AUTOMATIC RESERVATION SYSTEM FOR SMART CARS

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ABSTRACT

A virtual, intelligent, or computational assistant (e.g., also referred to simply as an "assistant") is described that automatically generates a reservation request at a business or for an event, for one or more identified persons. The assistant accesses a video stream from an electronic device and performs image recognition analysis to identify a number of people within a proximity of the electronic device. The assistant further, based on the image recognition analysis, may determine whether there are any people in the car who may require special accommodations (e.g., handicap accessibility, booster seats, highchairs, etc.). The assistant may, upon a user selection of a location or destination within a navigational application, determine, based on a navigational application algorithm, an arrival time. The assistant may then generate and then send a reservation request to the user-selected location for the arrival time for the number of identified people and any special accommodations that may be needed. Prior to making the reservation, the assistant may prompt the user to confirm that the user would like to make the reservation.

DESCRIPTION

An interactive assistant, such as shown in the example of Figure 1 below, may be included in a computing system that is configured to interact with one or more users. The computing system may be, include, or otherwise be included in a mobile device (e.g., smart phone, tablet computer, laptop computer, computerized watch, computerized eyewear, computerized gloves), a personal computer, a smart television, a personal digital assistant, a portable gaming system, a media player, a mobile television platform, an automobile navigation

and/or entertainment system, a vehicle (e.g., automobile, aircraft, navigable watercraft) and/or cockpit display, a home or other smart appliance and/or related device (e.g., interconnectable appliance/device via Internet of Things), or any other type of wearable, non-wearable, mobile, or non-mobile computing device, and the computing system may or may not include a display device. In some cases, the interactive assistant may be a voice-assistant that receives audible user commands, processes the commands based on speech recognition operations, and performs corresponding actions, such as providing audible responses to user queries and/or performing certain actions. The interactive assistant may provide or utilize a user interface with which a user can communicate to cause the assistant to output useful information, respond to a user's queries, or otherwise perform certain operations to help the user complete a variety of real-world or virtual tasks.

Figure 1 below illustrates an example of an interactive assistant that may generate a reservation request and then send the generated reservation request to a business (e.g., a restaurant, hotel, museum, or the like) or to a box office or digital reservation system for an event (e.g., an art gallery, play, concert, or the like), and then send the generated request to the, e.g., restaurant. The interactive assistant may, upon a user selecting a destination within a navigation application, access a video stream, for example, from a computing device, such as an in-car, or smart device, camera, identify a number of people that are within a proximity of the user (e.g., number of people within an automobile or a number of people walking with the user, such as within an area surrounding the user), generate a reservation request, and then send the reservation request to the user selected destination. For example, the reservation request may be sent to a host or hostess or made online through an online reservation system utilized by the restaurant.

In some examples, an AI system configured to conduct natural-sounding conversations may be utilized to create a reservation system. In this example, the AI system will "speak" to the host or hostess, letting them know of the reservation and may have a back and forth conversation with them. The back and forth conversation may include the host or hostess asking questions and the AI system answering the questions in a voice that mimics human mannerisms, e.g., by saying "umm" or using fill-in words. In some examples, the AI system will not facilitate back and forth conversation with the host or hostess, as in the previous example, but will only notify an owner of the restaurant of the reservation request in the form of a natural-sounding voice generated by the AI system that conveys the number of people, time of arrival, and any other relevant information, like a child's seat or a booth seating preference.

The system of FIG. 1 includes one or more external systems and computing devices A–N communicating across a network with each of computing devices A–N executing an assistant that performs operations involving generating a reservation request upon a user selection of a destination within a navigational application. Each of the computing devices A–N may include a camera and/or a navigational application. 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.

Computing devices A–N may represent any type of computing device, server, cloud computing system, mainframe, or other system 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 computing devices A–

N. For example, the external systems may support the assistants by utilizing a video-feed collection module to collect video-feed data from any of the computing devices A–N, or to utilize the navigational application to determine an estimated time of arrival.

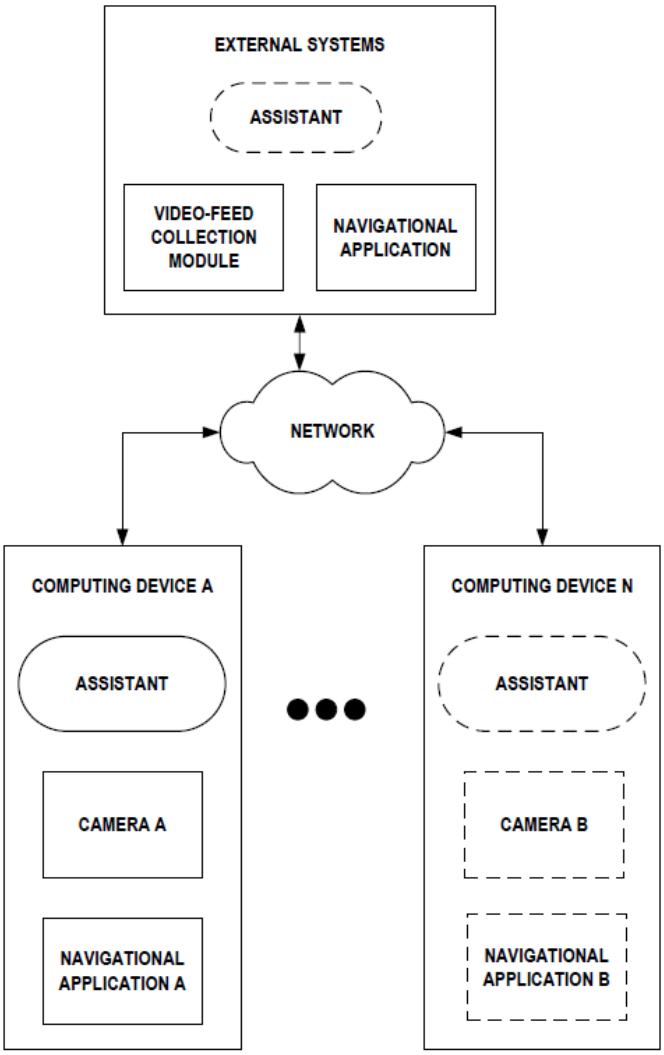

FIG. 1

The external systems and computing devices A–N can be personal computing devices. In some examples, the external systems and/or computing devices A–N may be assets of a single user. Examples of computing devices A–N include 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. For example, computing device A may be an automobile infotainment system comprising a camera and computing device N may be a mobile phone (e.g., smart phone) comprising a camera.

Although external systems, such as external servers, are included in FIG. 1, the external systems are not necessary to carry out functions required to generate a reservation request. For example, voice recognition, image processing, accessing a video stream, and generating the reservation request does not require any of the external systems described herein. However, the depicted system in FIG. 1 may require internet connectivity in order to generate a reservation request online and may require phone connectivity to generate a reservation request by transmitting the reservation request using a phone network. In these cases, without external systems, any of the computing devices A–N may have means of internet connectivity or phone connectivity to generate, and then transmit, the reservation request over the internet or telephonically.

An assistant executes across any combination of external systems one or more of computing devices A–N to provide assistant services to the user of computing devices A–N. Examples of assistant services include setting up reminders, creating calendar entries, booking travel, generating reservation requests, online ordering, sending/receiving 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 store personal information about the user. Examples of personal information include habits, routines, preferences, notes, lists, contacts, communications, interests, location histories, purchase history, calendar entries, 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, e.g., by retrieving the personal information, e.g., a location that the user has visited in the past to generate a reservation request.

An example in which the assistant may automatically generate a reservation request may begin with a user selecting a destination by utilizing any of the one or more navigational applications installed within one of the computing devices A–N. Once the user selects the destination, the assistant may determine to generate a reservation request by noting that the selected destination is a business or event, and not a home address. Once, the assistant has determined to generate a reservation request, the assistant may access a video stream from any of computing devices A–N (e.g., a mobile phone or an automobile infotainment system). For example, the assistant may access a video stream of a camera integrated in one of the computing devices A–N (e.g., a mobile phone). For example, the user may be walking to the destination with a group of people (e.g., five people) or driving to the destination with a group of people with him in his automobile.

The assistant may, while the user is walking, access the video stream of a mobile phone. In some examples, the user may have stationed her mobile phone to a dashboard of an automobile. The assistant may access the camera of the mobile phone capturing a view of the surrounding area, including a number of people seated within the automobile. In some examples,

the assistant may access a video stream from an automobile infotainment system that includes a camera capturing a stream of digital images of the inside of the automobile. In this example, the assistant may access the video stream of the automobile infotainment system.

In some examples, however, the assistant may not access a video stream; rather, a mobile operating system or software platform installed on any of the computing devices A–N may execute an image processing task and identify certain user characteristics. For example, the processing task may return such user characteristics as estimated age of the user or of any people within a proximity of the user, number of people within the proximity of the user or within the user's automobile, or whether the user is a driver, front seat passenger, or backseat passenger. The software platform may then transmit the returned user characteristics to the assistant running on any of the computing devices A–N.

The assistant may then perform image recognition analysis on the accessed video stream. The image recognition analysis may be performed to identify a number of people within a proximity of the user. For example, the image recognition analysis may identify that there are five people with the user in the automobile. In some examples, the assistant may identify that there are five people walking within a proximity of the user, and in the same direction as the user, indicating that they are associated with the user. The image analysis may also identify whether there are any children in the automobile by identifying a child car seat or child toys. This may be beneficial, for example, because the assistant may notify a host or hostess, or provide a note if making an online reservation, that a child seat will be needed.

The assistant, utilizing the same navigational application installed within one of the computing devices A–N, or a navigational application algorithm utilized and processed by the one or more external systems, may then determine an estimated time of arrival. For example, the

assistant may utilize the navigational application's algorithm to determine the estimated time of arrival. Optionally, the assistant may add a margin for error to the time of arrival, such as five minutes allocated for the user to find parking and/or to walk from the parking lot to the selected destination. This may be done by locating any parking garages within a block or few blocks of the destination, and then by calculating the time to find the garage (by adding in a couple minutes) and to walk from the garage to the destination.

Once the assistant has identified the total number of people (including the user) and the estimated time of arrival, the assistant may generate a reservation request in the form of, for example, an automated voice message to be sent telephonically to a host or hostess of the, e.g., restaurant. In some examples, the assistant may generate an online reservation request by accessing a reservation application online, utilized by the restaurant, and establishing a reservation for a particular time (including the buffer to find parking) and for the identified number of people.

Prior to making the reservation, either once the user has selected a destination or upon generating a reservation request, the assistant may prompt the user to confirm that the user would like to make the reservation. In some examples, the prompt may be displayed once the assistant has performed image recognition analysis to identify the total number of people within a proximity of the user and the estimated time of arrival. The assistant may display the prompt for the user to confirm the reservation within a display of the one or more computer devices A–N. For example, a prompt may display within the automobile infotainment system, and setting an estimated time of arrival and a total number of people for the reservation.

The user may confirm the reservation or cancel the reservation by, for example, either manually selecting an option within the assistant to confirm the reservation request by saying he

wishes to confirm the reservation request. The user may wish to modify the time of arrival because he wishes to go to a nearby store or run an errand prior to arriving at the destination. In this example, the user may modify the time of arrival by manually inputting a desired time of arrival or by saying out loud the desired time of arrival. The voice-assistant may receive the audible command to modify the time of arrival and accordingly modify the reservation request. Upon the user confirming the reservation, the assistant may generate the reservation request and then send the generated reservation request to the, e.g., restaurant. 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.