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## **A SYSTEM FOR AUTOMATICALLY ENHANCING ADVERTISER PROVIDED SITELINKS WITH RELEVANT CREATIVE TEXT**

### **ABSTRACT**

Systems and methods described herein allow for providing enhanced sitelinks in the voice activated computer environment. A data processing system can determine a primary search result and a URL responsive to the identified user request. The data processing system can determine a primary search result and a URL responsive to the identified user request. The data processing system can identify a plurality of candidate digital components associated with the URL, and calculate a respective score for each of the identified candidate digital components. The data processing system can select a digital component of the plurality of candidate digital components based on the computed scores. The data processing system can transmit an output audio signal corresponding to primary search result and a secondary output signal corresponding to the selected digital component for presenting to the user.

### **DETAILED DESCRIPTION**

The subject matter described herein relates generally to online content and/or online content delivery in a voice activated computer environment. Specifically, the methods and systems herein enable providing enhanced sitelinks in the voice activated computer environment. A data processing system can identify primary content and a respective URL responsive to a received user request. The primary content can be indicative of information requested by a user and can be presented to the user in audio format. The URL can be a link to additional information related to the primary content. The data processing system can identify candidate digital components associated with the URL, select at least one of the candidate digital

components, and present the selected digital component(s) as secondary content to the user. The data processing system can determine the format of the secondary content and the platform for presenting the secondary content to the user based on one or more criteria. The data processing system can then transmit the primary content and the secondary content for presenting to the user.

FIG. 1 is a flowchart illustrating an example method 100 of providing enhanced sitelinks responsive to voice commands in a voice activated computer environment. The method 100 can include, at step 105, identifying a user request based on a received input audio signal. The input audio signal can be received by a client device and can be indicative of a request or command made by a corresponding user. The user can initiate a conversation with an instance of a voice-based virtual personal assistant executing one the client device and/or a data processing system remotely connected to the client device. The user can make a request for an online service or action (e.g., an audio search query, making or checking an airline flight reservation, online purchase of movie tickets, rendering of an online live stream, scheduling of a cab service, etc.). The client device can receive the input audio signal via a respective microphone, and transmit the received input audio signal to the data processing system. A natural language processor (NLP) component of the data processing system can process the audio query to identify the user request. The NLP component can machine-translate the audio query to a corresponding text and parse the generated text to identify one or more keywords. For example if the user says “Ok, when is my flight,” the NLP component can identify the keywords “when” and “my flight.” Based on the identified keywords, the data processing system can determine that the user is asking about the time of a previously reserved flight.

At step 110, the method 100 can include the data processing system determining a primary search result and a URL responsive to the identified user request. The data processing system can determine the primary search result or a content item thereof based on keywords identified from the received input audio signal. For example, responsive to the request for flight time, the data processing system can perform a search to locate a data record related to a flight of interest to the user. Performing the search may include the data processing system searching a database (e.g., e-mail inbox or a database storing data related to previous conversations with user) associated with the user to identify a record (e.g., a confirmation e-mail confirming a previously performed flight reservation or flight ticket purchase) including the information requested by the user. The data processing system can generate the data component indicative of the primary search result as a speech signal, a text signal, an image, a video signal, or a combination thereof.

The URL can be a link to a digital document or information resource that can provide additional information about the primary search results. For example, if the input audio signal includes the “Ok, when is my flight,” the URL can be a link for the user to access additional information related to user flight such as, the reservation number of the airline with which the flight is booked, the flight reservation status (e.g., confirmed or not), the flight status, the airline’s ticketing webpage, the airline’s customer service webpage, the airline’s website, or Federal Aviation Administration (FAA) flying regulations. If the user request relates to nearby Italian restaurants, the primary search results can include the name and a brief description of a specific restaurant, whereas the URL can be a link of a webpage associated with the restaurant. The data processing system can generate a first action data structure associated with the primary search results, and can use the URL to generate a second action data structure. The first and

second data action data structures can relate to providing content associated with the primary search results and the URL, respectively, to the client device that transmitted the request in a conversational manner or another client device of the same user.

The data processing system may also determine an ad for presenting to the user responsive to the identified user request. The data processing system may determine an ad based on keywords identified from the received input audio signal. The data processing system may also determine a URL associated with the ad. For example, the URL can be a link of a landing page of the corresponding advertiser. The data processing system may generate separate data components associated with the ad and the URL for transmitting to the client device of the user.

At step 115, the method 100 can include identifying a plurality of candidate digital components associated with the URL. The data processing system can access and analyze the resource information associated with the URL to determine candidate digital components. For example, the data processing system may access and analyze the content of a website of a restaurant of interest to the user. The data processing system can identify, for example, based on tabs or various sections of the website, a plurality of corresponding digital components. The digital components can include one or more text components, one or more image components, one or more video components, one or more sub-links to internal webpages of the website, or a combination thereof. For example, the data processing system can identify a digital component indicative of the geographical address of the restaurant or corresponding driving directions, a digital component indicative of a phone number of the restaurant, a digital component indicative of the restaurant's menu, a digital component related to purchasing the restaurant's gift cards, a digital component related to reviews of the restaurant, and/or a digital component related to applying for jobs in the restaurant.

With regard to the user request for flight information, the data processing system may identify a digital component (e.g., a document) indicative of the flight information and flight reservation confirmation, a text string representing a phone number of the airline company, a link for language insurance, or a link for a website of the departure airport. For a given item associated with the URL (e.g., a phone number or a restaurant menu), the data processing system can identify multiple corresponding digital components representing the same content in different formats (e.g., video-based, audio-based, text-based, image-based, or a combination thereof). Continuing the above example, with the input of “Ok, when is my flight,” the candidate digital components associated with the phone number of the airline could be a text string of the phone number to the airline, a link to a webpage containing the airline’s phone number, or an audio file of a computerized voice reading the airline’s phone number.

At step 120, the data processing system can calculate a respective score for each of the identified candidate digital components. The score for each of the candidate digital component can be based on, for example, a term frequency within each of the plurality of candidate digital components, relevance of the digital component to the user or the user request, historical data of users’ interest in (or interactions with) that candidate digital component, a format of the digital component, characteristics of a client device of the user, a user location or context, or a combination thereof. For example, if the user is requesting a restaurant to have dinner, the user may be more interests in the restaurant’s menu than the restaurant’s gift cards or jobs available in the restaurant. Also, if the user request relates to a flight time that is within few hours, the user may be more interested in information depicting flight delays in the departure airport. In the case where the user is driving or communicating via a client device with no display capability, audio content can be more appropriate than visual content.

In calculating scores for different digital components, the data processing system can determine, for each candidate digital component, a plurality of scores (e.g., impression score, relevance score, format score, etc.) and calculate a final score for that candidate digital component as a weighted sum of the determined scores. In some implementations, the data processing system can calculate the scores for the candidate digital components using heuristics, artificial intelligence models, or a combination thereof.

At step 125, the data processing system can select a digital component of the plurality of candidate digital components based on the computed scores. The selection of one of the candidate digital components can be based on the respective score for each of the plurality of digital components. The data processing system may use filter rules to select the digital component. For example, the data processing system can filter the candidate digital components based on language constraints or criteria, geographic constraints or criteria, user device capabilities, or a combination thereof. The candidate digital components' scored and/or the filter rules can be used to ensure that the selected digital component is relevant to the user given the user's (or user request's) context, appropriate to user device location, appropriate to the user device type or characteristics, and/or more likely to be of interest to the user. The user device characteristics can include resources or capabilities of the client device to receive the digital component, such as the battery life, processor utilization, memory utilization, an interface parameter, bandwidth utilization, or a combination thereof. The capabilities can include the output capabilities of the client computing device that will receive the digital component, such as whether the device is capable of displaying video or images or playing audio messages.

In some implementations, the data processing system can transform the selected digital component from a first format to a second format. For example, the data processing may

generate an audio signal indicative of a phone number or some other content (e.g., a restaurant menu) based on corresponding textual content. The data processing system may determine multiple digital components for presenting to the user. The determined digital components can be representative of multiple formats of the same data content (e.g., audio and visual formats for a restaurant menu), or can be associated with different data content (e.g., phone number and menu).

At step 130, the data processing system can transmit an output audio signal and a secondary output signal for presenting to the user. The output audio signal can be indicative of the primary search results. For example, the data processing system can generate the output signal based on a textual format of the primary search results. The data processing system can generate the primary output audio signal responsive to processing the first action data structure. The generated output audio signal can include organic or non-sponsored content related to the identified user request. The secondary output signal can include the selected digital component(s). Depending on the format of the secondary output signal, the data processing system can transmit the secondary output signal to a secondary interface or a second client device of the user. For example, if the secondary output signal includes visual content, the data processing system can transmit the output audio signal for playing on a first client device, and transmit the secondary output signal for display on a second client device of the user.

The data processing system can transmit the output audio signal and the secondary output signal substantially simultaneously or at different time instances. For example, the data processing system can append the output audio signal with one or more audio segments indicative of one or more labels of the selected digital component(s), such as audio segments corresponding to the labels “menu,” “driving directions,” and/or “reviews.” The data processing



system can first provide the output audio signal for presenting to the user. If the user selects, e.g., by uttering one of the labels corresponding to the selected digital component(s), the data processing system can then transmit the secondary output signal or a portion thereof corresponding to the selected label for presenting to the user. The data processing system may first transmit an audio request to user regarding the preferred format or platform for presenting the secondary output signal. For example, the data processing system can send an audio signal asking “where would you like to receive the menu?” or “would like to see the restaurant’s menu on your phone?” The data processing system may then determine based on the user’s response the proper format and/or destination of the secondary output signal.

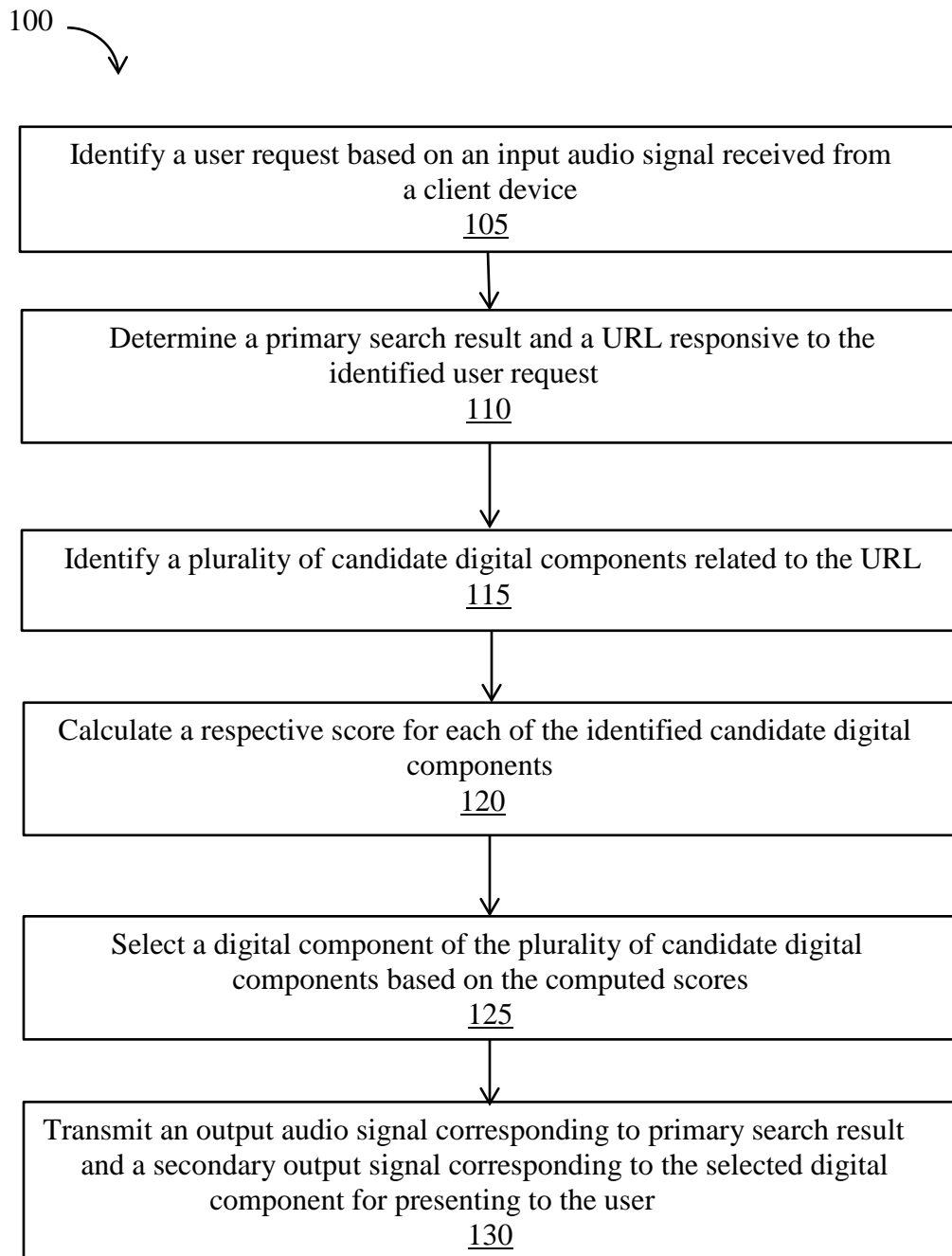


FIG. 1