advertisement codes, and/or other unique IDs or numbers. Further, Figure **10A** illustrates the user device with a digital camera to scan or capture the coupon indicia. Once the information is scanned/captured, Figure **10A** shows the innovations herein providing various GUI functionality on the

user device, including an image of the coupon, the ability to accept or decline the coupon and/or related offers, as well as additional advertisement(s) that may be targeted to the user and populated on the device via the back end processing component(s).

Figure 10B is a diagram further illustrating exemplary GUI aspects of scanning or obtaining of coupons and/or advertising, in accordance with one or more aspects consistent with the innovations herein. Referring to Figure 10B, various exemplary functionality as may be presented on the user device is shown. Here, for example, a selection screen depicting various options a user may have to scan or obtain coupons or deals are shown, including a scan coupons function, a scan advertisement function, and an enter code function. This functionality may be presented as part of various 'deals' or options available to the user, and may be presented with various advertisements related to the products, location or other demographic information known.

Figure 11 is a diagram illustrating various systems and methods for utilization of scanned or obtained coupons or codes, in accordance with one or more aspects consistent with the innovations herein. For example, the mobile offer application of the mobile device displays an offer that may include a scan-able coupon. The consumer shows the display of the coupon to a clerk, who manually scans the coupon(s) shown on the coupon redemption display. Alternatively, the user brings the mobile device within communication range of a coupon station at a merchant facility in order to print out coupons from the mobile device. The mobile offer application is opened to a print coupon dialog for printing the coupons via Bluetooth or WiFi, for example. Once printed, the printed coupons may be scanned at checkout by a clerk in the same manner as traditional coupons. Alternatively, coupons may be added to a consumer's loyalty card by the merchant and has the benefits that no entry is required by the user of the mobile device, and that additional coupons are added automatically at the time of checkout.

Contextual product offer implementations based on consumer location and purchasing mode

The present disclosure relates to the delivery of product promotions and advertising. More particularly, the present invention relates to contextual advertising based on indoor location, product interests, and/or demographics, such as in a mobile indoor environment.

Systems and methods are provided, here, for product advertisement(s) and promotional offer(s) delivered based on consumer product interest, purchasing mode and user location. Embodiments of these innovations may include an offer delivery program run on a mobile computing and communication

device which works in conjunction with a customer's account with a provider and an offer and advertisement system provided by an institution. Here, for example, the offer delivery program may determine the user's location, determine observed and inferred interests for a user, and deliver offers, for observed interests or alternatives, and/or targeted advertisements for products or services within a determined proximity of the user. In some implementations, the user of the mobile device may be notified of availability of determined promotional opportunities, advertisements and information of interest through a mobile computing device.

Embodiments of these systems and methods may address the above-identified problems and disadvantages of the prior art, above stated needs and achieve additional advantages by providing apparatuses, systems and methods, or a combination of the foregoing, that determine a consumer's product interests, both while they are shopping and through empirical means, their exact location within a merchant and uses this product and location information to provide the consumer with advertisements and promotional offers about goods and services (hereinafter "products") matching their interests and/or location while the consumer is in an active purchasing mode making the delivery of promotional offers and advertisements the most effective.

Here, for example, to achieve the best conversion rates and successfully influence consumers to act on an advertisement, offers presented to a consumer should be based on a plurality of factors, including precise location in a merchant/store/facility, the consumer's or product's position in a specific aisle/row/shelf, products scanned or identified of interest by a consumer, the consumer's purchasing history, the customer's shopping list, related products or services, products near the consumer's location, competitive products or services to a nearby product, consumer specific marketing information, the customer's advertising preferences with a merchant, manufacturer, institution or advertiser, the customer's relationship with the merchant or manufacturer of a product, etc.

Marketers typically combine several variables to define a demographic profile. A demographic profile (often shortened to "a demographic") provides enough information about the typical member of this group to create a mental picture of this hypothetical aggregate. For example, a marketer might speak of the single, female, middle-class, age 18 to 24, college educated demographic.

Researchers typically have two objectives in this regard: first to determine what segments or subgroups exist in the overall population; and secondly to create a clear and complete picture of the characteristics of a typical member of each of segments. Once these profiles are constructed, they can be used to

develop a marketing strategy and marketing plan. The five primary types of demographics for marketing are age, gender, income level, race and ethnicity, but a demographic can extend beyond these basic parameters.

It becomes clear from the above description that, if an advertiser could identify a consumer's precise location in a merchant facility and correlate this location information with the consumers product preferences, purchasing habits, purchase mode, demographic information and the advertisers marketing strategies, they would be able to better target their advertisements and achieve better results.

To solve this problem, embodiments of the present inventions may utilize a mobile computing and communication device, also known as a portable computing device, in a consumer's possession, to determine products of interest to the consumer, communicate information about products over a digital network to a centralized offer management application, that is used to determine the consumers exact location in a merchant, determine targeted location based advertisements, and deliver these advertisements over a digital communications network while the consumer is in an active purchasing mode.

Generally, embodiments of the current inventions may achieve this through a location and product based offer system that communicates with an application loaded on a mobile computing and communication device, hereinafter the mobile offer application. Recent advancements in computing technology have taken the processing power previously only available on personal computers (PCs) or laptop computers and miniaturized it into mobile computing devices that are carried by many consumers. Examples of consumer based mobile computing devices, used in embodiments of the invention, are set forth further below.

As set forth in part, for example, in connection with Figure 2B, embodiments of the current inventions may utilize a mobile computing and communication device's mobile network connection to communicate location specific offers from a centralized location and product based advertising and offer system, to the mobile computing and communication device over a digital network. The digital network used to communicate with the mobile computing device can consist of a combination of wireline and wireless networks and networking technologies.

Various embodiments of the present invention may also utilize or rely on one or a plurality of indexes, databases, and two & three dimensional (3D) maps of locations which contain information such as

product or item identification information, product or item location information, location based offer information, offer determination information and/or other information required for the operation of the system relative to these locations. The database(s) and index used to provide spatial product, item, ID tag and location information (hereinafter "Index") may include one or more of the following technologies or methodologies: spatial database, relational database, multidimensional database, hierarchical database, flat file database, spatiotemporal database, data cube, online analytical processing (OLAP) cube, grid index, spatial index, suffix tree index, inverted index, ngram index, bitmap index, (dense index), sparse index, reverse index, etc. or any known or future methods for storing, searching, accessing and indexing data for logical, two and three dimensional environments. Additionally, parsing breaks apart the components (words or numbers) of a document or other form of media for insertion into forward and inverted indices. The elements found are called tokens, and so, in the context of indexing and natural language processing, parsing commonly referred to as tokenization. It is also sometimes called word boundary, tagging, text segmentation, content analysis, text analysis, text mining, concordance generation, segmentation, lexing, or lexical analysis. The terms 'indexing', 'parsing', and 'tokenization' are used interchangeably and are consistent with the indexing described in certain embodiments of the present invention. It is contemplated that some embodiments of the present invention would provide methods to support storing indexed data in clustered and non-clustered environments and/or in cloud computing or virtualized environments.

Further, in accord with embodiments of the present invention (e.g., Fig. 2, etc.), a consumer precise location can be determined by using a mobile computing and communication device, the Internet, a Network and a product/tag index/database. Many mobile computing and communication devices include location based services and features. These location determination features can be used by the mobile offer application to determine the macro location of the mobile computing device. A macro location is a low resolution position and is typically limited to outdoor spaces and building/address level resolution. However, the resolution of a typically mobile computing and communication device's location services is generally not granular enough to provide targeted advertisements or marketing messages while indoors or while a consumer is viewing a particular product or at a specific location in a store. In many cases, a mobile computing and communication device's location service is not capable of working when the device is in an indoor location where a clear view to the sky is not possible.

Various embodiments of the present inventions may use the location based services of the mobile computing device to identify a user's macro location and then incorporate the methods associated with

the features of the “System and method for determining indoor location through index mapping” aspects herein to determine a user’s exact indoor location. Specifically, in one embodiment of the present invention (e.g., Figs. 1 and 2, etc.) a consumer would use the mobile offer application in conjunction with their mobile computing and communication device, product identifying information, location identifying information and a network connection to or cached store of an index to identify their location in an indoor or outdoor shopping location while looking at a product of interest. A user accomplishes this by using the barcode scanner or the image capture functionality of a mobile computing and communication device to visually identify or electronically identify products or unique location identifying information. A user may also manually enter a code, ID number, select a product from a list, audibly enter product or location information, etc... to identify their location through the mobile offer application, as shown for example, in Figs. 2 and 4, etc.

Examples of electronically readable codes, tags and IDs that can be scanned by or entered into a mobile computing device include, but are not limited to, product ID codes or numbers; location ID codes or numbers, Universal Product Codes (UPC); linear barcodes including postal coding formats; stacked linear barcode symbol formats such as PDF417; matrix barcodes such as Aztec code, semacode and Quick Response (QR) code; polar coordinate barcodes such as MaxiCode; High Capacity Color Barcode (HCCB); RFIDs; Bokode; dot matrix codes; ZigBee; Bluetooth tags; etc...

In some embodiments of the present inventions, such as shown in Figs. 1 and 2 for example, the mobile offer application uses visually unique product identifying information, electronically readable product codes or unique location identifying features or data to determine the consumer’s exact indoor location through index information provided by the product offer and index management system. This is accomplished by using a product and/or location unique visual characteristic index and the methods associated with the features of the “System and method for determining indoor location through index mapping” aspects herein. The mobile computing device may use the Internet or a Network connection to communicate its macro location and the product identification codes/data and or ID tag/code information to an index database operatively coupled to a location identification application.

Alternatively, the mobile computing device may contain a locally cached index and location identification application and index in its memory. The index and location identification application is used to determine the exact indoor or outside location of the consumer within a macro location as well as to identify products or offers of interest within the immediate proximity of the consumer, referred to as the consumer’s precise location.

Another embodiment of the current invention uses the mobile computing and communication device's motion detection and movement measuring components, such as Microelectromechanical Systems (MEMS) accelerometers, gyroscopes, altimeter, etc... to track acceleration, motion and movement of the consumer (e.g., Fig. 4). This allows the Mobile Application to maintain the consumer's specific location within a macro location during the periods between product or location identification scans. To achieve this, the mobile offer application could connect to a map of the macro location through its Network connection, the Internet or use a locally cached map of the macro location stored in its memory. The index determined precise location is then updated and maintained in the macro locations map based on the movement and motion information gathered from the mobile computing and communication device's sensors through the incorporation of an inertial navigation system (INS) using the available sensors in the mobile computing and communication device.

An inertial navigation system includes at least a processing device and module containing accelerometers, gyroscopes, or other motion-sensing devices. The INS is initially provided with its position and velocity from another source (a human operator, a GPS satellite receiver, etc.), and thereafter computes its own updated position and velocity by integrating information received from the motion sensors. The advantage of an INS is that it requires no external references in order to determine its position, orientation, or velocity once it has been initialized.

An INS can detect a change in its geographic position (a move east or north, for example), a change in its velocity (speed and direction of movement), and a change in its orientation (rotation about an axis). It does this by measuring the linear and angular accelerations applied to the system. Since it requires no external reference (after initialization), it is typically immune to outside influences.

Inertial-navigation systems are used in many different moving objects, including vehicles—such as aircraft, submarines, spacecraft—and guided missiles. However, their application has been spreading to consumer devices such as video game controllers and mobile phones.

Gyroscopes measure the angular velocity of the system in the inertial reference frame. By using the original orientation of the system in the inertial reference frame as the initial condition and integrating the angular velocity, the system's current orientation is known at all times. This can be thought of as the ability of a blindfolded passenger in a car to feel the car turn left and right or tilt up and down as the car ascends or descends hills. Based on this information alone, the passenger knows what direction the car is facing but not how fast or slow it is moving, or whether it is sliding sideways.

Accelerometers measure the linear acceleration of the system in the inertial reference frame, but in directions that can only be measured relative to the moving system (since the accelerometers are fixed to the system and rotate with the system, but are not aware of their own orientation). This can be thought of as the ability of a blindfolded passenger in a car to feel themselves pressed back into their seat as the vehicle accelerates forward or pulled forward as it slows down; and feel themselves pressed down into their seat as the vehicle accelerates up a hill or rise up out of their seat as the car passes over the crest of a hill and begins to descend. Based on this information alone, they know how the vehicle is accelerating relative to itself, that is, whether it is accelerating forward, backward, left, right, up (toward the car's ceiling), or down (toward the car's floor) measured relative to the car, but not the direction relative to the Earth, since they did not know what direction the car was facing relative to the Earth when they felt the accelerations.

However, by tracking both the current angular velocity of the system and the current linear acceleration of the system measured relative to the moving system, it is possible to determine the linear acceleration of the system in the inertial reference frame. Performing integration on the inertial accelerations (using the original velocity as the initial conditions) using the correct kinematic equations yields the inertial velocities of the system, and integration again (using the original position as the initial condition) yields the inertial position. In our example, if the blindfolded passenger knew how the car was pointed and what its velocity was before he was blindfolded, and if they are able to keep track of both how the car has turned and how it has accelerated and decelerated, they can accurately know the current orientation, position, and velocity of the car at any time.

All inertial navigation systems suffer from integration drift: small errors in the measurement of acceleration and angular velocity are integrated into progressively larger errors in velocity, which are compounded into still greater errors in position. Since the new position is calculated from the previous calculated position and the measured acceleration and angular velocity, these errors accumulate roughly proportionally to the time since the initial position was input. Therefore the position is periodically corrected by input from some other system.

Accordingly, inertial navigation is usually used to supplement other navigation systems, providing a higher degree of accuracy than is possible with the use of any single system. For example, if, a current location is intermittently updated by determining a precise location from a known source such as an indexed location or product tag within a location, the position maintained by an INS will remain precise for a much longer time.

Estimation theory in general, and Kalman filtering in particular, provide a theoretical framework for combining information from various sensors in a INS. By properly combining the information from an INS and other systems (GPS/INS/location index), the errors in position and velocity can remain stable. Furthermore, INS can be used as a short-term fallback to determine a current location between precise locations updates where product and/or location unique visual characteristics are identified.

Various embodiments of the innovations herein may use the precise location and product information provided by the index and location identification application to present offers to the consumer, through the mobile offer application, based on their specific precise location as determined by the location identification application. This is accomplished by using a product and/or location unique visual characteristic index and the methods associated with the features of 'System and method for delivery of contextual advertising through location, product interest and index mapping' aspects herein. It is contemplated that, in some embodiments of the present invention, offers for other products within their immediate proximity, alternative products, related products, etc... would be presented to the consumer through the mobile offer application (e.g., Figs. 6C, 10A, etc). It is also contemplated that, in some embodiments of the present invention, the mobile offer application would present offers or advertisements to a consumer by tracking their movement through the macro location through the use of the mobile computing and communication device's sensors, after initially establishing a base precise location (e.g., Figs. 1, 2, etc.) It is contemplated that the contextual advertising, described herein, will use performance-based advertising methodologies and pricing philosophies.

Performance-based advertising is a form of advertising in which the purchaser pays only when there are measurable results. Performance-based advertising is becoming more common with the spread of electronic media, notably the Internet, where it is possible to measure user actions resulting from and advertisement or offer.

There are four common pricing models used in the online performance advertising market:

CPM (Cost-per-Mille, or Cost-per-Thousand) Pricing Models charge advertisers for impressions, i.e. the number of times people view an advertisement. Display advertising is commonly sold on a CPM pricing model. With CPM advertising is that advertisers are charged even if the target audience does not click on the advertisement.

CPC (Cost-per-Click) advertising overcomes problems associated with CPM pricing models by charging advertisers only when the consumer clicks on the advertisement. However, due to increased competition, search keywords have become very expensive.

Cost per Lead (CPL) pricing models are the most advertiser friendly. CPL models allow advertisers to pay only for qualified leads as opposed to clicks or impressions and are at the pinnacle of the online advertising ROI hierarchy. In a Cost-per-Lead pricing model, advertisers pay only for qualified leads - irrespective of the clicks or impressions that went into generating the lead.

Cost per Action (CPA) is where advertisers pay for a specific action such as a credit card transaction or purchase transaction (also called CPO, Cost-Per-Order).

In CPA campaigns, the advertiser typically pays for a completed sale involving a credit card transaction or purchase and is typically the most expensive "cost-per" advertising model. CPA is all about 'now' -- it focuses on driving consumers to buy at that exact moment. If a consumer doesn't buy anything, there's no easy way to re-market to them and no cost associate with the initial marketing.

Embodiments of the present invention focus on the CPA model, but all performance marketing models can be contemplated to be supported.

It is further contemplated that, in some embodiments of the present invention, the image capture capabilities of the mobile computing and communication device could be used to passively collect product, 3D special or electronically readable tag images as a user navigates through a 3D space, as shown in Fig. 9B. These images would be used to identify products, isles or rows by their visually unique characteristics, visible or electronically readable tags. As specific products or electronically readable tags are identified, the user's location is updated using the product and location index either locally or over a network connection. Additionally, physical and visual characteristics of the precise location inside the macro location, such as rows, signs, isles, walls, windows, floors, tiles, etc... may also be indexed and used to identify the precise location of the user. This is similar to the methods used by the human brain to recognize faces and locations. Throughout a macro location exist physical objects with unique visual characteristics. These characteristics will have key identifying components that differentiate them from one another, similar to a fingerprint, which can be identified, collected and then used to identify a precise location based on the special relationship of the viewer to the characteristics.

Various embodiments of the present inventions are configured to enable the consumer to accept or reject offers presented through the mobile offer application (e.g., Fig. 8B). In such embodiments, the mobile offer application could communicate a consumer's product and offer preferences to a centralized location and product offer application. Additionally, accepted offers would preferably be stored locally in the memory of the mobile computing and communication device or in centrally located applications accessed over a Network or the Internet by the mobile offer application; using the mobile computing and communication device's network connection(s). The 'System and method for delivery of contextual advertising through location, product interest and index mapping' aspects herein teach how a consumer's specific location, expressed product interests through scans, offer acceptances or rejections and available offers impact the contextual advertisements delivered to the mobile offer application.

Certain embodiments herein may use the mobile computing and communication device's human interface features to enable a consumer to accept or reject offers. Methods to accept or reject an offer through the mobile computing and communication device could include; tactically selecting an indicator on its display, using the motion detection sensors to communicate or input a gesture, audibly communicating a selection, pressing a button, tapping a keyboard, or by using any other method of interfacing with the mobile computing device to communicate an intention or command such as shown in Fig. 4.

Alternatively, the current invention could present a map from the consumer's current precise location to the precise location of a product of interest, an accepted offer for a product in a different location or a precise location within the macro location (e.g., Figs. 6C, 8C, etc.). This is accomplished by using macro location maps/floorplans, a product and/or location unique visual characteristic index and the methods associated with features of the 'System and method for maintaining indoor location and providing directions' aspects herein. Additionally a consumer could search for or enter a product into a mobile offer application and have the application map the desired product from their current location and potentially provide a picture of the product and/or its exact location on a shelf.

Other embodiments of the invention allow a consumer to manually search for a product(s) of interest within the current or a future macro destination(s) to see if the product(s) of interest are present at the macro location and if offers exist for those products. The consumer would be able to use the mobile offer application to select items of interest from a list of products in a store, facility or macro location, search for a specific product, enter product specifics via a keyboard or tactical input device, use voice

recognition technologies to input product specifics or interests. The mobile offer application, product and location index and/or offer application would determine the location(s) of applicable product(s) and provide mapping to them as well as offers, advertisements, marketing or information to the consumer or other application(s) (e.g., Figs. 4, 6C, 8B, 8C, 10A, 10B, etc).

Alternatively, the current invention could allow a consumer to use a local or web based application to perform the above mentioned product searches and identify products of interest to them on a typical or non-mobile computing device such as a desktop Personal Computer (PC), gaming system, computing capable TV, or any other element capable of executing computer executable code and possessing a Network connection (e.g. Fig. 3). In all embodiments, the current invention allows the consumer to create shopping lists and identify products of interest. The mobile offer application could create maps to products on the shopping list through the macro location. Embodiments herein may also notify the consumer visually, tactically and or audibly when they are in close proximity to a product of interest, a product on their shopping list or a product the location and product based offer system determines would be of interest to the consumer (e.g., Figs. 4, 6C, 8B, etc.)

As shown in FIG. 6C, 8B, and 9B, for example, it is contemplated that some embodiments of the present invention would provide a "Shelf View" of a specific location in a store to aid a consumer in finding/locating a specific product. This shelf view would be similar to existing technologies for geographic mapping that show pictures or graphical representations of geographies, streets, buildings, addresses, etc... Similarly, the shelf view would provide picture or graphical views of a specific shelf/location in a macro location as determined by a consumer's current or product of interest's precise location. The product of interest could be highlighted in the view to allow a consumer to more easily locate a specific product of interest among all other products in its proximity.

Other embodiments may track the location of a consumer over time as well as their product purchases and preferences. This information could be captured and stored by the mobile application or centralized location and product based offer system and may be incorporate in an index specific to that consumer (e.g. Figs. 2, 3, 8A, etc.)

In all embodiments, the current invention allows consumers to identify products they intend to purchase and to redeem offers they accepted for the products they intend to purchase. Offer redemption can be achieved using multiple methods. The consumer can use the mobile offer application to visually display an image on the devices display that is capable of being scanned by a

cashier or bar code scanner like a typical coupon, such as shown in Fig. 10A. The mobile offer application could alternatively use the mobile computing and communication devices network, Bluetooth or a devices physical serial or parallel connection, such as a Universal Serial Bus (USB) connection, etc. to electronically add offers to a consumer's loyalty card/account or a payment system at that macro location. Another method would allow the mobile offer application to use the mobile computing and communication devices Network, Bluetooth or a physical connection, such as a USB connection, etc... to interface with a printing device at the macro location to physically print coupon like offers for redemption, as shown in FIG. 11. Alternatively, the location and product based offer system could interface with a printing device or offer redemption service at the macro location over a Network and/or the Internet to print and/or automatically or electronically redeem offers as a consumer checks out with a representative/cashier at the macro location.

It is further contemplated that in some embodiments a consumer would be able to scan the images of traditional coupons into the system and use these digital images of coupons in the same way a traditional coupon would be used, eliminating the need to clip and organize coupons. It is further contemplated that a digitally scanned coupon would automatically be added to the consumers shopping list so they do not forget to use the coupon while shopping. Additionally, commercials, billboards audio or print advertisements can include simple coupon or offer codes that could be entered into the system and organized or redeemed using the methods discussed herein.

Other embodiment include application or live features used while shopping that allow the consumer to see their savings, choose their offer and marketing preferences, select "favorite" products so they can be notified when offers exist for those products, enter shopping lists, select recipes that will populate their shopping list with the required ingredients, scan product as they are consumed so they are added to their shopping list and marked on the offer watch list, see and edit their inventory of products/groceries on-hand, share and compete with their 'friends' through social networking, win prizes and incentives based on their product savings, etc. It is contemplated that these features of the system can be accessed through applications loaded on their mobile computing and communication device or via a web interface operating on any compatible device connected to the Internet.

It is to be understood that both the foregoing general description and the following detailed description are by examples and are intended to provide further explanation of the invention as claimed and may not describe all possible embodiments of the present invention.

Implementations and Other Nuances

Examples of consumer based mobile computing devices, used in embodiments of the invention, include smartphones (iPhone, Android, Blackberry, etc.), personal digital assistants (PDAs), cell phones, tablet PCs (iPad, Zoom, Playbook, Galaxy, etc.), phablets (ultra-mobile personal computing devices that are larger than a smartphone, but smaller than a tablet), e-book readers also known as e-readers (nook, kindle, etc.), wearable computers taking the form of watches, wrist PCs, portable music devices, etc., portable or wearable augmented reality devices that interface with a user's environment through sensors and actuators and can use head-mounted displays and virtual retinal displays for visualization and or data communication purposes, or any similar portable computing devices. Mobile computing and communication devices are not limited to the above listed consumer based devices. Embodiments of the current invention could operate on any existing or future mobile computing or augmented reality device.

In general, a mobile or portable computing device is defined as any device small enough to be carried in a hand, connected to a shopping cart, or worn on the body, that possesses one or more of the following key components: a central processing unit (CPU), hereinafter "processing device", application specific integrated circuit (ASIC), integrated circuit (IC), or microprocessor, capable of executing computer readable code or instructions; a display/presentation device to present information in visual or tactical form to the user, such as light emitting diodes (LEDs), liquid crystal displays (LCDs), electroluminescent displays (ELDs), electronic paper/e-ink, plasma display panels (PDPs), thin film transistors (TFTs), organic light emitting diodes (OLEDs), laser displays, holographic displays, tactical electronic displays, or any other existing or future methods for visually, audibly or tactically presenting information or images to a user; a human interface or input device such as a touch screen, keyboard, stylus, mouse, trackball, button, scanner (barcode, laser, LED, image, CCD, etc.), camera, headset, pointing stick, joystick, motion sensor, microphone, gesture recognition, or any other existing or future methods for humans to tactically, visually or audibly communicate commands and controls or data to the mobile device; volatile or non-volatile memory used by the mobile computing and communication device such as ROM, RAM, NVRAM, flash memory, EPROM, EEPROM, or any other existing or future methods for the mobile computing and communication device to store and execute computer readable code or data; a mobile power source such as a battery, solar cell, fuel cell, capacitor, generator or any other existing or future

methods for storing and releasing or generating on demand power for the mobile device; and optionally an audio device such as a typical speaker, piezoelectric audio device, magnetostrictive speaker, digital speaker, or any other existing or future methods for generating human audible sound waves; and a mobile network communications device used to communicate information over a digital wireless or wireline network.

A processing device is the hardware within a computer or computing device that carries out the instructions of a computer program or computer executable code by performing the basic arithmetical, logical, and input/output operations of the system. Hardwired into a processors design is a list of basic operations it can perform, called an instruction set. Such operations may include adding or subtracting two numbers, comparing numbers, or jumping to a different part of a program or executable code. Each of these basic operations is represented by a particular sequence of bits; this sequence is called the opcode for that particular operation. Sending a particular opcode to a CPU will cause it to perform the operation is represented by that opcode. To execute a computer executable instruction in a program, the CPU uses the opcode for that instruction as well as its arguments (for instance the two numbers to be added, in the case of an addition operation). A computer program is therefore a sequence of instructions, with each instruction including an opcode and that operation's arguments. The actual mathematical operation for each instruction is performed by a subunit of the processor known as the arithmetic logic unit (ALU). In addition to using its ALU to perform operations, a CPU is also responsible for reading the next instruction from memory, reading data specified in arguments from memory, and writing results to memory. In many CPU designs, an instruction set will clearly differentiate between operations that load data from memory, and those that perform math. In this case the data loaded from memory is stored in registers, and a mathematical operation takes no arguments but simply performs the math on the data in the registers and writes it to a new register, whose value a separate operation may then write to memory. The processing device contains control unit circuitry that uses electrical signals to direct the entire system to carry out stored program instructions or executable instructions. The control unit does not execute program instructions; rather, it directs other parts of the system to do so. The control unit communicates with both the arithmetic/logic unit and memory. In context of the present invention a processing unit can also include microcontrollers, ASICs, analog to digital converters, digital to analog converters, digital signal processors, other types of processing circuitry, and/or any combination of the foregoing.

Wireless data connections used for mobile computing by embodiments of the present invention can take several general forms; cellular, Wi-Fi and satellite. Cellular data service uses technologies such as GSM, PCS, CDMA or GPRS, and more recently 3G and networks such as W-CDMA, EDGE or CDMA2000 and 4G networks such as LTE or WiMAX, or any future cellular data technologies known or unknown. These networks are usually available within range of commercial cell towers and provide data network connectivity to mobile computing devices. Wi-Fi connections often offer higher performance than cellular, and may be provided by either a personal, private business network or accessed through public hotspots, and have a typical range of hundreds of feet indoors and up to 1000 feet outdoors. Satellite Internet access covers areas where cellular and Wi-Fi are not available and may be set up anywhere the user has a line of sight to the satellite's location. Wireless telecommunications networks are generally implemented and administered using a transmission system called radio waves, often using dedicated microwave frequencies for non-line of sight paths (often referred to as Radio Frequency (RF) signals) or modulated laser light beams over line of sight paths. Some wireless network deployments combine networks from multiple cellular networks or use a mix of cellular, Wi-Fi and satellite.

In general, a wireless network refers to any type of digital network that is not connected by cables of any kind. However, a wireless network connects to a wireline network in order to interface with the Internet, other carrier voice and data networks, business networks and personal networks. A wireline network is typically carried over copper twisted pair, coaxial cable or fiber optic cables. There are many different types of wireline networks including, wide area networks (WAN), metropolitan area networks (MAN), local area networks (LAN), campus area networks (CAN), global area networks (GAN), like the Internet, and virtual private networks (VPN). Hereinafter "Network" refers to any combination of combined wireless, wireline, public and private data networks that are typically interconnected through the Internet, to provide a unified networking and information access solution.

The Internet is a global system of interconnected computer networks that use the standard Internet protocol suite (often called TCP/IP, although not all applications use TCP) to serve billions of users worldwide. It is a network of Networks that consists of millions of private, public, academic, business, and government Networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies. The Internet carries an extensive range of information resources and services, such as the inter-linked hypertext documents of the World Wide Web (WWW) and the infrastructure to support email and mobile applications that run on many mobile computing devices.

The Internet is typically accessed and navigated with a web browser. A web browser is a software application for retrieving, presenting and traversing information resources on the World Wide Web (Internet). An information resource is identified by a Uniform Resource Identifier (URI) and may be a web page, image, video, script, application, plugin or other piece of content. Hyperlinks present in resources enable users to easily navigate their browsers to related resources. A web browser can also be defined as an application software or program designed to enable users to access, retrieve and view documents and other resources on the Internet. Although browsers are primarily intended to use the World Wide Web, they can also be used to access information provided by web servers in private networks or files in file systems. The major web browsers are Chrome, Firefox, Internet Explorer, Opera, and Safari. A web browser typically accesses data from a web server over the Internet.

Web server can refer to either the hardware (the computer) or the software (the computer application) that helps to deliver content that can be accessed through the Internet. The most common use of web servers is to host websites, but there are other uses such as gaming, data storage and /or running enterprise applications.

A primary function of a web server is to deliver web pages on the request to clients using the Hypertext Transfer Protocol (HTTP). This means delivery of HTML documents and any additional content that may be included by a document, such as images, style sheets and scripts.

A user agent, commonly a web browser or web crawler, initiates communication by making a request for a specific resource using HTTP and the server responds with the content of that resource or an error message if unable to do so. The resource is typically data from the server's secondary storage, but this is not necessarily the case and depends on how the web server is implemented and if it uses cloud computing or virtualization.

While the primary function is to serve content, a full implementation of HTTP also includes ways of receiving content from clients. This feature is used for submitting web forms, including uploading of files, data, information and preferences.

Many generic web servers also support server-side scripting using Active Server Pages (ASP), Hypertext Preprocessor (PHP), or other scripting languages. This means that the behavior of the web server can be scripted in separate files, while the actual server software remains unchanged. Usually, this function is used to create HTML documents dynamically ("on-the-fly") as opposed to returning static documents.

The former is typically used with databases while the latter is typically much faster and more easily cached.

Web servers are not always used for serving the World Wide Web. A web server may then be used as a part of a system for monitoring and/or administering the devices or services in question. This usually means that no additional software has to be installed on the client computer to access or use a particular service or device; since only a web browser is required (which is typically included with most operating systems and computing devices).

Most traditional communications media including telephone, music, film, and television have been reshaped or redefined by the Internet, giving birth to new services. The Internet has enabled or accelerated new forms of human interactions through instant messaging, Internet forums, and social networking. Online shopping has boomed both for major retail outlets and small artisans and traders. Likewise, embodiments of the invention incorporate the Internet, with its interconnected Networks, as the medium for the mobile offer application to communicate with the centralized offer management application, which determines the a consumers location and delivers advertisements and offers to the consumer's mobile computing and communication device while they are shopping; redefining how consumers take advantage of offers.

An index is one way of providing quicker access to data. Indices can be created on any combination of attributes on a relation. Queries that filter using these attributes can find matching tuples randomly using the index, without having to check each tuple in turn. This is analogous to using the index of a book to go directly to the page on which the information you are looking for is found i.e. you do not have to read the entire book to find what you are looking for. Relational databases typically supply multiple indexing techniques, each of which is optimal for some combination of data distribution, relation size, and typical access pattern. Indices are usually implemented via B+ trees, R-trees, and bitmaps. Indices are usually not considered part of the database, as they are considered an implementation detail, though indices are usually maintained by the same group that maintains the other parts of the database. It should be noted that use of efficient indexes on both primary and foreign keys can dramatically improve query performance.

Although the present invention has been described in considerable detail with reference to certain embodiments thereof, other embodiments are possible. Therefore their spirit and scope of the present inventions should not be limited to the description of the embodiments contained herein. It will be

apparent to those skilled in the art that various modifications and variations can be made to the structure of the present innovations without departing from the scope or spirit of the inventions herein. In view of the foregoing, it is intended that the present invention cover modifications and variations of this invention provided they fall within the ambit of the present innovations.

This application also incorporates earlier lab notebook type materials, attached hereto as Appendices.

CLAIMS

What is claimed is:

1. A method of determining a mobile device location, the method comprising:
capturing product information from a product within a facility by a mobile device;
retrieving a product location within the facility from a database based on the captured product information; and
determining the mobile device location within the facility based on the product location and the product information.
2. The method of claim 1 or any claim herein, wherein product location information is indexed in the database by an institution.
3. The method of claim 2 or any claim herein, wherein the database comprises hierarchical relationship information for products and locations.
4. The method of claim 2 or any claim herein, wherein the product location information comprises location coordinates.
5. The method of claim 5 or any claim herein, wherein the product location information comprises supplemental location information including a micro location of a product within the facility.
6. The method of claim 6 or any claim herein, wherein the micro location is a three-dimensional spatial location within the facility comprising one or more of: location coordinates inside the facility, a shelving unit, an aisle, a case, a distance from an end of the shelving unit, a distance from an end of the aisle, a distance from an end of the case, and a three-dimensional distance from a predetermined point.
7. The method of claim 2 or any claim herein, wherein the product location information is captured by the institution by at least one of: a product location and index system, interfacing with facility inventory management information, and user input of product coordinates within the facility.

8. The method of claim 7 or any claim herein, wherein the product location and index system comprises a digital imaging device, distance/movement measurement device and computing device on a mobile platform to record product identities and associate the product identities with a location of the product location and index system.

9. The method of claim 1 or any claim herein, wherein the product information comprises a product characteristic comprising at least one of a Universal Product Code (UPC), product name, brand, product image, product packaging, radio frequency identification (RFID), and barcode.

10. The method of claim 1 or any claim herein, wherein the database is accessed over a communication network.

11. The method of claim 1 or any claim herein, wherein a portion of the database is stored in memory of the mobile device.

12. The method of claim 1 or any claim herein, wherein the capturing of the product information comprises operating a digital camera coupled to the mobile device.

13. The method of claim 1 or any claim herein, wherein the capturing of the product information comprises operating a keypad coupled to the mobile device for manual input.

14. The method of claim 1 or any claim herein, wherein the capturing of the product information comprises operating an audio input device coupled to the mobile device for acoustic input.

15. The method of claim 1 or any claim herein, wherein the capturing of the product information comprises operating a radio frequency (RF) input device coupled to the mobile device to wirelessly capture product information.

16. The method of claim 1 or any claim herein, wherein the capturing of the product information comprises operating a scanner coupled to the mobile device.

17. The method of claim 1 or any claim herein, wherein the capturing of the product information comprises operating a data capture device coupled to the mobile device to convert visual properties of the product.

18. A mobile device, comprising
a processor;
an input device coupled to the processor that captures product information from a product within a facility;
a communication device coupled to the processor that retrieves product location information within the facility based on the captured product information from a database, wherein the processor determines a mobile device location within the facility based on received the product location information.

19. The device of claim 18 or any claim herein, wherein the product information is captured within an immediate proximity of the mobile device.

20. The device of claim 18 or any claim herein, wherein the processor executes a routine operable to determine the mobile device location based at least in part on the product location information associated with the facility within which a consumer is located.

21. The device of claim 18 or any claim herein, wherein the product location information corresponds to a location of the mobile device.

22. The device of claim 18 or any claim herein, wherein the processor executes a routine operable to determine a three-dimensional spatial location of the mobile device within the facility comprising one or more of:

a
location inside the facility, a location near a shelving unit, a location near an aisle, a location near a case, a distance from an end of the shelving unit, a distance from an end of the aisle, a distance from an end of the case, and a three-dimensional distance from a predetermined point.

23. The device of claim 18 or any claim herein, wherein the retrieved product location information comprises relationship information between a first product location in the facility and the mobile device location.

24. The device of claim 18 or any claim herein, wherein the processor executes a routine operable to determine the mobile device location in part as a function of correspondence information between hierarchical relationship index information accessed from an institution of the database and the mobile device.

25. The device of claim 18 or any claim herein, wherein the communication device comprises a wireless transmitter.

26. The device of claim 18 or any claim herein, wherein the mobile device comprises any of a smartphone, cell phone, tablet computer, wearable computing device, computer enabled watch, phablet, PDA, mobile shopping device, laptop computer, notebook computer, and handheld computing device.

27. The device of claim 18 or any claim herein, wherein the input device comprises at least one of an image capture device, operation key device, microphone, scanner, radio frequency receiver.

28. A method of determining a product location, the method comprising:
capturing first product information from a first product within a facility by a mobile device;
retrieving a first product location within the facility from a database based on the captured first product information; and

determining a second product location of the facility for a second product based on the first product location and the first product information.

29. The method of claim 28 or any claim herein, wherein hierarchical relationship information includes product characteristics and relationship information between the first product and the second product.

30. The method of claim 28 or any claim herein, wherein product location information comprises supplemental location information of related products within a proximity of the first product.

31. The method of claim 30 or any claim herein, wherein the supplemental location information comprises related product information relevant to an offer wherein the related product is outside an immediate proximity of the first product.

32. The method of claim 29 or any claim herein, wherein the hierarchical relationship information is stored as a product index record in the database.

33. The method of claim 28 or any claim herein, further comprising:
retrieving relationship information from the database based on the first product information;
determining an offer based on the first product location and the relationship information obtained from the database; and
providing the offer by the mobile device.

34. The method of claim 28 or any claim herein, further comprising:
retrieving relationship information from the database based on the second product information;
determining an offer based on the second product location and the relationship information obtained from the database; and
providing the offer by the mobile device.

35. The method of claim 29 or any claim herein, wherein the relationship information corresponds to at least one of a relationship between the first product and the second product, a consumer and the first product, the consumer and the second product, the consumer and the database, the facility and the database, a product manufacturer and the database, and the customer and the facility.

36. The method of claim 29 or any claim herein, wherein the hierarchical relationship information corresponds to at least one of customer transaction information, customer profile information, consumer product information, and manufacturer relationship information related to offer preferences the manufacturer has with facility.

37. The method of claim 33 or any claim herein, further comprising:
sending an alert to the mobile device when the offer is determined.

38. A mobile device, comprising
a processor;
an input device coupled to the processor that captures product information from a first product within a facility;

a communication device coupled to the processor that retrieves first product location information within the facility based on the captured first product information from a database, wherein the processor determines a second product location of the facility for a second product based on received the first product location and the first product information.

39. The device of claim 38 or any claim herein, wherein the supplemental location information comprises related product information relevant to an offer wherein the related product is outside an immediate proximity of the first product.

40. The device of claim 38 or any claim herein, wherein the communication device retrieves relationship information from the database based on the first product information;
wherein the processor determines an offer based on the first product location and the relationship information obtained from the database; and
a display of the mobile device provides the offer.

41. The device of claim 38 or any claim herein, wherein the communication device retrieves relationship information from the database based on the second product information;
wherein the processor determines an offer based on the second product location and the relationship information obtained from the database; and
a display of the mobile device provides the offer.

42. A method of tracking a mobile device location, the method comprising:
capturing first product information from a first product within a facility by a mobile device;
retrieving a first product location within the facility from a database based on the captured first product information;
determining a first mobile device location as a function of the first product location;
detecting movement from a motion detection device of the mobile device;
determining a second product location within a proximity of the mobile device based on the first product location and the detected movement.

43. The method of claim 42 or any claim herein, further comprising:
retrieving relationship information from the database based on the second product information;
determining an offer based on the second product location and the relationship information

obtained from the database; and

providing the offer by the mobile device.

44. The method of claim 42 or any claim herein, further comprising:

retrieving location information from the database based on the second product information;

determining a second mobile device location; and

providing the mobile device location on the mobile device.

45. The method of claim 42 or any claim herein, wherein the motion detection device comprises one or more of: an accelerometer, a gyroscope, a compass, and an inertial navigation system (INS).

46. The method of claim 45 or any claim herein, wherein the motion detection device calculates orientation, acceleration and direction of motion of the mobile device.

47. The method of claim 45 or any claim herein, further comprising:

determining an angular velocity of the mobile device for a predetermined period of time based at least in part on angular acceleration detected by the motion detection device.

48. The method of claim 45 or any claim herein, further comprising:

determining a direction of movement of the device and a distance of movement of the device based at least in part on an angular velocity of the mobile device correlated with time, wherein the angular velocity is detected by the motion detection device.

49. The method of claim 42 or any claim herein, further comprising:

determining a change in acceleration of the mobile device from a first velocity to a second velocity or to another direction of acceleration.

50. The method of claim 42 or any claim herein, further comprising:

determining a change in a direction of the movement of the mobile device from a first direction to a second direction.

51. The method of claim 50 or any claim herein, further comprising:
determining an overall distance and direction traveled based on cumulative movement and changed directions over a predetermined period of time.

52. The method of claim 42 or any claim herein, further comprising:
updating second products in proximity to the mobile device based on the detected movement.

53. A mobile device comprising:
a processor;
an input device coupled to the processor that captures product information from a product within a facility;
a communication device coupled to the processor that retrieves product location information within the facility based on the captured product information from a database; and
a motion detection device coupled to the processor that captures motion information of the device;
wherein the processor determines a mobile device location within the facility based on the product location information and a second product location within a proximity of the mobile device based on the product location information and motion information.

54. The system of claim 53 or any claim herein, wherein the processor:
retrieves relationship information from the database based on the second product information;
determines an offer based on the second product location and the relationship information obtained from the database; and
provides the offer by the mobile device.

55. The system of claim 53 or any claim herein, wherein the processor:
retrieves location information from the database based on the second product information;
determines a second mobile device location; and
provides the mobile device location on the mobile device.

56. The system of claim 53 or any claim herein, further comprising:
determining an angular velocity of the mobile device for a predetermined period of time based at least in part on angular acceleration detected by the motion detection device.

57. The system of claim 53 or any claim herein, wherein the processor:
determines a direction of movement of the device and a distance of movement of the device based at least in part on an angular velocity of the mobile device correlated with time, wherein the angular velocity is detected by the motion detection device.

58. The system of claim 53 or any claim herein, wherein the processor:
determines an overall distance and direction traveled based on cumulative movement and changed directions over a predetermined period of time.

59. The system of claim 53 or any claim herein, wherein the processor:
updates second products in proximity to the mobile device based on the detected movement.

60. A method of tracking a mobile device location, the method comprising:
capturing first product information from a first product within a facility by a mobile device;
retrieving a first product location within the facility and map information of the facility from a database based on the captured first product information;
detecting movement from a motion detection device of the mobile device;
determining a mobile device location based on the first product location and the detected movement and the map information; and
providing the mobile device location by the mobile device.

61. A mobile device, comprising:
a processor;
an input device coupled to the processor that captures product information from a product within a facility;
a communication device coupled to the processor that retrieves mapping information and product location information within the facility based on the captured product information from a database;
a motion detection device coupled to the processor that captures motion information of the device, wherein the processor determines a mobile device location within the facility based

on received the product location information and motion information; and

an output device coupled to the processor, wherein the processor causes the output device to display the mapping information correlated to the determined mobile device location information.

62. A method of locating a product, the method comprising:

capturing first facility information and first product information for a first product by a mobile device;

retrieving a first product location within the first facility or within a second facility from a database based on the captured first facility information and the first product information; and
displaying the first product location on the mobile device.

63. The method of claim 62 or any claim herein, wherein the displayed first product location is a shelf view image of the first product.

64. A mobile device comprising:

a processor;

an input device coupled to the processor that captures product information from a product within a facility;

a communication device coupled to the processor that retrieves mapping information and product location information within the facility based on the captured product information from a database;

an output device coupled to the processor, wherein the processor causes the mobile device to display the product location information.

65. A method of determining user interest in a product, the method comprising:

capturing a mobile device location within a facility and product information indicating consumer interest in a product within a proximity of the mobile device location;

retrieving a product location within the facility from a database based on the captured product

information; and

determining the product location within the facility based on the product location and the product information.

66. The method of claim 65 or any claim herein, further comprising:
retrieving relationship information from the database based on the product information;
determining an offer based on the first product location and the relationship information obtained from the database; and
providing the offer by the mobile device.

67. A mobile device comprising:

a processor;
an input device coupled to the processor that captures product information from a product within a facility;
a communication device coupled to the processor that retrieves offer information and product location information within the facility from a database; and
an output device coupled to the processor that displays offer information of the device;
wherein the processor determines an offer for a product location within the facility based on the received product location information and mobile device location information.

68. The system of claim 67 or any claim herein, wherein the processor:
retrieves relationship information from the database based on the product information;
determines an offer based on the first product location and the relationship information obtained from the database; and
provides the offer by the mobile device.

69. A method of determining user interest in a product through a mobile device, the method comprising:
capturing a mobile device location within a facility;
detecting mobile device sensor information that indicates interest in a product location;
retrieving relationship information for products within a proximity of the mobile device location

from a database; and

determining a first product location.

70. The method of claim 69 or any claim herein, further comprising:

determining an offer based on the first product location and the relationship information obtained from the database; and

providing the offer by the mobile device.

71. The method of claim 70 or any claim herein, further comprising:

calculating an orientation, acceleration and direction of motion of the mobile device by the motion detection device.

72. The method of claim 69 or any claim herein, further comprising:

determining a motion indicating interest in the product location as a function of any of deceleration from a predetermined velocity, rotation toward the product location, stopping, lowering in elevation, raising in elevation, reversing direction, reversing direction without changing orientation, changing orientation and lateral acceleration.

73. The method of claim 69 or any claim herein, wherein the mobile device sensor information comprises image data generated by an image capture device.

74. The method of claim 69 or any claim herein, further comprising:

retrieving relationship information from the database based on the first product information; determining an offer based on the first product location and the relationship information obtained from the database; and providing the offer by the mobile device.

75. The method of claim 69 or any claim herein, further comprising:

retrieving relationship information from the database based on the second product information; determining an offer based on the second product location and the relationship information obtained from the database; and providing the offer by the mobile device.

76. A mobile device comprising:

a processor;

a location device coupled to the processor that captures a mobile device location within a facility;

a communication device coupled to the processor that retrieves relationship information for products within a proximity of the mobile device location from a database;

an input device coupled to the processor that detects mobile device sensor information that a product location;

wherein the processor determines interest in a product location within the facility based on the mobile device location and product location.

77. The system of claim 76 or any claim herein, wherein the processor:

determines an offer based on the first product location and the relationship information obtained from the database; and

provides the offer by the mobile device.

78. The system of claim 76 or any claim herein, wherein the processor:

calculates an orientation, acceleration and direction of motion of the mobile device by the motion detection device.

79. The system of claim 76 or any claim herein, wherein the processor:

retrieves relationship information from the database based on the first product information;

determines an offer based on the first product location and the relationship information obtained from the database; and

provides the offer by the mobile device.

80. The system of claim 76 or any claim herein, wherein the processor:

retrieves relationship information from the database based on the second product information;

determines an offer based on the second product location and the relationship information obtained from the database; and

provides the offer by the mobile device.

1/22

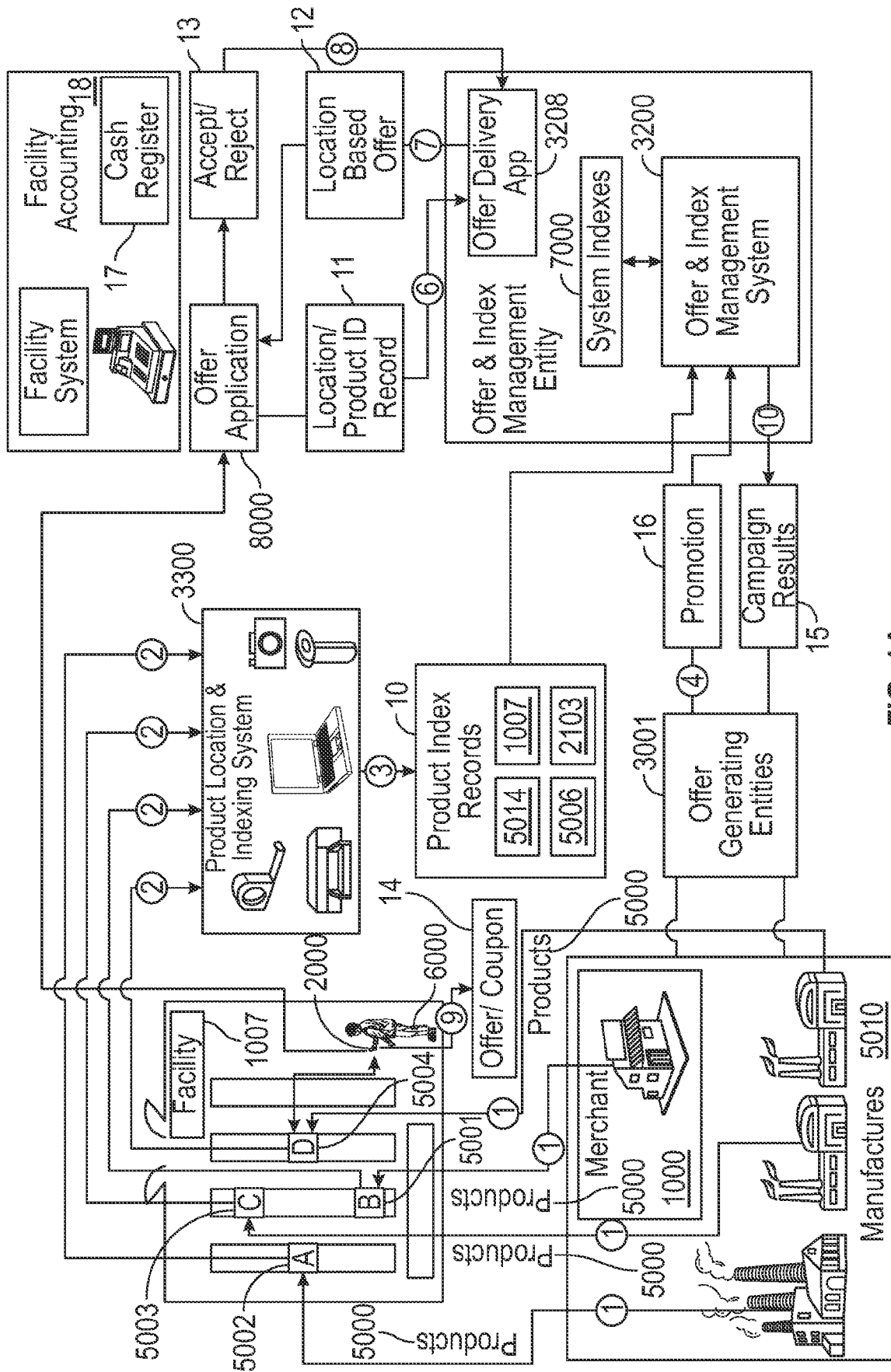


FIG. 1A

2/22

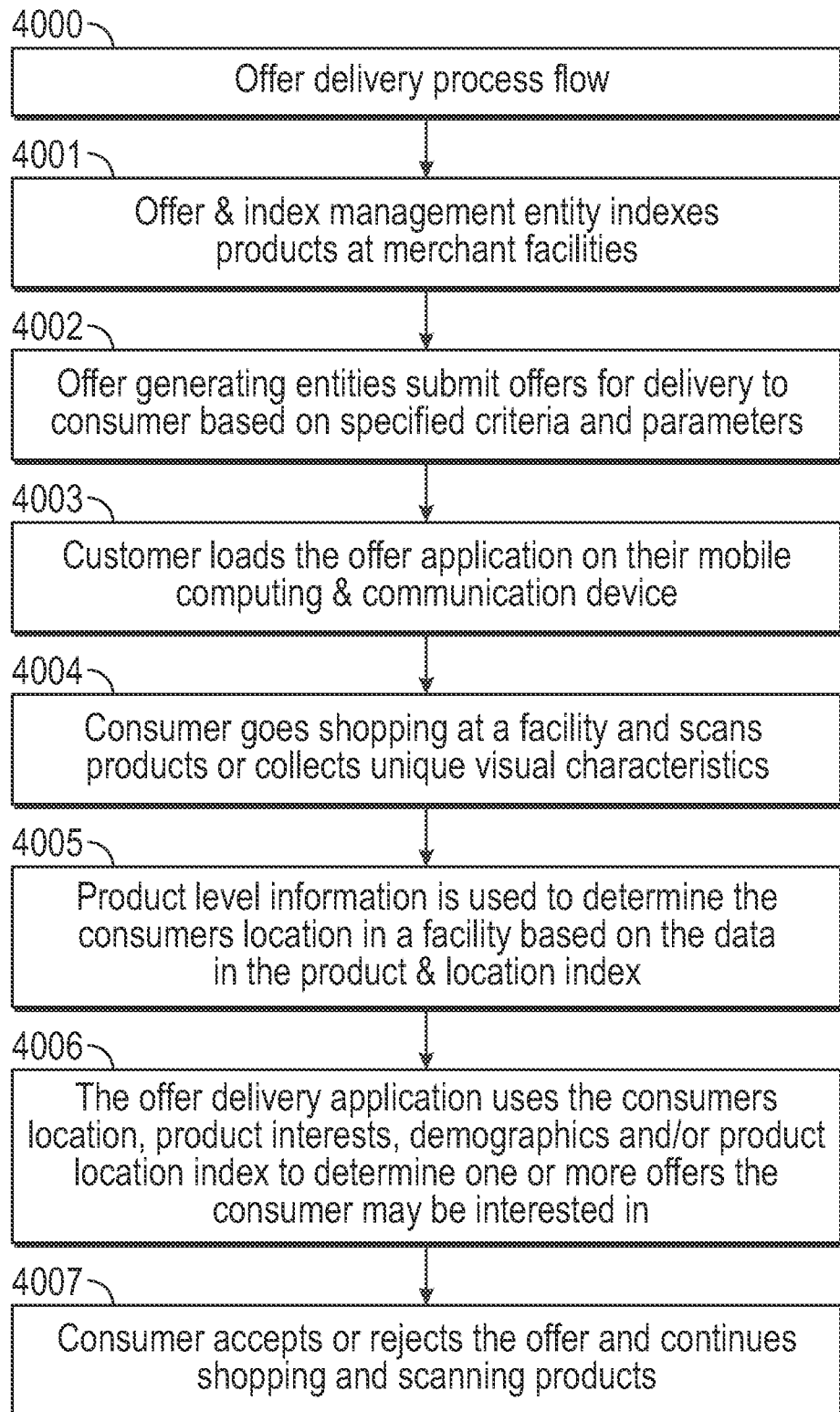
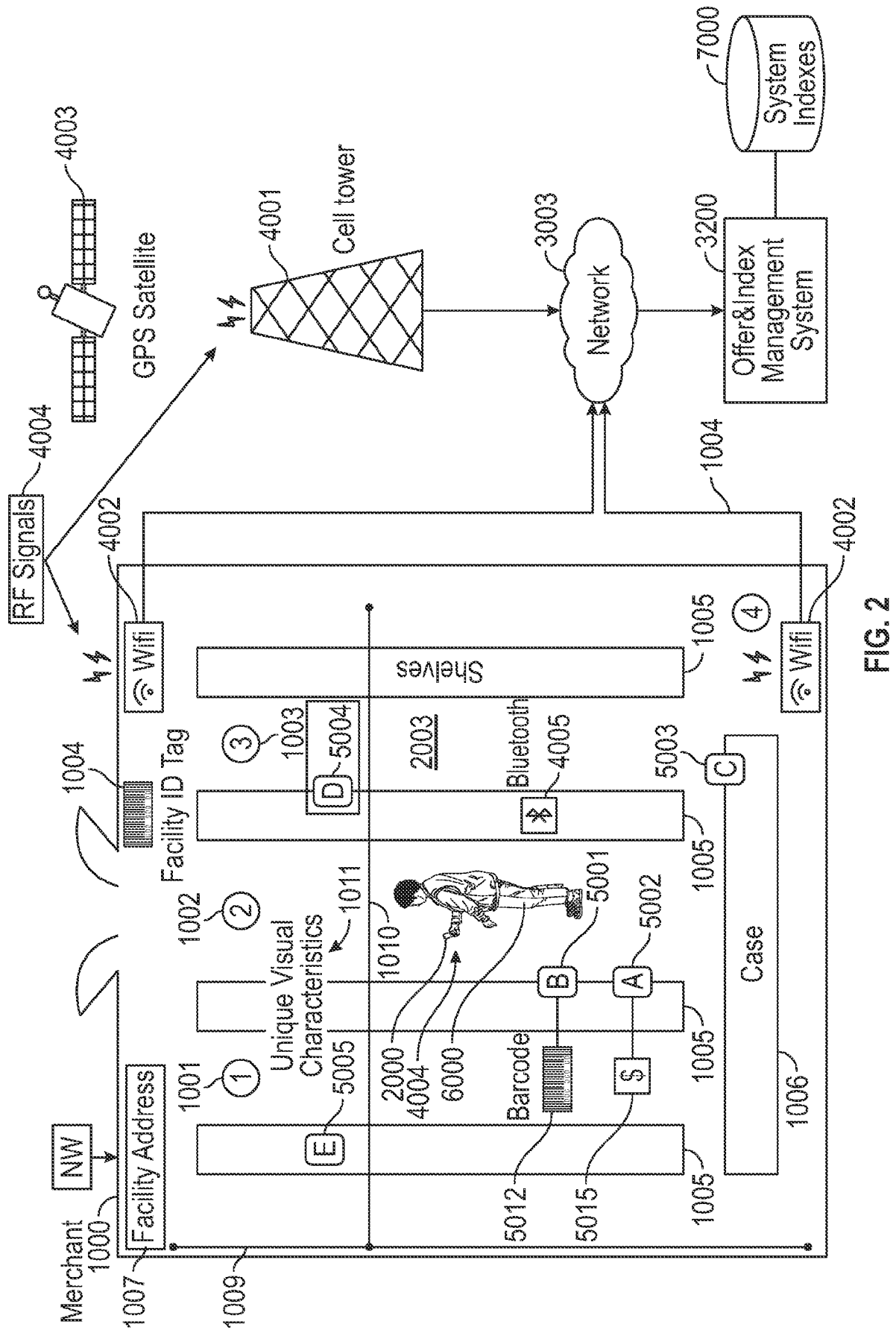


FIG. 1B

3/22



4/22

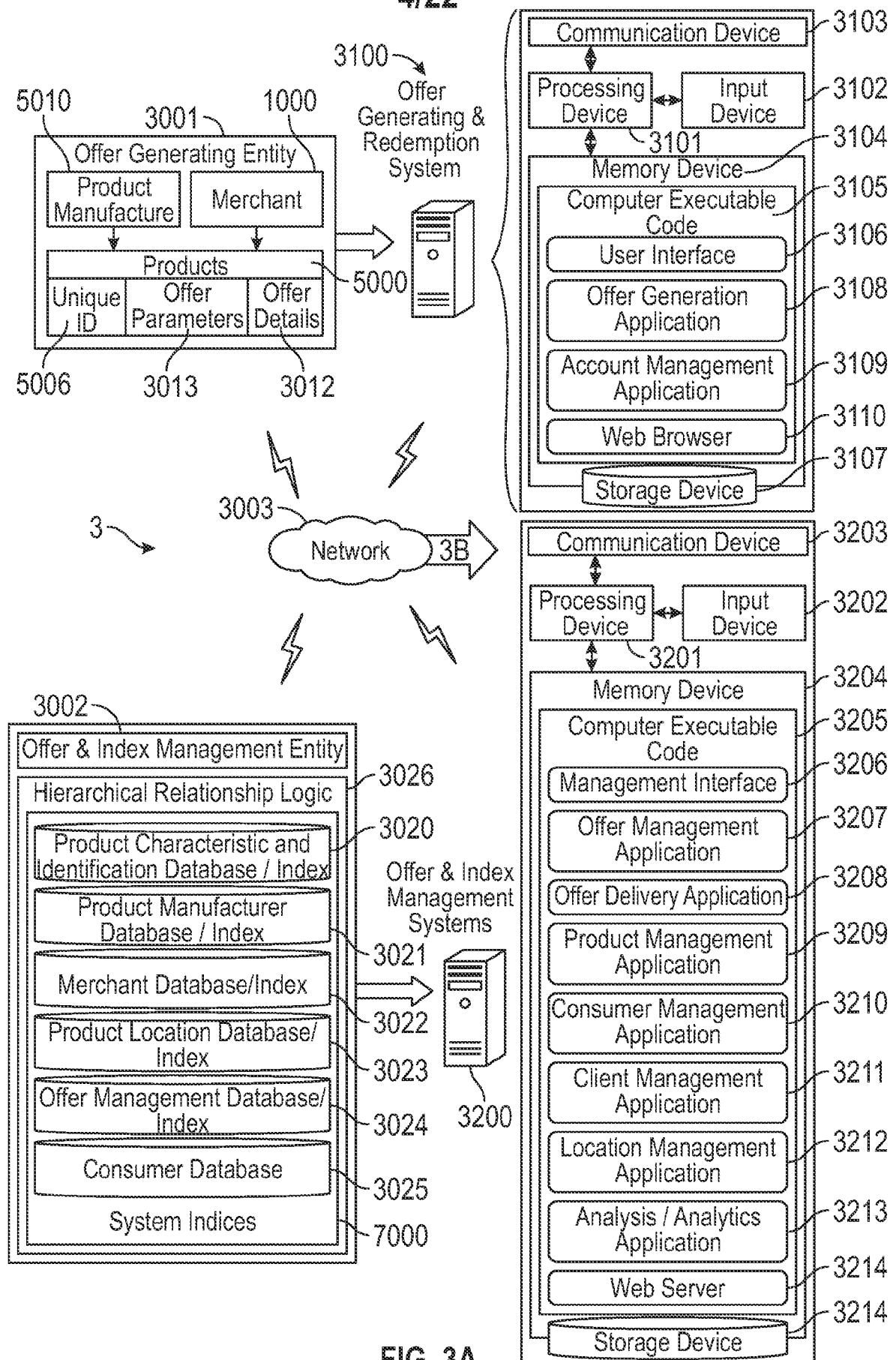


FIG. 3A

5/22

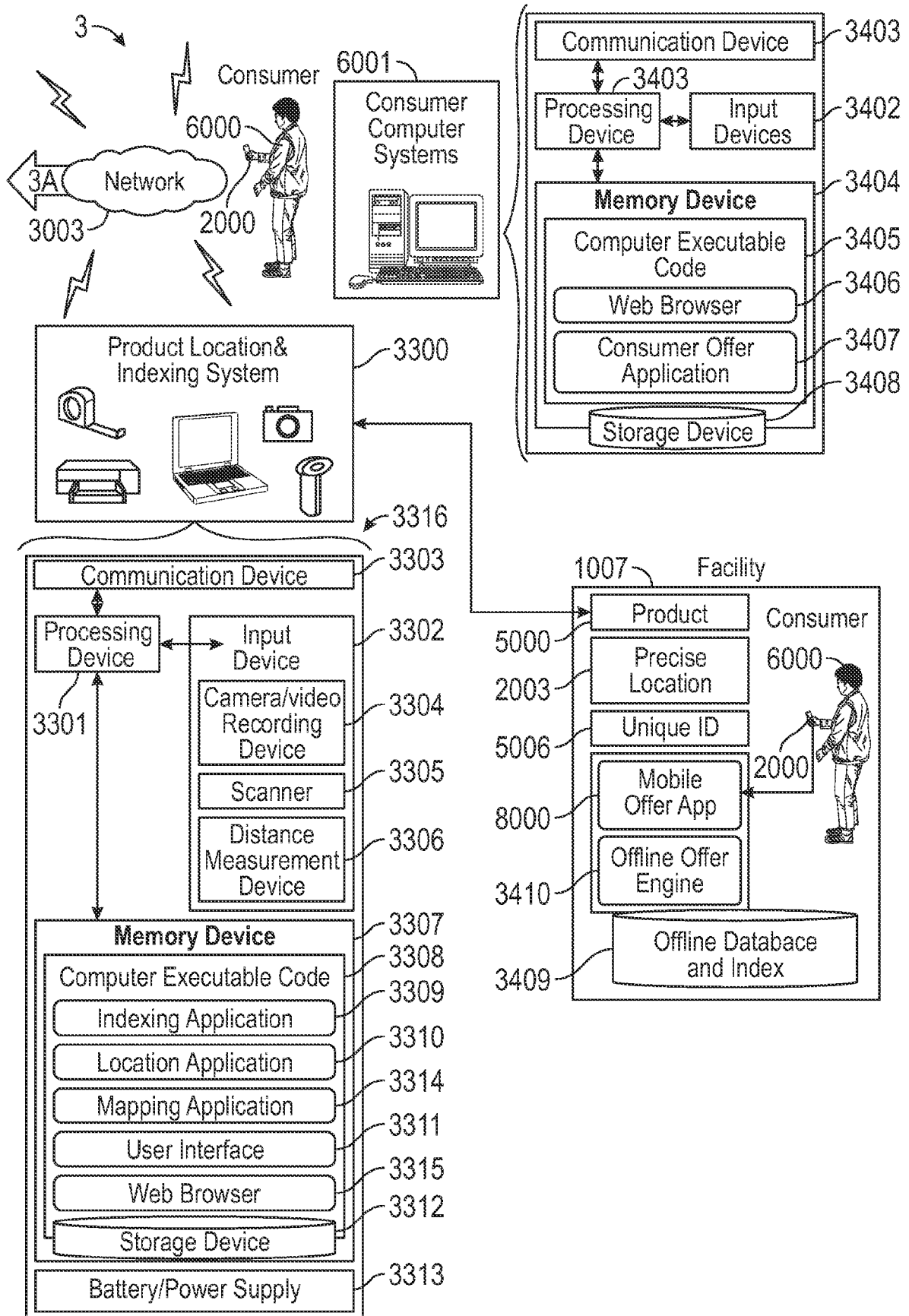


FIG. 3B

6/22

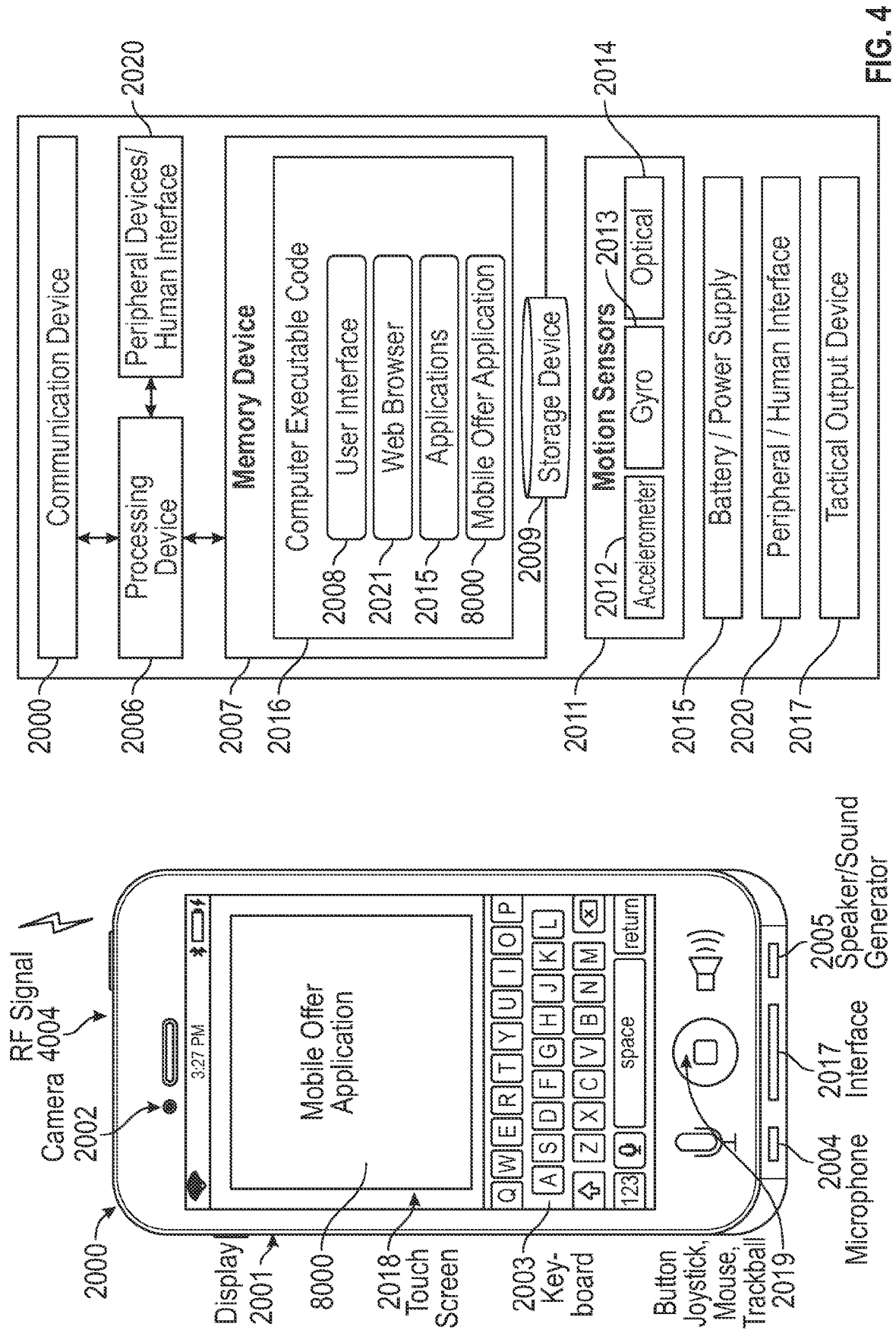


FIG. 4

7/22

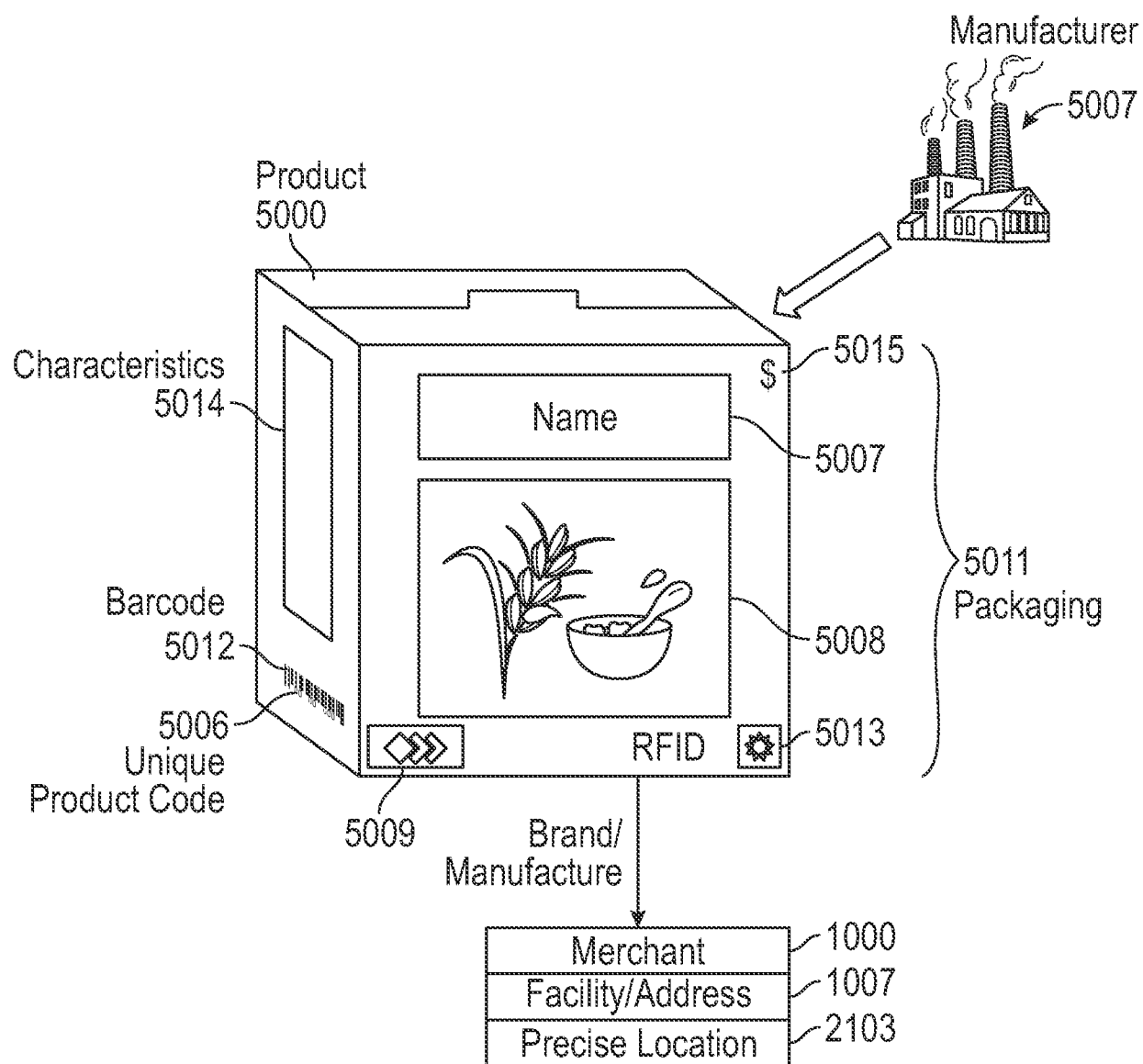


FIG. 5

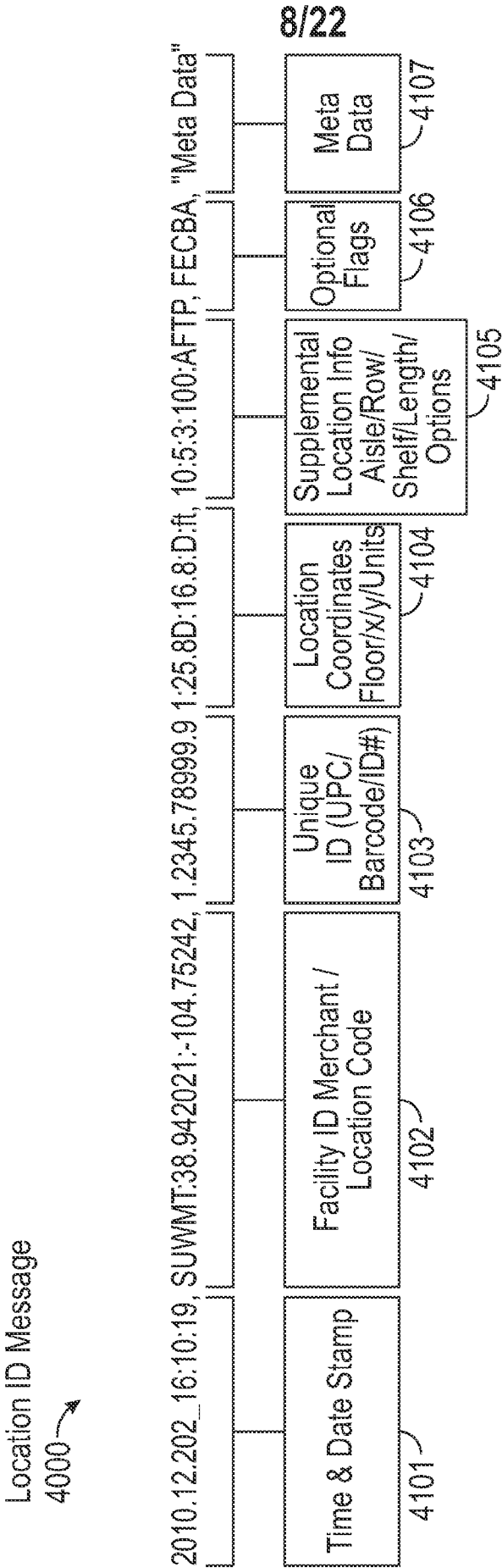


FIG. 6A

9/22

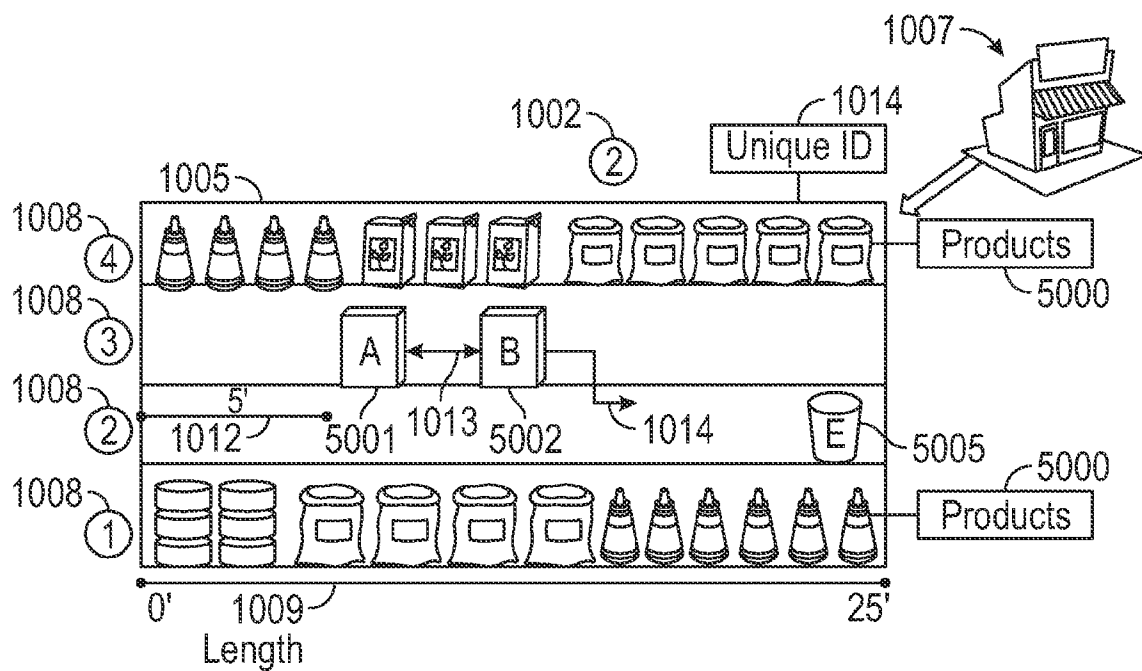


FIG. 6B

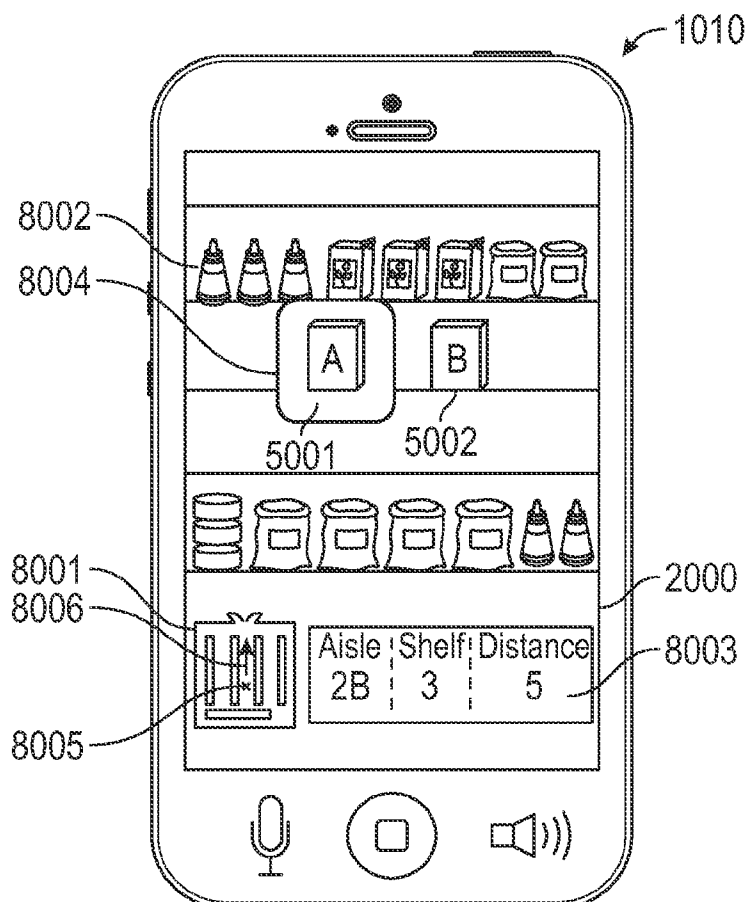


FIG. 6C

10/22

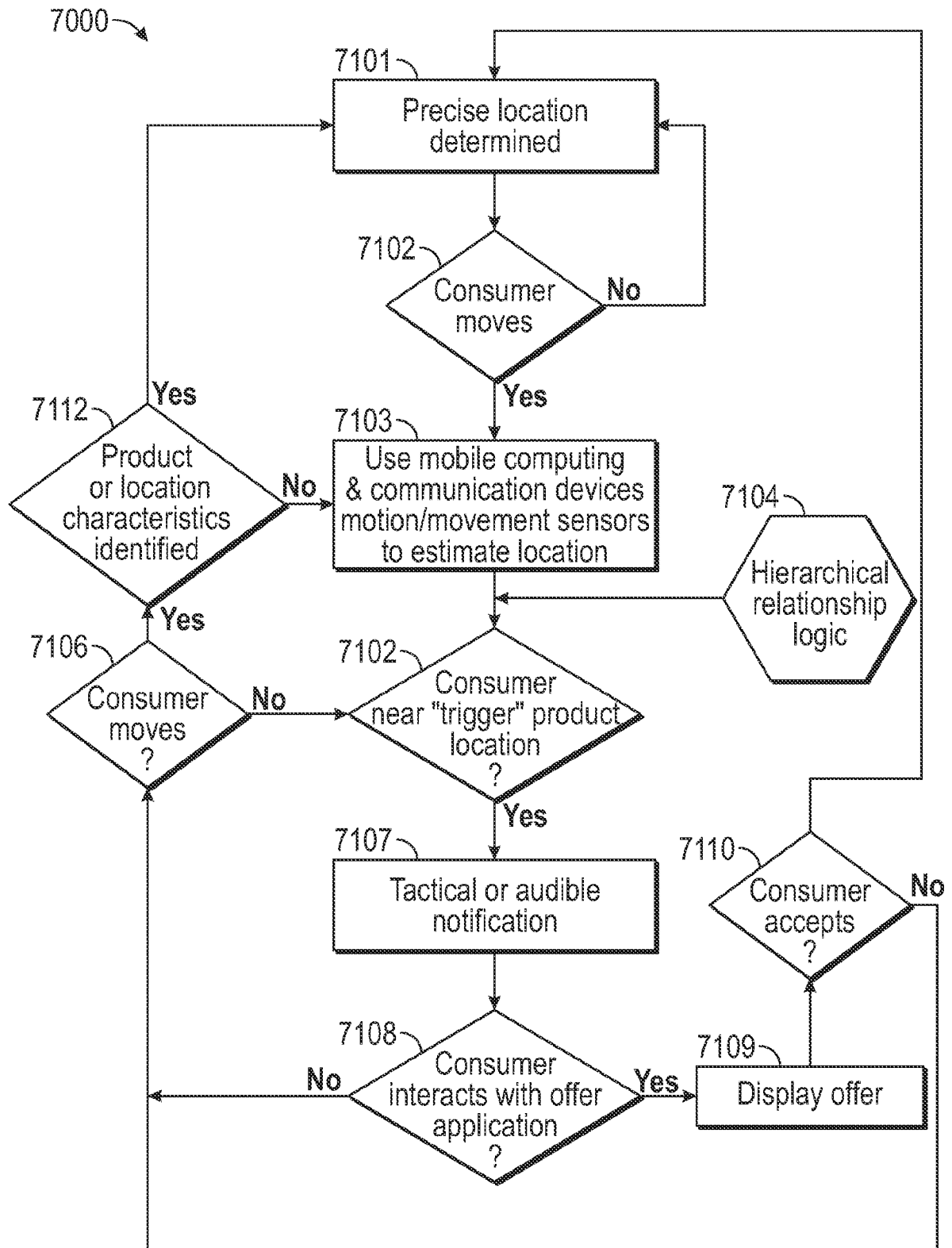
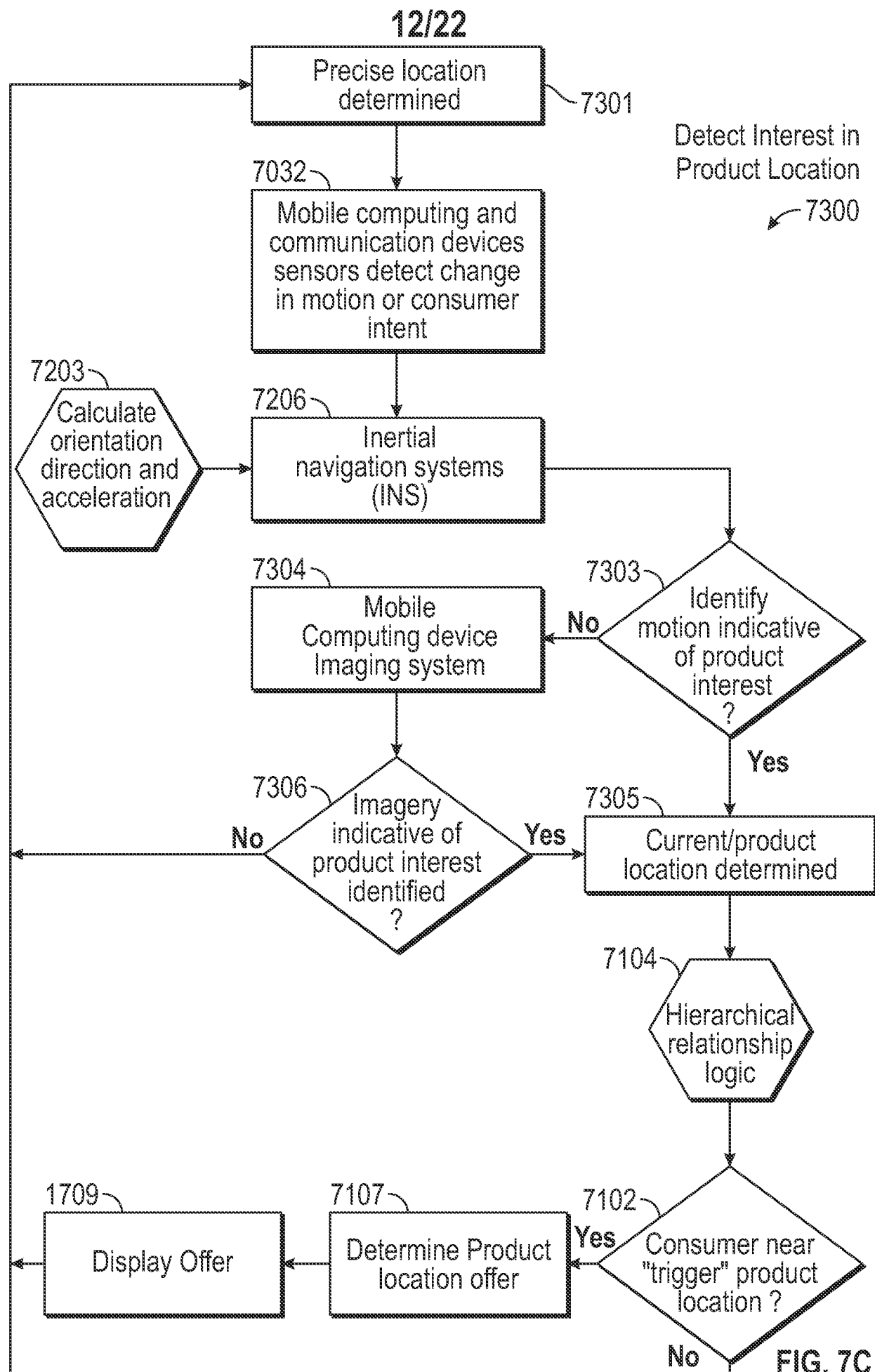


FIG. 7A



FIG. 7B



13/22

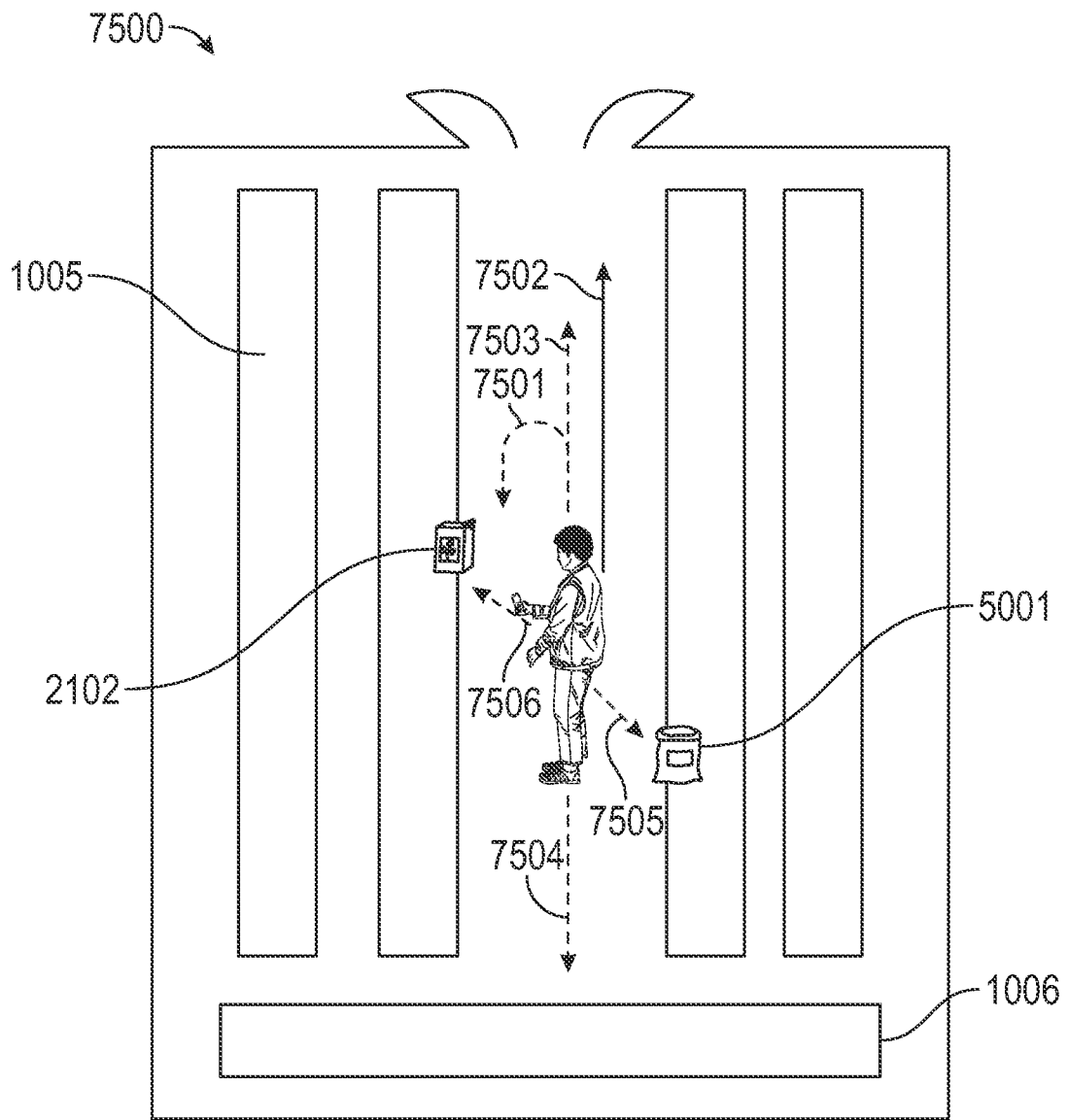


FIG. 7D

14/22

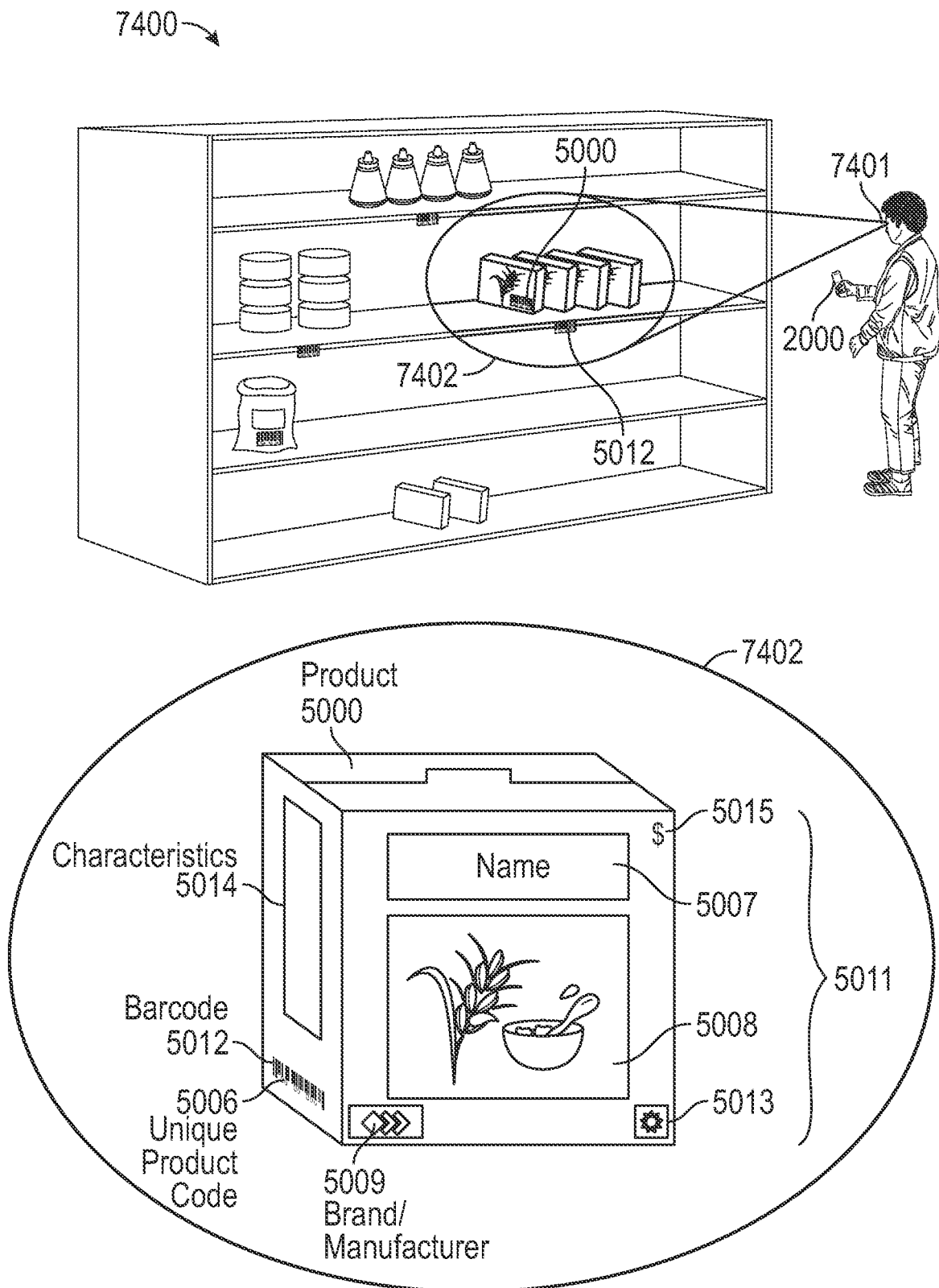


FIG. 7E

15/22

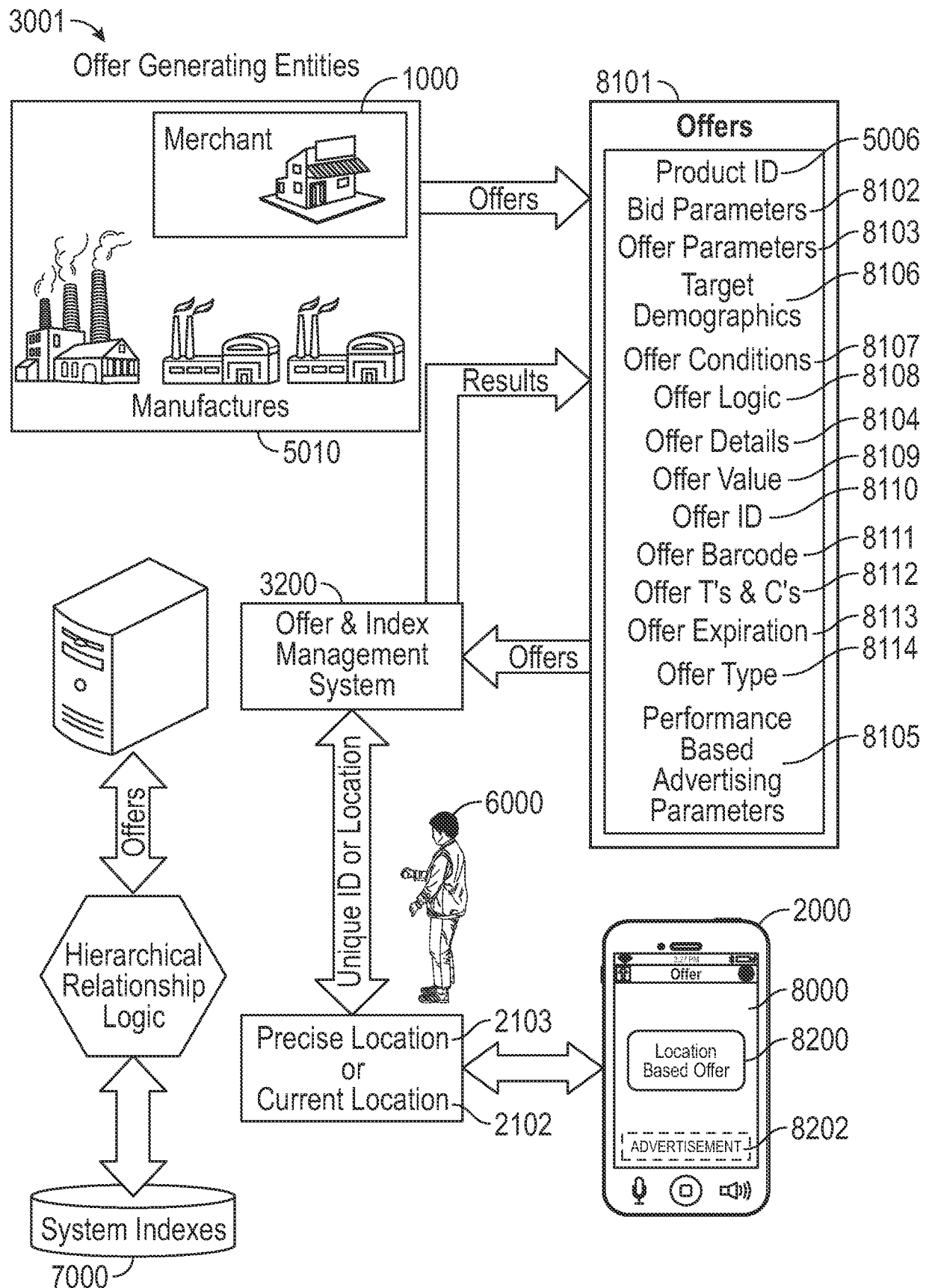


FIG. 8A

16/22

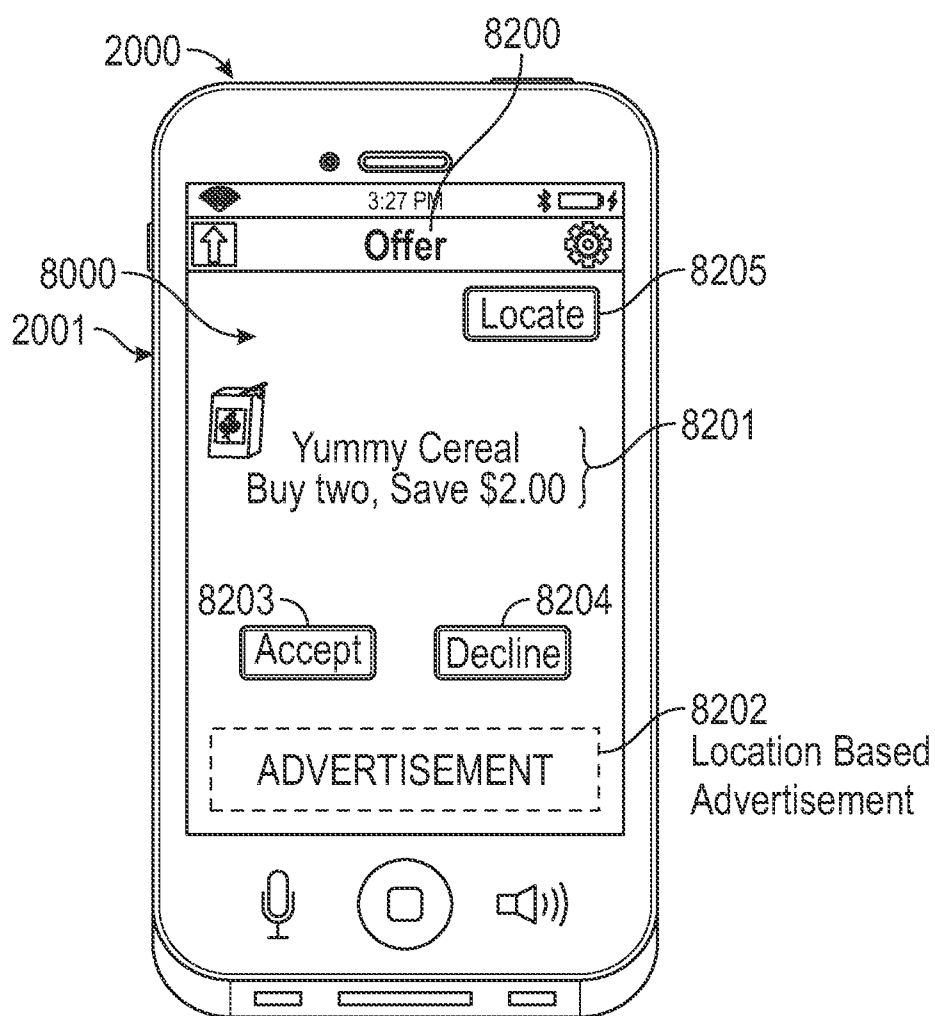


FIG. 8B

17/22

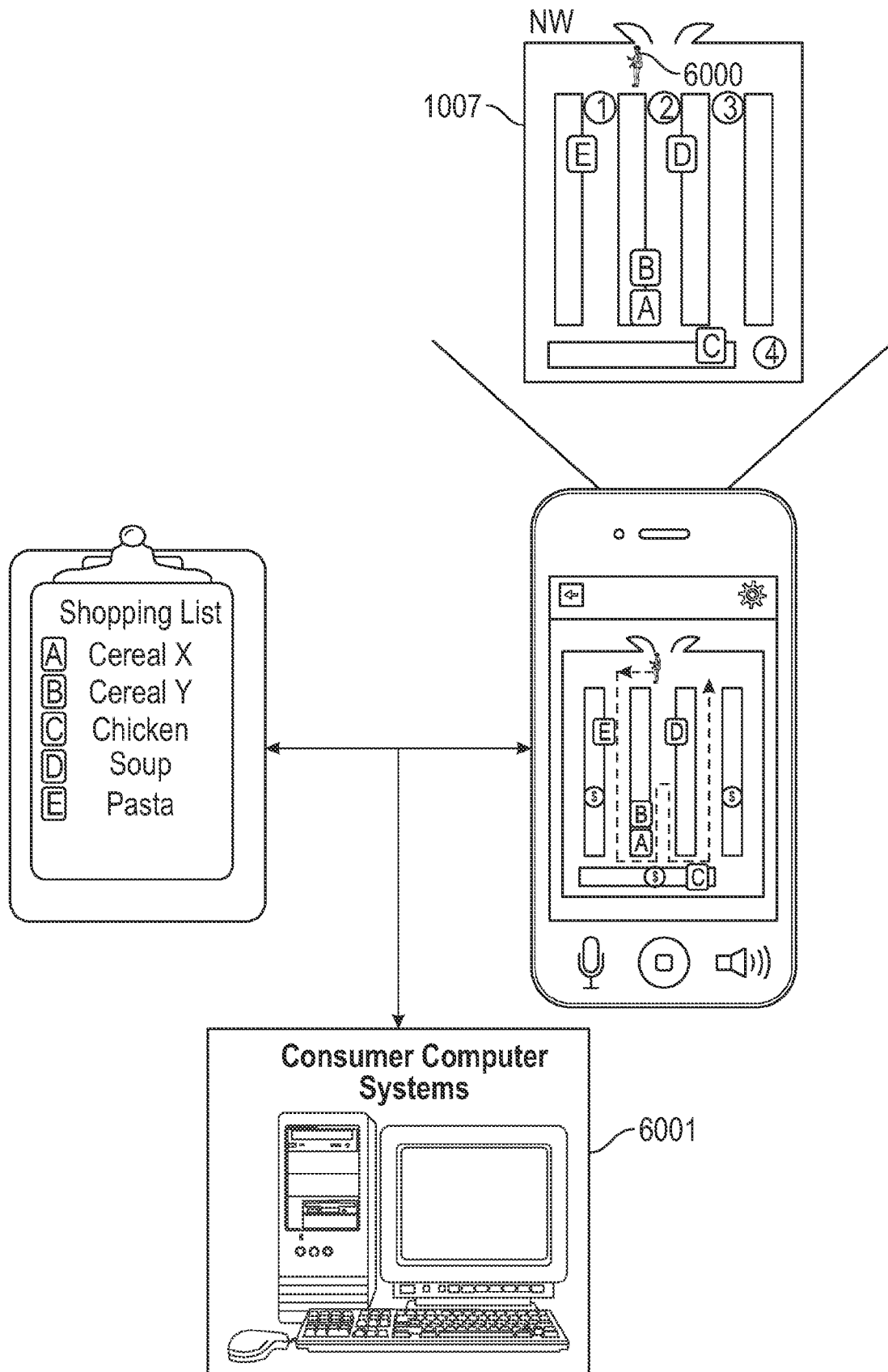


FIG. 8C

18/22

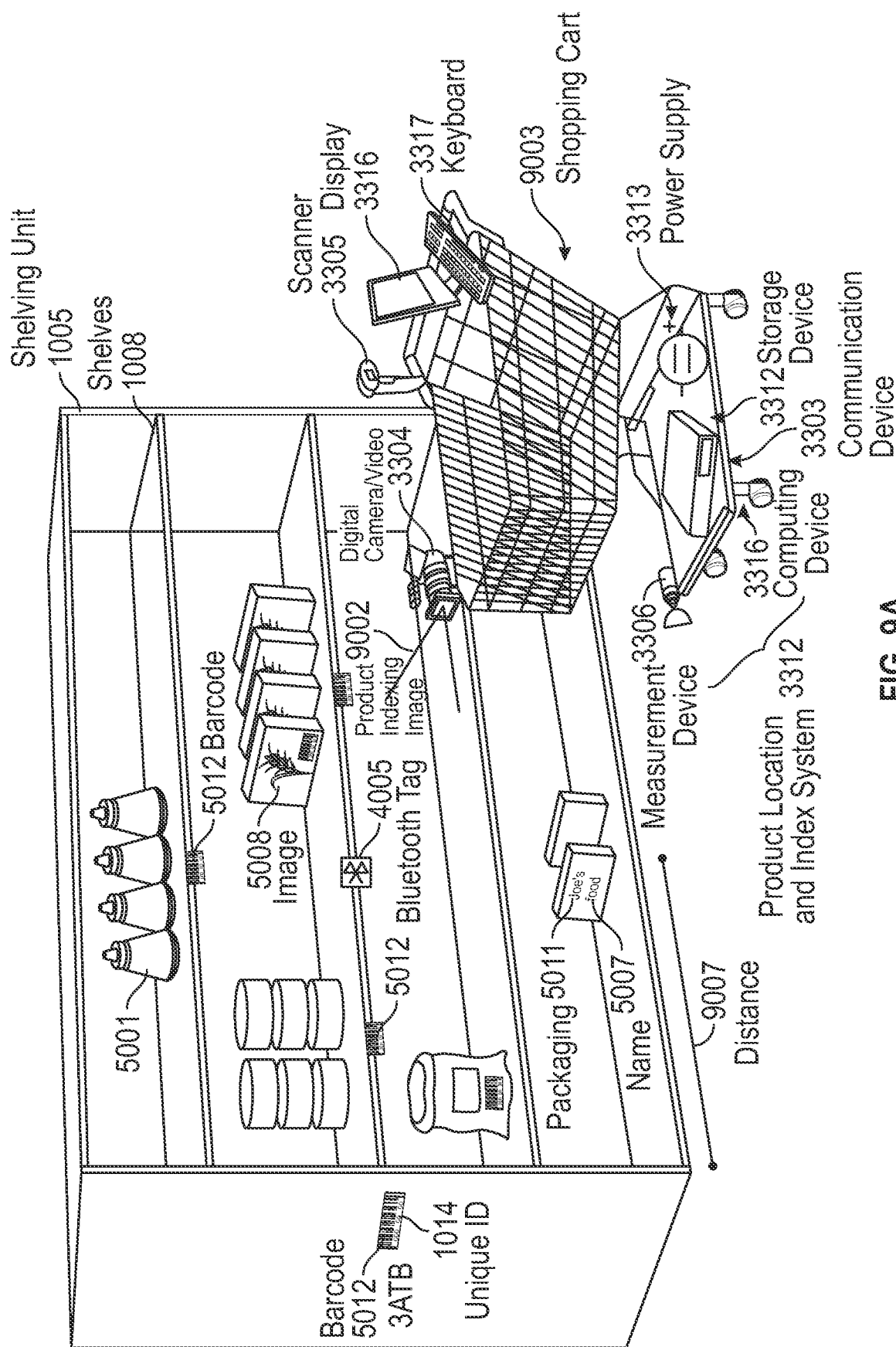
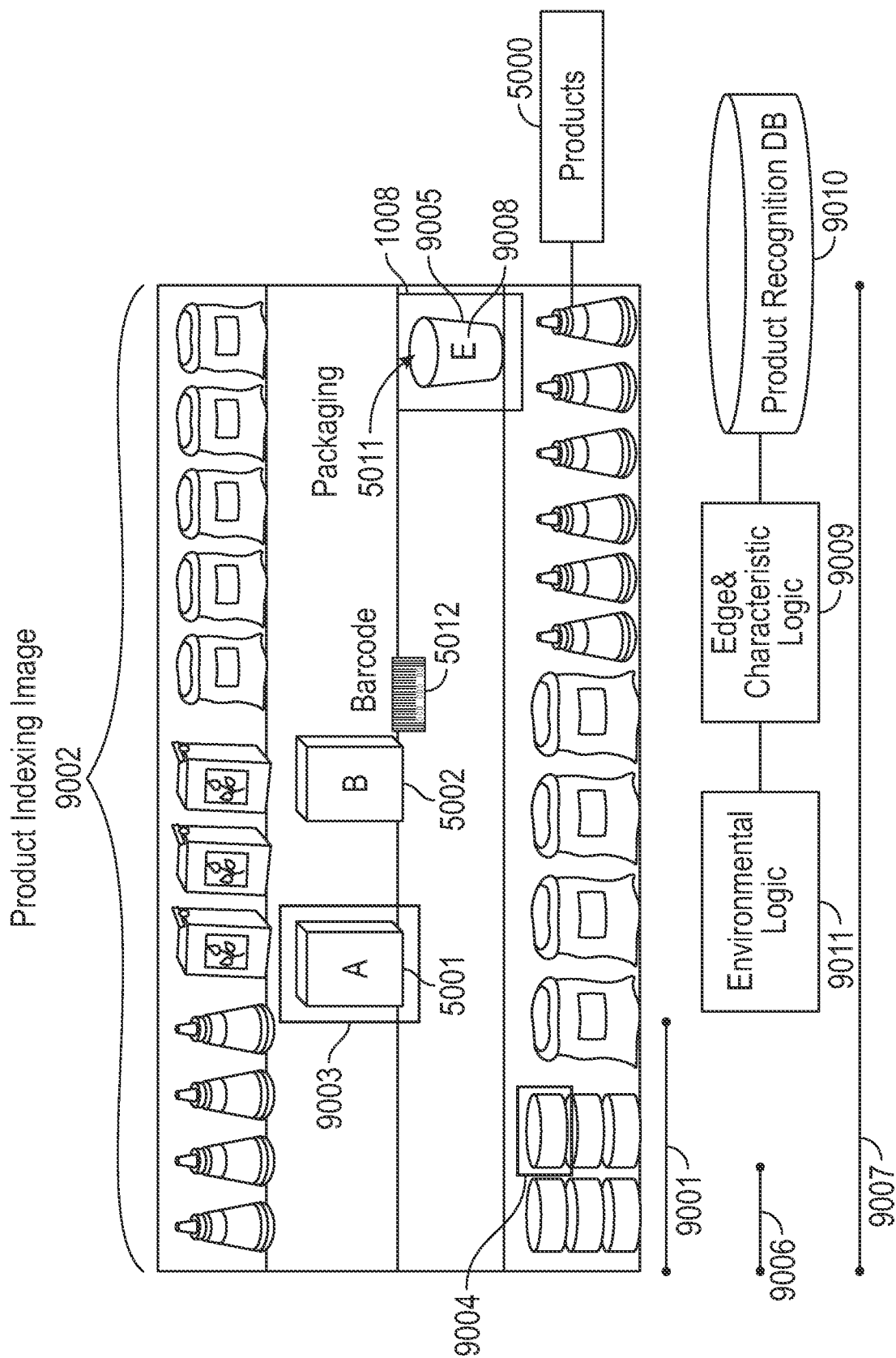
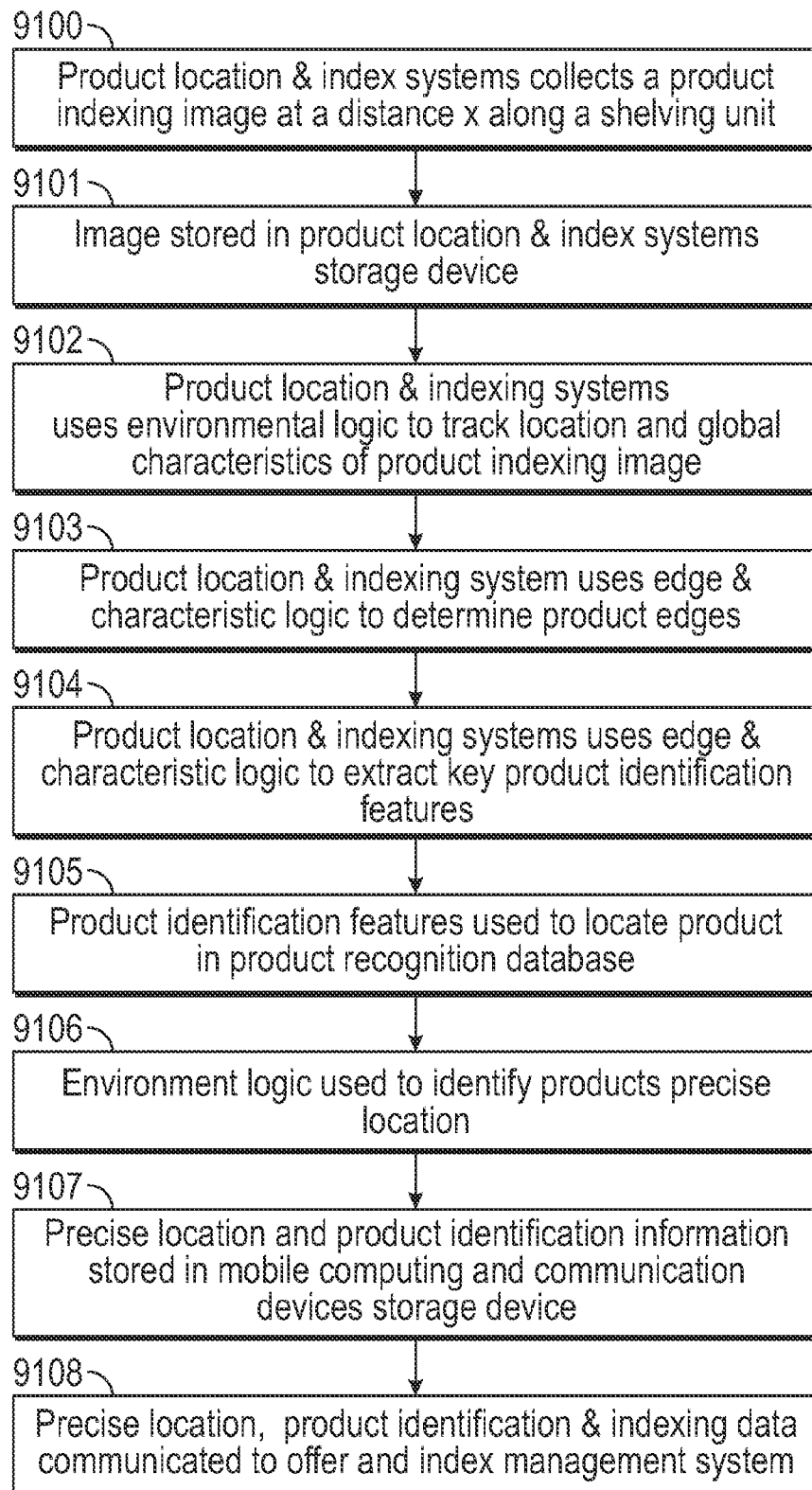


FIG. 9A



20/22

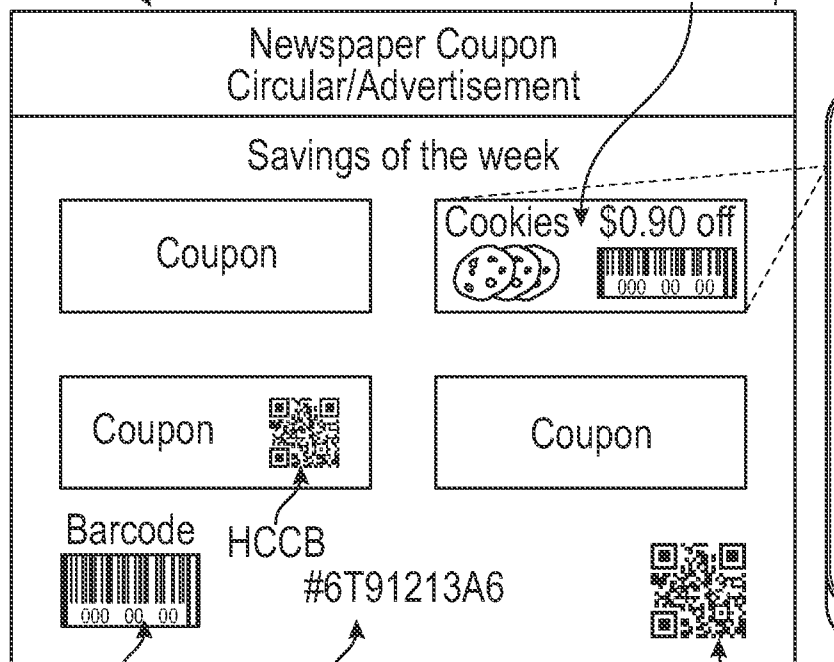
Flowchart of Product Indexing Processing**FIG. 9C**

21/22

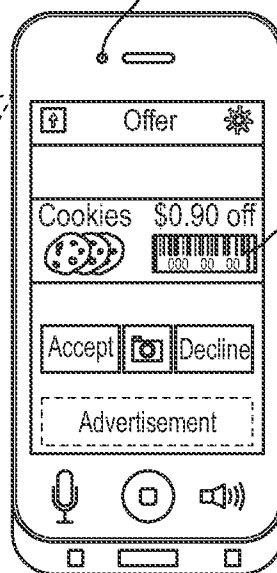
Circular/Advertisement/Coupon Mailer

10001

Standard Coupon



Digital Camera



Standard Coupon

FIG. 10A

QR Code

2000

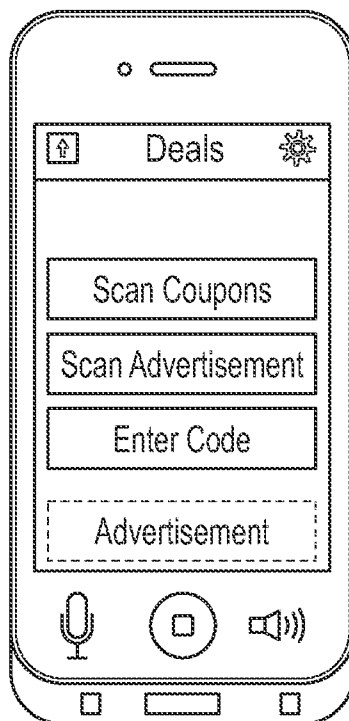


FIG. 10B

22/22

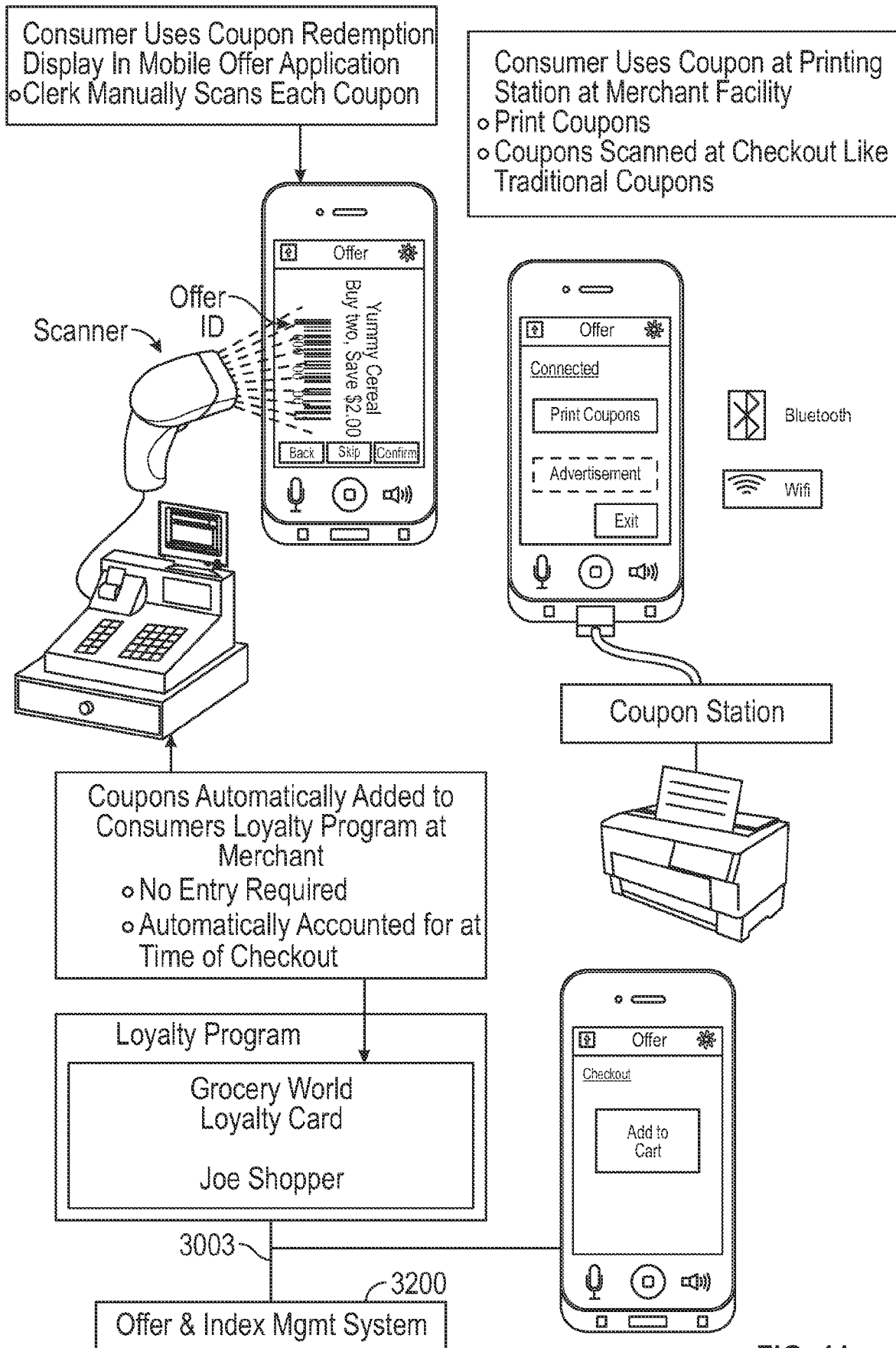


FIG. 11