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Hands-free voice assistant application in a vehicle

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ABSTRACT

This disclosure describes the integration of a digital voice assistant application with a vehicular hands-free (e.g., Bluetooth) calling system. A user pairs their mobile device, e.g., smartphone, tablet, etc., with a vehicular hands-free system to facilitate hands-free calling. The dialing of a designated number using the mobile device serves as an indicator to the Bluetooth stack and/or the operating system to trigger the voice assistant application. When triggered, the voice assistant application receives commands and input via voice over Bluetooth. Responses from the voice assistant application are played over the speaker system.

KEYWORDS

- Voice assistant
- Vehicle
- Bluetooth
- Hands-free
- Virtual assistant

BACKGROUND

While many vehicles provide the capability of hands-free calling, e.g., using Bluetooth, through integration with mobile devices, e.g., cell phones, smartphones, etc., only a few provide direct integration with digital voice assistants and other voice-based systems. User interaction with a voice-based assistant in most current vehicles requires the user to invoke the voice assistant directly on a mobile device, without the benefits of hands-free capability.

DESCRIPTION

This disclosure enables hands-free use of voice assistants in vehicles. Techniques described herein enable a user to utilize a vehicular hands-free system in combination with voice assistants available on a mobile device.

The user pairs their mobile device, e.g., smartphone, tablet, mobile phone, etc., with the hands-free system of a vehicle, e.g., using a communication protocol such as Bluetooth. The pairing enables the user to place a phone call via different methods, e.g., entering a number to call, using a call history, specifying the number using a voice command, etc.

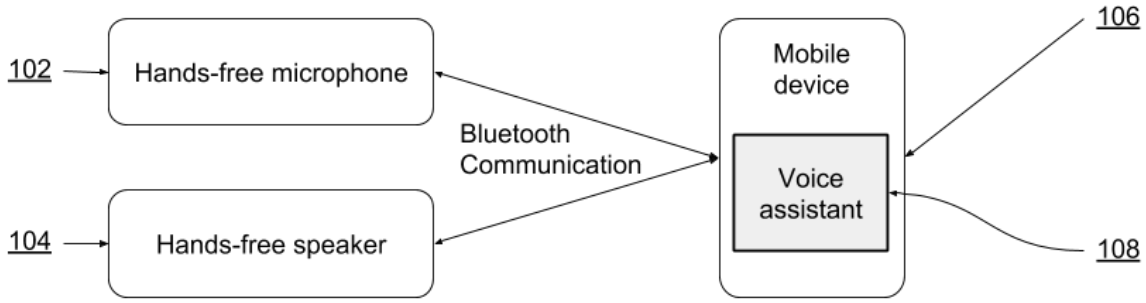

Fig. 1: Voice assistant integrated with a hands-free calling system

Fig. 1 illustrates the hands-free use of a voice assistant application in a vehicle (e.g., a car). The user's mobile device (106) is configured with a voice assistant application (108). The voice assistant application runs on top of the Bluetooth stack provided by the operating system of the mobile device. The mobile device pairs with the car hands-free device and uses a hands-free profile (HFP) and/or headset profile (HSP) to provide voice calling capabilities.

The user can use a hands-free microphone (102), e.g., microphone installed on the vehicle, on the mobile device, etc. The mobile device is paired with the speaker system of the vehicle. Upon successful pairing, a hands-free speaker (104), i.e., the car speaker system is available for use.

In operation, the user requests the hands-free calling system to call a predetermined (specially designated) number using their mobile device, e.g., a phone. The predetermined number is an indicator to the Bluetooth stack and/or the operating system to trigger the voice assistant application on the phone. Instead of a call being placed, the voice assistant is thus invoked.

The hands-free unit operates as if a voice call were in progress. Voice data with input and commands from the user is provided to the voice assistant application from a vehicular microphone or the microphone of the user's mobile device. Responses from the voice assistant application are played back over the speaker system of the vehicle. The mobile device operates as it would if a call were in progress with the voice assistant application as the called party.

The techniques of this disclosure can be extended to other applications with a conversational interface. Different applications can be triggered by the user dialing unique phone numbers mapped to a respective application. The disclosed techniques can be implemented without any additional cabling or any software changes on the vehicular side of the hands-free Bluetooth system. The user's interaction with the voice assistant application is comparable to a user's voice calling experience. While the foregoing discussion refers to Bluetooth, any suitable protocol can be utilized. While described with reference to a vehicle, the techniques can be used in any context where hands-free access to a voice assistant application on a mobile device with calling capability is to be provided.

CONCLUSION

This disclosure describes the integration of a digital voice assistant application with a vehicular hands-free (e.g., Bluetooth) calling system. A user pairs their mobile device, e.g., smartphone, tablet, etc., with a vehicular hands-free system to facilitate hands-free calling. The

dialing of a designated number using the mobile device serves as an indicator to the Bluetooth stack and/or the operating system to trigger the voice assistant application. When triggered, the voice assistant application receives commands and input via voice over Bluetooth. Responses from the voice assistant application are played over the speaker system.