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October 2020

## Enabling Repeat Purchases Via A Virtual Assistant

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### Recommended Citation

Carbune, Victor and Sharifi, Matthew, "Enabling Repeat Purchases Via A Virtual Assistant", Technical Disclosure Commons, (October 26, 2020)

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## **Enabling Repeat Purchases Via A Virtual Assistant**

### **ABSTRACT**

This disclosure describes a virtual assistant that can help users repeat prior purchases made via a shopping app or website. When making a repeat purchase, users expect the product or service to be identical to the previous purchase. Per techniques described herein, the virtual assistant automatically detects and highlights differences between a current order and past purchases of the same product or service prior to the user finalizing the purchase. The interaction between the user and the virtual assistant can take place via any device such as a smartphone, smart speaker, etc. Further, the actual purchase can be completed via any shopping app or website. Machine learning techniques are utilized to analyze past purchases, accessed with user permission; detect repeat orders; identify mismatches; and provide notifications and assistance with modifying and placing the order.

### **KEYWORDS**

- Order history
- Repeat purchase
- Shopping assistant
- In-app fulfillment
- Virtual assistant
- Smart speaker
- Voice command

### **BACKGROUND**

People often purchase the same or similar items on a repeated basis. For instance, when ordering take-out or shopping for groceries, people tend to buy items that they have previously

ordered. In many such cases, an order may consist entirely of previously ordered items. For instance, a customer's entire grocery basket may be identical to that during the customer's previous order from the store, whether online or physical. In other cases, only a subset of the products in the order may be repeat purchases. Transactions that include repeat purchases can occur for a variety of products and services, such as consumer goods, groceries, restaurant meals, hotel reservations, car rentals, flights, etc.

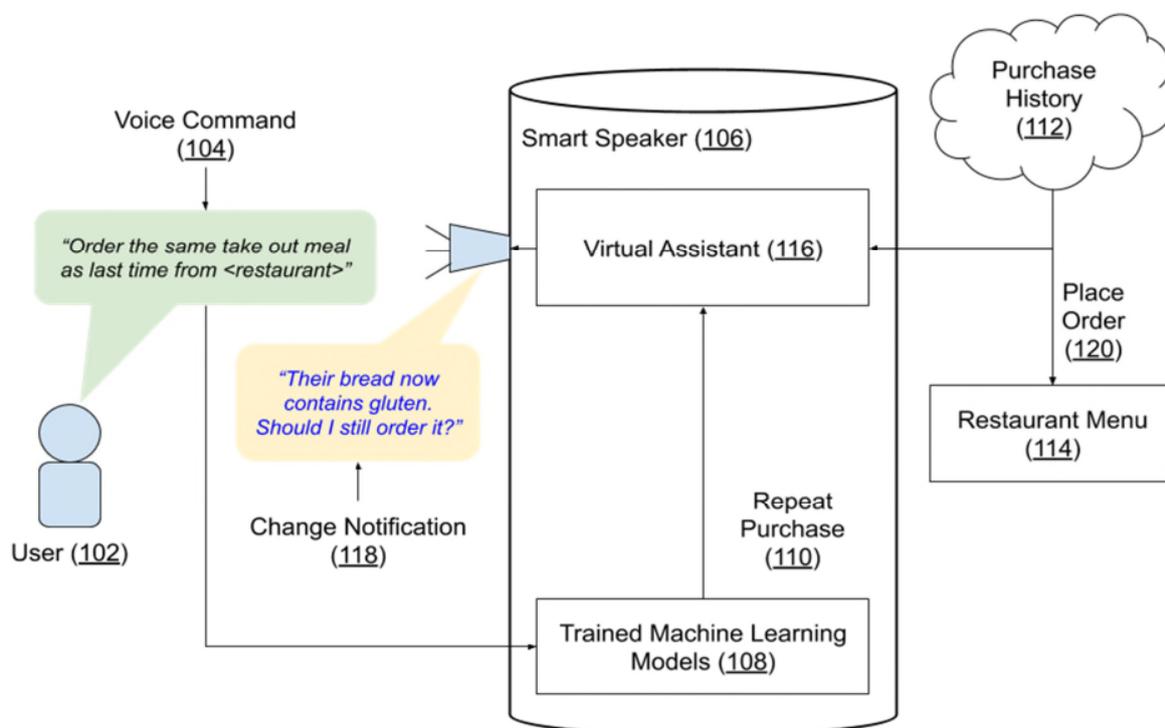
When making a repeat purchase, people typically expect the parameters to be identical to the previous purchase of the product or service. Sometimes, however, the product or service in question may differ from its previously purchased instance in one or more parameters, such as price, quantity, ingredients, etc. In order to avoid breaking expectations, differences between current and past purchases of the same product or service should be detected and brought to the customer's attention prior to them finalizing the purchase.

## DESCRIPTION

This disclosure describes techniques, implemented with user permission, that enable a virtual assistant to help users with repeat purchases. The virtual assistant (shopping assistant) can help with repeat purchases based on relevant voice commands. For instance, a user may issue a voice command to "order the same take out meal as last time from <restaurant>," "order toilet paper," etc. Further, with user permission, a virtual assistant can help with repeat purchases based on the user's actions within the user interface (UI) of an app or a website on the user's device, such as a smartphone. For instance, upon detecting that a user is shopping using an app or a website, the virtual assistant can proactively ask whether the user wishes to repeat any of the past purchases at that store. Additionally, with user permission, the current shopping cart can be

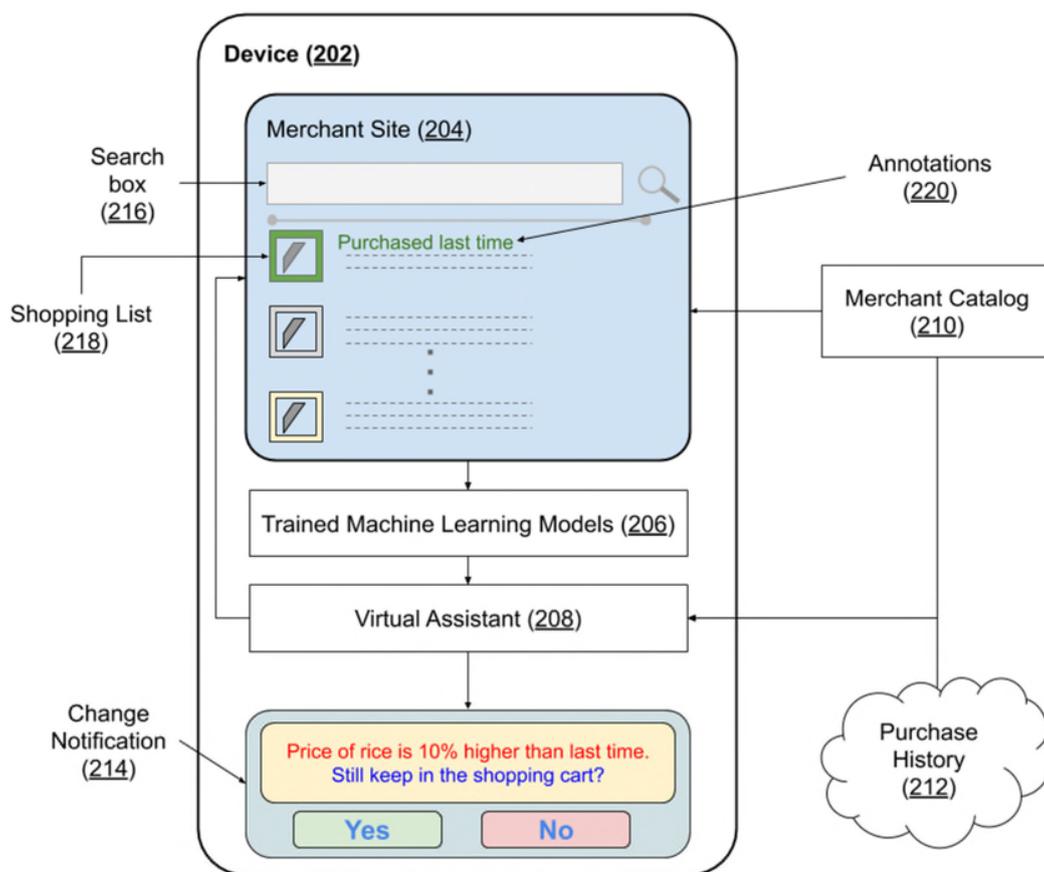
compared to past purchases at that store and the user can be asked if any of the items missing from the current cart are to be added as a repeat purchase.

When assisting with repeating previous purchases, the virtual assistant can compare the current purchase and the past purchase of a product or service along relevant parameters, such as price, quantity, packaging, ingredients, etc. If any of the details differ between the current and past purchases, the virtual assistant can provide a notification to the user of the change and seek the user's confirmation prior to proceeding with the repeat purchase on the user's behalf. For instance, the user can be prompted, "The price of this item has increased by 10% compared to the last time you bought it. Would you still like to purchase it?" Alternatively, or in addition, the user can be offered a substitute that better matches parameters of their prior purchase(s). For instance, the user can be prompted, "Would you like to purchase a similar item that is the same price as what you paid for this item last time?"



**Fig. 1: Using voice commands for repeat purchases using a virtual assistant**

Fig. 1 shows an implementation of providing shopping assistance when the user provides voice commands. A user (102) issues a voice command (104) to repeat a prior order at a restaurant to a virtual assistant (116) provided via a smart speaker (106). With the user's permission, the user's intent for repeating a prior purchase (110) is detected by processing the user's voice command, e.g., using trained machine learning models (108). The restaurant menu (114) and the user's purchase history (112) are examined to identify items on the menu that match the user's previous order. Based on the comparison, the user is notified (118) that the ingredients in one of the items have changed e.g., "Their bread now contains gluten" in the example of Fig. 1. If the user wishes to proceed with the order despite the change, the order is placed (120) on the user's behalf.



**Fig. 2: Virtual assistant helping with repeat purchases based on UI interactions**

Fig. 2 shows another example implementation of operations based on the user's UI interactions indicating shopping actions. With user permission, the user's shopping interactions with a merchant site (204) within the UI of a user device (202) are analyzed using training machine learning models (206) to detect repeat purchases. The output of the models is passed to a virtual assistant (208) along with content of the various UI elements, such as the search box (216), the current list of items in the user's shopping cart (218), etc.

The virtual assistant combines the information with the user's purchase history (212) obtained with user permission and product information in the merchant catalog (210) to annotate (220) the shopping list to indicate items that are repeat purchases. If the parameters of any of the detected repeat purchases are substantially different, the user is shown a change notification (214), e.g., "Price of rice is 10% higher than last time. Still keep in the shopping cart?" to confirm that the item is to be retained in the shopping cart or to remove the item.

The shopping assistance techniques described in this disclosure rely upon the implementation of relevant voice commands to support the operations that support repeat purchases. To that end, an automatic speech recognizer, grammar rules and/or trained machine learning models are employed to process the user's voice commands to detect whether the user intends to repeat a previous purchase. Whenever the user is deemed to request a repeat purchase, the specific item is determined by examining the user's purchase history (accessed with specific user consent) obtained via any suitable source such as a database of transactions recorded in the user's account, product catalog and order history provided by the store, purchase records obtained from the user's device, etc. The repeat purchase is then fulfilled by following the same steps as those involved in prior purchases, seeking confirmation in case any of the parameters differ from the past purchase.

For operations based on user interactions within the UI, content on the device screen is accessed (with user permission) and examined via trained machine learning models, such as neural networks with convolutional or recurrent layers for processing images and text on the screen. If the output of the models indicate that the user is using an app or website for shopping, the user's shopping history with the corresponding merchant is accessed (with specific user consent), in the same manner as that used for voice based operation. Information from the past purchases can be used to annotate the UI as the user interacts with the store and its shopping cart. For instance, previously purchased products rendered on a page can be marked with a circle and a corresponding note indicating that it was purchased in the past. Matching between previous purchases and current items can be performed using training machine learning models that generate a similarity score based on product information, such as images, description, etc.

The virtual assistant can also proactively query a store for past purchases to account for cases where one or more items from a previous order is unavailable. If the user searches for an unavailable product during a shopping session, the virtual assistant can suggest a close substitute at the same store and/or offer to purchase suitable alternatives from other stores.

With user permission, differences in purchase parameters between current and past purchases can be detected at a suitable time, e.g., when an item is added to the shopping cart and/or at the time of checkout. Similarly, the user can be notified of these changes at either or both of those times. The user may not wish to be bothered with the notifications and confirmations when the differences are comparatively minor or unimportant. For instance, it may be important to a user to know if product ingredients have changed to include gluten, whereas a user is unlikely to care about minor rewording of the product description. A rule-based and/or machine learning based component can be employed to determine whether differences between

current and past purchases are significant enough to trigger user notification and confirmation. An online learning algorithm can be used to fine tune the operation based on generated notifications that are subsequently dismissed by the user (thus serving as feedback, used with user permission) without making any changes to the current purchase.

The described techniques can support orders in which all items are repeat purchases as well as orders in which only a subset of the items are repeat purchases. The notifications and confirmations issued during the repeat purchase process can be relayed to the user using spoken output and/or UI dialogs. The threshold values, such as product similarity scores, used in the operational implementation of the described techniques, can be set by the developers and/or specified by the users and/or determined dynamically at runtime. The operation can be implemented to obtain order and item information using application programming interfaces (APIs) for merchants that provide it. The model operation can be customized to support repeat purchases of a diverse range of products and services and can be personalized for the user.

The above techniques can be implemented for any voice-based virtual assistant available via any user device such as smart speakers, smartphones, etc. Implementation of the techniques can enable users to make repeat purchases quickly and conveniently and in certain cases, automate the process completely, thus enhancing the user experience (UX) of shopping using a virtual assistant.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may enable collection of user information (e.g., information about a user's past purchases, shopping preferences, voice commands, interactions with a virtual assistant, payment modes, or a user's current location), and if the user is sent content or communications from a server. In addition,

certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user, how that information is used, and what information is provided to the user.

## CONCLUSION

This disclosure describes a virtual assistant that can help users repeat prior purchases made via a shopping app or website. When making a repeat purchase, users expect the product or service to be identical to the previous purchase. Per techniques described herein, the virtual assistant automatically detects and highlights differences between a current order and past purchases of the same product or service prior to the user finalizing the purchase. The interaction between the user and the virtual assistant can take place via any device such as a smartphone, smart speaker, etc. Further, the actual purchase can be completed via any shopping app or website. Machine learning techniques are utilized to analyze past purchases, accessed with user permission; detect repeat orders; identify mismatches; and provide notifications and assistance with modifying and placing the order.