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Aggregated And Anonymized Tracking Of Offline Purchases in Response to Sponsored Content in a Voice Activated Computing System

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AGGREGATED AND ANONYMIZED TRACKING OF OFFLINE PURCHASES IN RESPONSE TO SPONSORED CONTENT IN A VOICE ACTIVATED COMPUTING SYSTEM

Voice activated computing systems provide a user with content or services in response to voice commands spoken by the user. Such systems can capture voice commands from a user, process the voice commands to determine requests and keywords in the voice commands, and provide the user with content or services related to the determined requests and keywords.

The following discusses techniques for correlating sponsored content provided to the user over a voice activated computing system to offline purchase activity. A voice activated computing system processes the voice commands received from the user and identifies non-sponsored and sponsored content related to the voice commands. The sponsored content is presented to the user via a voice assistant device or another available device accessible to the user, such as the user's smartphone, tablet, etc. The user may act in response to the sponsored content, such as purchasing a product or service advertised in the sponsored content. However, the users actions may take place offline. That is, the user may purchase the product or service at a brick-and-mortar store or purchase it at an internet store a long time after the user responds to the sponsored content. By determining correlations between the users responses and any subsequent purchases, the system can provide merchants with estimates of the effectiveness of their ad campaigns.

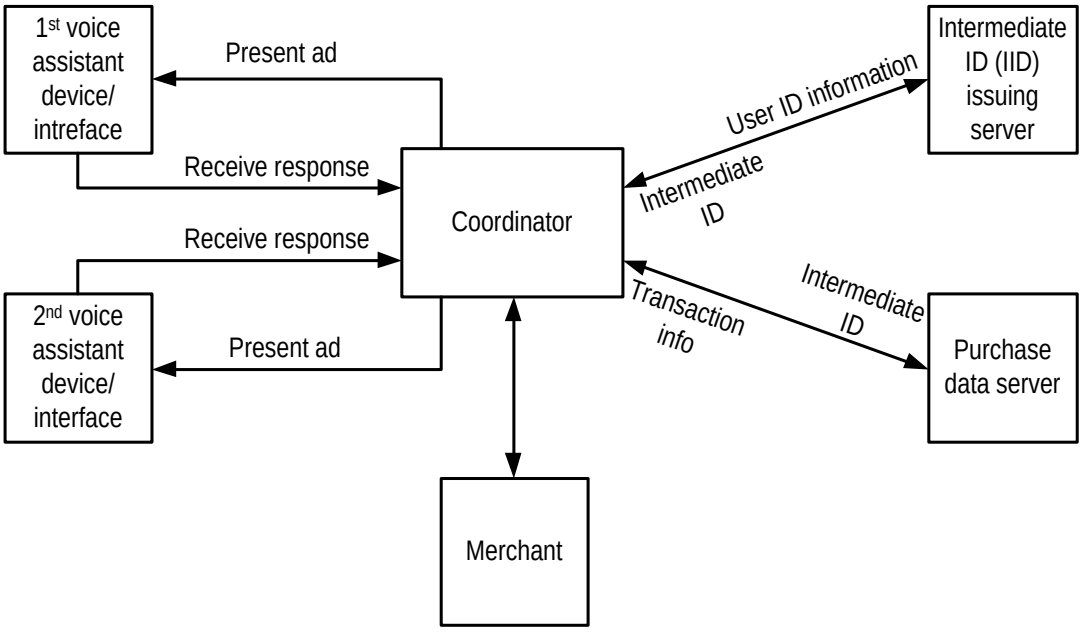

Figure 1

Figure 1 shows a representation of a voice activated computing system. The system can include a coordinator, an intermediate identity (IID) issuing server, and a purchase data server. The coordinator communicates with a 1st voice assistant device or interface, and a 2nd voice assistant device or interface. The 1st and 2nd voice assistant devices can receive voice commands from users, convert the voice commands into audio files, and provide the audio files to the coordinator. The coordinator can process the audio files, and generate non-sponsored content and sponsored content. The non-sponsored content and sponsored content can be in the form of audio files, which when sent to the respective voice assistant device, are played back to the user. The non-sponsored content and the sponsored content can also be sent to one or more interfaces available to the user, such as smartphones, tablets, laptops, smartwatches, etc., capable of presenting the content to the user as audio, video, or in other forms. The coordinator can

communicate with several other voice assistant devices or interfaces in addition to the 1st and 2nd voice assistant devices shown in Figure 1.

The coordinator can include ads in the sponsored content sent to the 1st and 2nd voice assistant devices. The ads can represent offers to purchase products or services provided by one or more merchants. For example, the ad can include an audio message such as "XYZ has a new game console out for $200. Would you like to check it out?" If the user responds with a voice response showing interest in the product, such as "Yes, I would like more information on the game console," the coordinator, in addition to providing the user with additional information, can register an impression associated with the ad. The coordinator can register an impression even if the user responds to the ad using an interface different from the voice assistant device. For example, the coordinator can register a user's clicking on the ad displayed on the user's smartphone as an impression. The coordinator can register identities of the users for each impression, and associate the identities with the ad presented. The identities can include email-ids, usernames, etc. The coordinator can gather a set of identities of user responding to ads, and the associated ads. The coordinator also can store the date range within which the user impressions were registered. The coordinator also can store hashed values of the identities, instead of storing the actual identities of the users. Storing the hashed values can increase the degree of user privacy provided by the system.

The coordinator can send the set of identities (or hashed values thereof) to an intermediate ID (IID) issuing server. The IID issuing server associates identities in the set of identities received from the coordinator with IIDs. Each IID can be associated with a credit ID, such as an identity issued by a creditor or financial institution. An IID may be an identifier that is distinct from an email address or a credit ID of the user. The purpose of the IIDs is, in part, to

protect user-privacy by inhibiting the coordinator from discovering credit IDs and inhibiting a purchase data provider from discovering email addresses of users. That is, the IID, when received by the coordinator, does not provide the coordinator with the credit ID associated with the user. Instead, the coordinator receives an intermediate identity, which it can pass on to a purchase data server to receive transactions carried out by the user associated with the IID.

In some implementations, the IID issuing server associates IIDs with hashes of email ids of users. This improves the privacy of the user email ids, as the IID issuing server does not view the actual email ids, and instead only stores the hash values of the email ids. In such implementations, the coordinator sends to the IID issuing server a set of hashes of the email ids of the users, instead of sending a set of email ids.

In some instances, the coordinator can be inhibited from making one-to-one association between the email ids of the users and their associated IIDs received from the IID issuing server. In one approach to achieving this, the IID issuing server can be configured to return IIDs only if the set of email ids received by the coordinator include a minimum number of ids. If the minimum number of email IDs are received, the IID issuing server can return the IIDs in a random order, such that the coordinator cannot readily associate the received IIDs to the sent email ids. In another approach, the IID issuing server can be configured to only return a minimum number of IIDs. In yet another approach, the IID issuing server can be configured to return an error message if subsequently received set of email ids differ from a previously received set of email ids by given (small) number of email addresses.

The coordinator can send the IIDs, the merchant IDs associated with the ads that the users responded to, and the date range to the purchase data server. The purchase data server can be a credit card issuer, a bank, or any other entity that can maintain or access user transaction data.

The merchant ID is typically a merchant specific identifier, and a single merchant may have multiple merchant IDs. The purchase data server can maintain transaction data that includes transactions associated with the merchant IDs. For example, the purchase data server can maintain credit card purchase data associated with purchases made at brick-and-mortar stores of a set of merchants. The purchase data may also include online purchases made at merchants' online stores. This data also can include credit IDs of users that carried out those transactions. The purchase data server can associate the IIDs received from the coordinator with credit IDs in the transaction data, thereby associating IIDs with one or more merchant IDs.

In addition, the purchase data server can consider the date range associated with each IID to limit duplicating IIDs with merchant IDs. For example, if a user responds twice to the same audio sponsored content at his or her voice assistant device, the data range associated with each of the two responses can be used to associate the transaction with the second response instead of both the first and the second response. The purchase data server can send to the coordinator, transaction information, which can include the time and value of each offline transaction associated with an IID at a particular merchant identified by the corresponding merchant ID within the specified date range. The transaction information also can include aggregated metrics, such as the number of unique users that made purchases at a particular merchant store identified by a merchant ID, the number of unique transactions made by users with corresponding IIDs, or the total aggregate transaction value. In some instances, the coordinator may request transaction information from more than one purchase data servers, each of which can provide the coordinator with transaction information associated with the IIDs provided by the coordinator.

Measures can be taken to ensure user privacy. In one approach, the purchase data server can be configured to not return transaction information unless the set of IIDs sent by the

coordinator contains a minimum number of IIDs. In another approach, the purchase data server can be configured to not return transaction information for a currently received set of IIDs sent by the coordinator, if the difference between a number of IIDs in the currently received set of IIDS and a number of IIDs in a previously received set of IIDs is less than a minimum number. In another approach, the purchase data server can shuffle or randomize the order of information sent to the coordinator, such that the coordinator can be inhibited from matching the IIDs to the transaction information based on their relative order.

The coordinator can process the transaction information received from the purchase data server, and present offline transaction information to one or more merchants. The offline transactions data can provide correlations between sponsored content provided to the user over a voice activated computing system to offline purchase activity. In some instances, the coordinator can process the transaction data to determine the number of, or the total amount of, offline transactions associated with an ad campaign. For example, the information can include offline transactions made as a percentage of responses or impressions associated with an sponsored content, such as 5% of users that responded to a sponsored content made offline purchases of the product or service offered in the sponsored content. In some other instances, the coordinator can determine the total amount of offline purchases made in response to an ad campaign. In some instances, the coordinator can provide online purchase information in addition to offline purchase information, so that the merchant can compare the effectiveness of the ad campaign in generating online purchases as opposed to brick-and-mortar store purchases.

The coordinator can also estimate additional relationships between offline transactions made by users and ads presented by merchants. For example, the coordinator can estimate call based purchases that followed a response to a sponsored ad campaign, the coordinator can

estimate service based purchases (such as, for example, taxis, plumbers, etc.) that followed a response to a sponsored ad campaign.

To protect user privacy, the coordinator can ensure that email ids of users are not sent to the merchant in addition to the offline transaction information.

In some instances, the coordinator can determine correlation between the sponsored content presented to the user and any offline purchase activity by directly enquiring the user on any offline transactions. For example, a predetermined time period after sending the user an audio ad for shoes from a merchant, the system can send another audio message to the user's voice assistant device asking the user "did you like those shoes by XYZ?" If the user responds with a voice message that suggests that the user did indeed purchase the shoes, then the coordinator can include this information in the offline transaction information provided to the merchant. Of course, the system can send the purchase query to the user at another available interface instead of at the voice assistant device.

Abstract

This document describes a technique for processing voice commands received by a voice activated computing system to identify correlations between sponsored content provided to the user over a voice activated computing system and offline purchase activity. A voice activated computing system processes the voice commands received from the user and identifies non-sponsored and sponsored content related to the voice commands. The sponsored content is presented to the user via a voice assistant device or another available device accessible to the user, such as the user's smartphone, tablet, etc. The user may act in response to the sponsored content, such as purchasing a product or service advertised in the sponsored content. However, the users actions may take place offline. That is, the user may purchase the product or service at a brick-and-mortar store or purchase it at an internet store a long time after the user responds to the sponsored content. By determining correlations between the users responses and any subsequent purchases, the system can provide merchants with estimates of the effectiveness of their ad campaigns.