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Virtual Assistant With Tappable User Interface

ABSTRACT

Virtual assistants that can respond to spoken queries are popular. However, in some situations, users may prefer to provide input via typing or other modalities, rather than voice. This disclosure describes a virtual assistant with a user interface that enables a user to provide spoken as well as typed input. A typeahead search is performed based on received partial input and tappable query suggestions are provided to the user. If the user selects a suggested query, the corresponding action is performed directly, without the user having to complete the query input.

KEYWORDS

- Voice assistant
- Virtual assistant
- Smart display
- Smart appliance
- Typeahead search
- Tappable UI
- Tappable interface
- Multimodal interface

BACKGROUND

Users rely on voice commands to interact with virtual assistants. However, in some situations, e.g., while in a library, train, lecture, etc., it is inconvenient for the user to provide spoken input. Virtual assistant software, e.g., provided via devices such as smartphones, tablets, wearable devices, laptops, etc. include features to provide a virtual keyboard or other displayed

user interface that allows users to provide input by typing or tapping on a touchscreen.

However, switching between voice and touch input can be cumbersome, e.g., if it requires multiple steps to open the virtual keyboard.

DESCRIPTION

This disclosure describes a virtual assistant user interface that simultaneously supports voice and keyboard input. To provide a command to the virtual assistant the user can either speak or type. If the user provides spoken input, the virtual assistant performs speech recognition while continuing to show the keyboard, allowing the user to type on the keyboard at any time to modify or complete their query. If the user starts to type directly (without providing voice input), the voice mode is turned off. This improves the user experience of using the virtual assistant and also provides the feature of typeahead searching. Specifically, when the user types the prefix of a word, the virtual assistant can automatically identify relevant queries and display some suggested queries. The user can tap (or otherwise select) any of the suggestions to trigger the corresponding query. Based on the suggestions, the user can learn the types of actions they can perform using the virtual assistant and try new queries. Further, the user can also modify their queries based on the provided suggestions.

Typeahead search suggestions are provided with the use of incremental ranking. For example, with user permission, the virtual assistant can utilize various data sources to identify the suggested queries, e.g., both on-device sources and remote servers. On-device sources can include data that may not be available on the server, e.g., the user's contacts, recent applications used, etc. Data from such sources is accessed with specific user permission.

There is typically a delay in retrieving suggestions from the server as compared to local suggestions. The presented suggestions are displayed based on the rank order, and if additional

suggestions are obtained after the initial display of suggestions, the display is updated if necessary, based on the ranking. In this manner, the virtual assistant can provide best-effort query suggestions on-the-fly as the user provides input, without having to wait for the user to complete their query. The suggestions are updated/ refined as the user continues to provide additional query input. The user can select a particular suggestion from the virtual assistant user interface to initiate the corresponding action without having to leave the virtual assistant user interface.

Query suggestions can be determined based on factors permitted by the user. For example, such factors can include the user's current context, e.g., recently used applications, time, location, etc. If the user denies permission, suggestions are provided based on the received query input. The user is provided with options to disable query suggestions entirely, limit query suggestions to on-device data sources, and customize query suggestions in other ways.

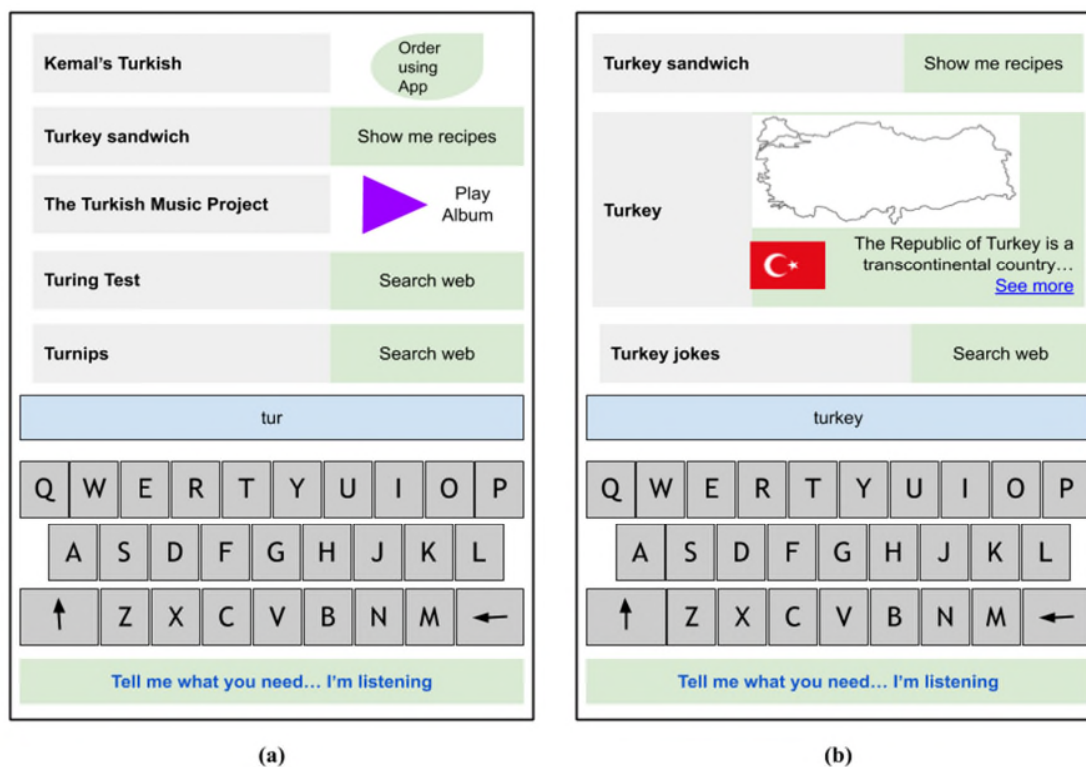


Fig. 1: Typeahead searching with refinement

Fig. 1 illustrates a virtual assistant user interface with typeahead searching and query suggestions. The virtual assistant user interface includes a keyboard and also enables voice input (“Tell me what you need... I’m listening”). As illustrated in Fig. 1(a), as the user starts typing the letters “tur” query suggestions are automatically provided in the user interface, e.g., to place an order from “Kemal’s **Turkish**” restaurant, to view recipes for a **Turkey** sandwich, to play music from the **Turkish** Music Project, to search the web for “**Turing** Test” or to start playback of “Lana **Turner**’s Greatest Hits.” As can be seen, each of the suggestions is based on the user entered text “tur”.

As the user continues to provide further input, extending the text to “turkey,” the virtual assistant user interface is automatically updated to show corresponding suggestions. Fig 1(b) shows the suggestions to search for recipes for a **Turkey** sandwich, to view information about the country **Turkey** from a knowledge base, or to search the web for “**Turkey** jokes.”

At any point during the query input, the user can simply tap the displayed suggestion to complete the corresponding action, e.g., order from a restaurant, view recipes, start or resume media playback, search the Internet, place a call, etc. The tappable user interface can save the user time by suggesting queries that the user is likely to be interested in.

The suggestions can be determined using any suitable technique such as heuristics, machine-learning, etc. The suggestions are ordered and ranked based on user-permitted contextual factors, obtained with user permission. For example, such user-permitted factors can include application usage on the user device, user’s top contacts, communications actions, recent searches, location, or virtual assistant settings.

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 device, application use, a user's queries, a user's preferences, 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 with a user interface that enables a user to provide spoken as well as typed input. A typeahead search is performed based on received partial input and tappable query suggestions are provided to the user. If the user selects a suggested query, the corresponding action is performed directly, without the user having to complete the query input.

REFERENCES

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