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DETERMINISTIC PRODUCT SEARCH BASED ON MACHINE-READABLE LINK ACTIVITY

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Deterministic product search based on machine-readable link activity

Abstract

In the context of retail shopping experiences, it has historically been challenging for a consumer to verify the availability of a specific product in a "brick and mortar" retail store. The disclosure proposes a system where each item in an offline shop is marked with some type of marking technology and scanning of these marked items will store the item's metadata (Item location, Item name) in a searchable database. This will enable other consumers searching for the same item to get information about its availability in a particular area.

Problem Statement

In today's retail world, it is a challenge to locate a product in an offline capacity. Consumers need to visit different stores, search for skilled and knowledgeable store staff and generally spend a lot of time just to find whether an item is available or not. Currently, there is no easy way to figure out if an item would be available in any shop or a market. In the future, the expectation is with nearly every product or product package being marked in some way, such as using "passive marks" like barcodes or digital watermarks or using active marks like RFID tags or Bluetooth low energy (BLE) devices. A passive mark needs to be scanned by a smartphone or a visual device for it to be detected. An active mark can be detected by a smartphone or a compliant device.

Existing solutions and differentiation

- Google search allows users to search for a product. Ex: A google search of "Gillette Shaving foam Menthol near me" will give search results that show supermarket stores in my vicinity. This is a probabilistic search because Google is showing me supermarkets because supermarkets have a good probability of stocking shaving cream, but there is no guarantee that the supermarket has the specific product and make that I am looking for. However, with this solution of searching for products based on link activity, there is solid evidence that the product has been present in the supermarket. Even if the product is sold out by the time I get there, there is a very good chance of it getting fresh stock.
- Certain stores expose their inventory over the internet. For example, I can go to a Costco website and search whether a particular item is available in one of their specific outlets. The problem here is that this solution is very specific to Costco. If the product I need is in a Walmart store, then I need to visit the Walmart website as well. Doing product search with a mobile app will enable the consumer to do a search that crosses retail store boundaries and will give a great chance for the consumer to locate the specific product being searched for.

Solution

Using a mobile app, this disclosure proposes a system to look up items and objects that are marked with either passive or active marks. This system will be based on scans performed by other consumers on the object. A consumer will scan a watermarked product before purchase to view an experience related to that product to enhance the buying experience. The system will store information about the product and location regarding the scan. This information will serve as the database and help other consumers to locate any product.
The system will also include a feedback mechanism for the consumers to identify a location as a valid store or an outlet. This feedback will allow us to filter authentic locations and return an assured response back to the consumer. The feedback will help us to translate genuine store location coordinates to human-readable address.

For example (Refer to Fig. 1),

- Bob goes to a local store to buy some kitchen cutlery. He scans some items like spoons, coffee mugs etc. to view the experience attached to them regarding its specifications and uses.
- The items that are being scanned will have been pre-marked with detectable marks and have metadata associated that describe the product.
- The information about the product and location of scan is stored at this point in time in the system. Bob does not necessarily need to purchase the item for it to appear in search results of the system.
- Alice, before going out to a local market, searches the same item in the search engine which Bob has just scanned. The search result will give back the location A regarding the availability of the said item. Now, Alice can directly go to store A and purchase the item.
- The feedback mechanism afterward will request Alice to validate the authenticity of the location to provide better search results in the future. The more the number of scans, the better the search results.

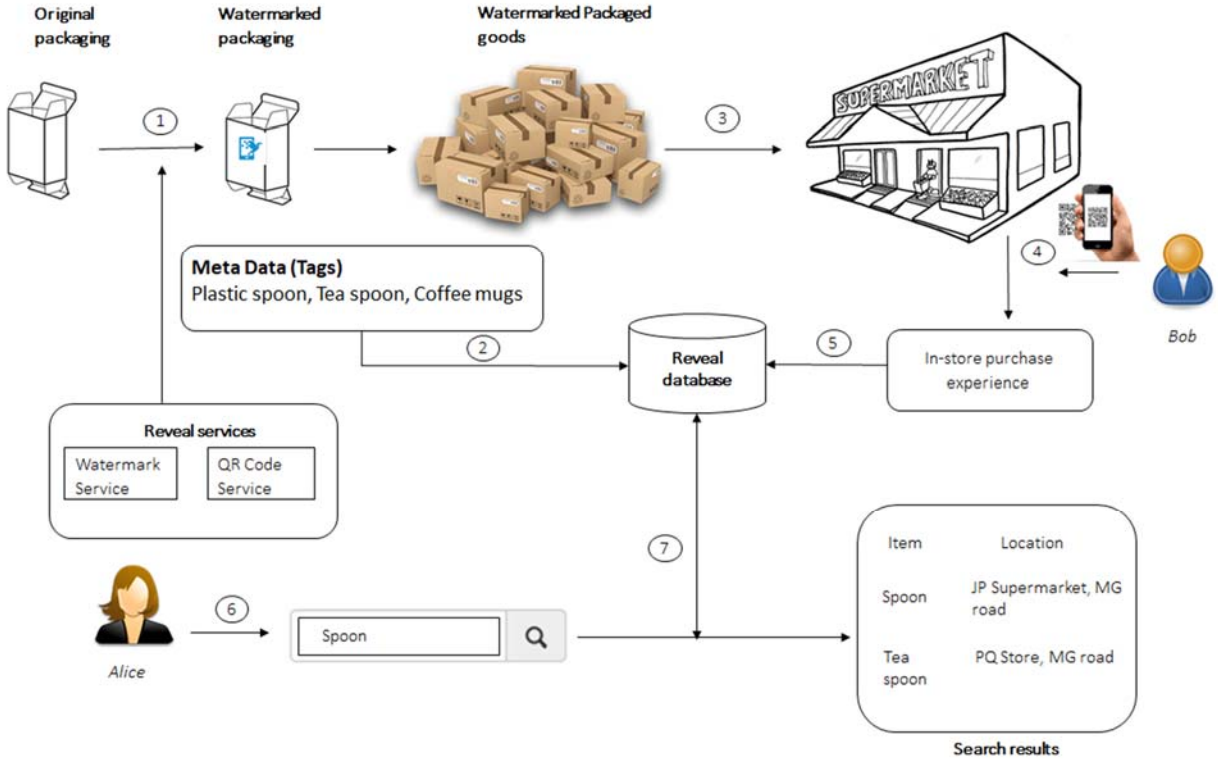

Fig 1. High level solution

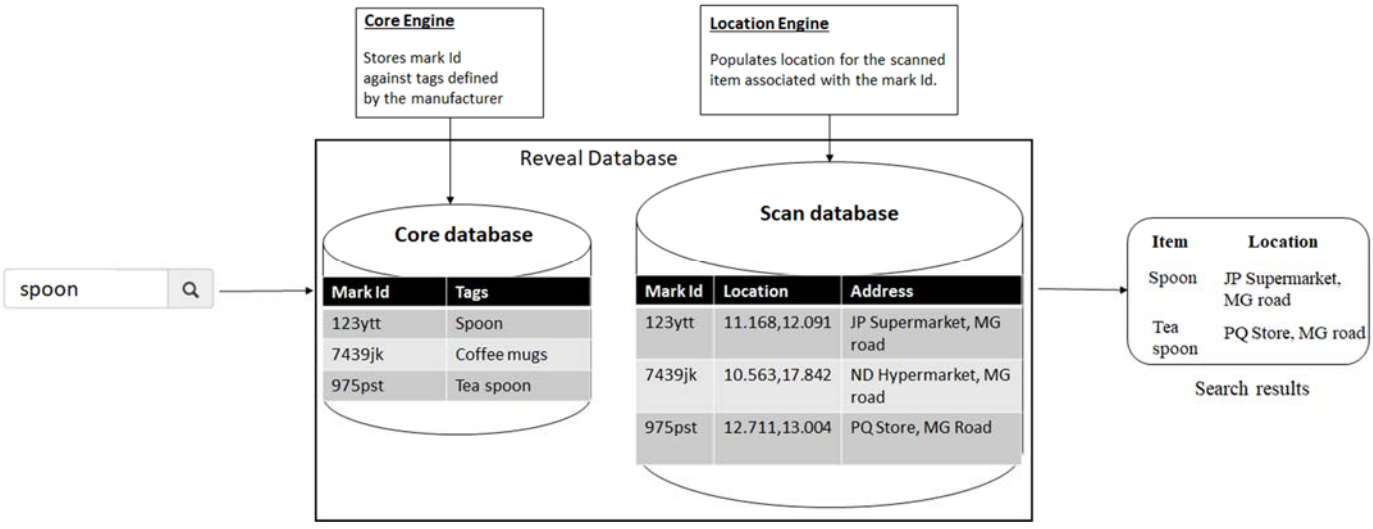

Fig 2. Low level solution

Description:

Step 1 - Packaging

- The original product package is embedded with a unique digital mark using mobile app marking technology resulting in a watermarked package (Refer to steps 1 and 2 of Fig 1).
- The core engine stores the mark ID against tags defined by the manufacturer in core database (Refer to Fig 2).

Step 2 - Scanning

- The marked product is now available in the store ready to be scanned by a mobile app (Refer to steps 3, 4 of Fig 1).
- Once a consumer scans the product package, the location engine will store the location of the scan in scan database against the mark ID (Refer to Fig 2).

Step 3 - Searching

- Another consumer searches for a product on the mobile app's search platform. Internally, the system accumulates data by talking to both databases and using the tag name, conveys the availability of the product at all the locations where similar products were scanned.

Example flow involved in searching:

- Consumer searches for "Hard disk model Seagate HD7313"
- Search UI sends geo-location of the consumer and the search strings to the cloud search service.
- Search service searches the core database using the search string to find a list of IDs matching the search strings
- If a match is found, the scan database is queried to find the locations where the item exists in relation to the scanning consumer's location. This could be a search with increasing radius from the consumer's location.
    - The search could be in an exponentially increasing search radius: Search for scans within the nearest 1 km followed by 2 km -> 3 km -> 5 km -> 8 km -> 13 km and so on. This would be based on a simple formula: Next search radius = Sum of previous two search radii.
    - Preference could be given to stores based on any previously known loyalty memberships to certain stores.
    - Preference could also be given to stores where multiple scans have been registered for the same item - thus indicating that the store has been known to stock this well, and thus has a faster moving inventory of the specific item. That would help the system make the inference that the store has newer stock for perishable products.

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