October 02, 2017

ASSISTANT SEARCH CORPUS USING EVENT METADATA

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ABSTRACT

A virtual, intelligent, or computational assistant (e.g., also referred to simply as an "assistant") is described that includes event metadata in its search corpus to determine a response to queries related to a personal calendar of events. The assistant determines a query related to an event that is recorded on a calendar of a user. To determine a response to the query, the assistant searches through an advanced search corpus that includes past and future event data published on the calendar as well as event metadata associated with each past and future event in the calendar. Reliance on the advanced search corpus enables the assistant to respond to a variety of complex and detailed queries related to a user's personal events.

DESCRIPTION

Virtual, intelligent, or computational assistants (e.g., also referred to simply "assistants") execute on counter-top computing devices, mobile phones, automobiles, and many other types of computing devices. Assistants output useful information, responds to users' needs, or otherwise performs certain operations to help users complete real-world and/or virtual tasks. Some assistants are configured to maintain a calendar of individual and often personalized events for their users and provide a user interface from which users may obtain answers to queries related to the individual events. While providing such an interface is useful, the usefulness of the assistant is limited by the complexity of the search corpus used by the assistant to obtain event information in developing answers to queries related to events.

The example system shown in FIG. 1 provides an assistant architecture that that includes event metadata in its search corpus to determine a response to queries related to personal events

on a calendar. The assistant determines a query related to an event that is recorded on a calendar of a user. To determine a response to the query, the assistant searches through an advanced search corpus that includes past and future event data published on the calendar as well as event metadata associated with each past and future event in the calendar. In other words, rather than rely on a traditional search corpus made up mostly of event titles, descriptions, participants, locations, and start and end times, the assistant relies on a larger search corpus that also includes locations, participants, contexts, event types, and other event metadata from which the assistant can search to respond to a query. Reliance on the larger, more advanced search corpus enables the assistant to respond more complex, detailed, and personal queries related to a user's personal events that other assistants may not be able to answer.

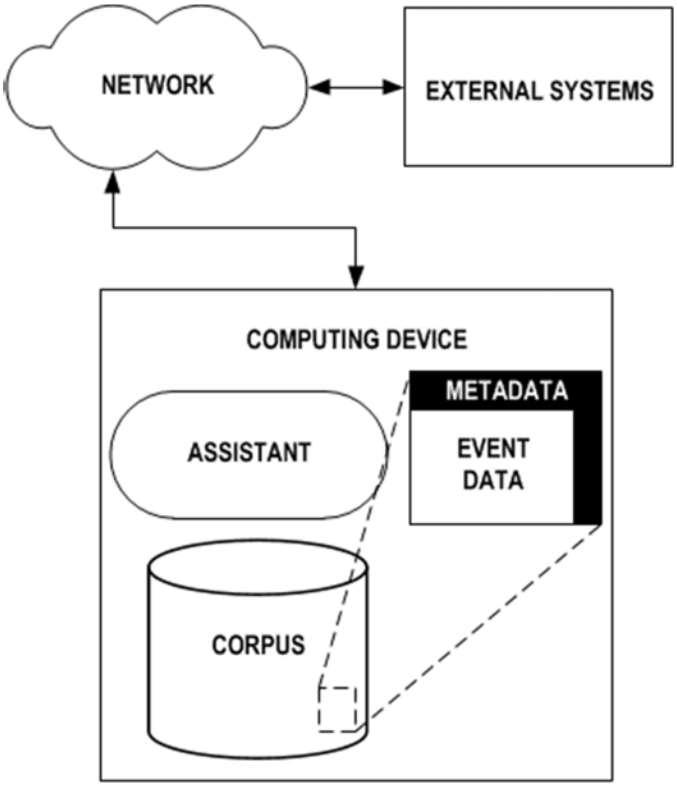

FIG. 1

The system of FIG. 1 includes one or more external systems and a computing device communicating across a network to provide an assistant service that utilizes past and future event meta for responding to queries about personalized events. The network of FIG. 1 represents a combination of any one or more public or private communication networks, for instance, television broadcast networks, cable or satellite networks, cellular networks, Wi-Fi networks, broadband networks, and/or other type of network for transmitting data (e.g., telecommunications and/or media data) between various computing devices, systems, and other communications and media equipment.

The computing device represents any type of computing device that is configured to execute an assistant and communicate on a network. The external systems represent any type of server or other computing system that is configured to support the assistants executing at the computing device. The external systems and computing device can be personal, corporate, or government owned computing devices. In some examples, the computing device may be a shared asset of multiple users. Examples of the computing device include servers, mainframes, cloud computing environments, mobile phones, tablet computers, wearable computing devices, countertop computing devices, home automation computing devices, laptop computers, desktop computers, televisions, stereos, automobiles, and any and all other type of mobile and non-mobile computing device that is configured to execute an assistant.

The computing device includes an assistant that executes across the external systems and the computing device to provide assistant services to users of the computing device. Examples of assistant services include: setting up reminders, creating calendar entries, booking travel, online ordering, sending messages or other communications, controlling televisions, lights,

thermostats, appliances, or other computing devices, providing navigational instructions, or any other conceivable task or operation that may be performed by an assistant.

As a user interacts with the assistant, the assistant may obtain personal information about the user. Examples of personal information include: calendars, scheduled, events, habits, preferences, notes, lists, contacts, communications, interests, location histories, and other types of user information. After receiving explicit permission from the user, the assistant may store, the personal information at user information data stores and in the course of providing assistant services, make use of the personal information stored at the user information data stores.

The external systems and the computing device treat the information stored at the information stores so that the information is protected, encrypted, or otherwise not susceptible to hacking or unauthorized use. The information stored at the information data stores may be stored locally at the computing device and/or remotely (e.g., in a cloud computing environment provided by the external systems and which is accessible via the network of FIG. 1).

The assistant is configured to respond to queries related to personal events. For example, a user may provide a voice input to the computing device via a microphone that asks the assistant "how many people are coming to the training session this afternoon" and the assistant may respond to the query with a voice prompt that says "out of the thirty invitees, only twenty are shown as having accepted and will be attending."

To enable the assistant to answer an event query, the assistant relies on a corpus. The corpus is made up of past and future event information (e.g., event title, event description, event location, event start and end time, and other information typically included as part of a calendar event) for each event in a user's calendar(s). Unlike other assistants, the corpus used by the assistant of the computing device shown in FIG. 1 further includes past and future metadata

associated with each event (e.g., event type, event invitees, event attendees, event category, or other event metadata). In some cases, the metadata associated with each event may include context information associated with the event. The context information specifies characteristics of physical and/or virtual environment of the event. For example, the context might indicate physical location, weather conditions, application requirements, or any and all other types of characteristics of the physical or virtual environment of the event.

In any event, the assistant searches the corpus to find information to answer or respond to the query. By including event metadata in addition to event information in the corpus, the assistant can answer more complex and detailed queries.

For example, a user may provide a voice input to the computing device via a microphone that asks the assistant "how many people are coming to the training session this afternoon." The assistant may search the regular event information included in the corpus for all future events occurring this afternoon and determine that there are two events, with one titled "Status Check with Acme Supplier" and the other titled "Advance Supplier Management Session 1". With neither event including "training" in the title or description, the assistant may search the metadata associated with each of the events and determine that the "Advance Supplier Management Session" is categorized as "training". By further analyzing the metadata of the "Advances Supplier Management Session" event, the assistant can determine that out of all the invitees identified in the metadata, twenty have a status of "accepted". Accordingly, the assistant may respond to the query with a voice prompt that says "out of the thirty invitees, only twenty are shown as having accepted and will be attending."

As another example, if a user asks the assistant "when is my next haircut" the assistant can search the corpus for events having haircut as an event type in their event metadata. Without

the ability to search event types, the assistant may not identify any events related to haircuts, particularly if the event titles or descriptions merely include a name of a person or business without any indication of whether that business provides haircuts. For example, if a person's stylist is named Serge, the user may have added a personal event in their electronic calendar titled "Serge" and may have selected a drop down to indicate that the event type or category of haircut, but failed to include any other information about the location or description. By enabling the assistant to search the metadata of future events in the user's calendar, the assistant can search for terms related to haircuts within the metadata and will identify the event titled "Serge" based on the event type or category being haircut. As another example, if the user's spouse asks the assistant "how often does my spouse get haircuts" (e.g., while the spouse attempts to create a family budget) the assistant can search past event metadata to identify a frequency of occurrence of past events of the event type or category being haircut.

By including event metadata in the search corpus used by the assistant while responding to queries of personal events, the assistant can respond to more complex, detailed, and personal queries related to users' personal events that other assistants may not be able to answer. The above examples are just some use cases for the assistant architecture shown in FIG. 1, the assistant architecture has many other applications and use cases.