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Customized Gesture Interactions to Issue Virtual Assistant Commands on Wearables

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ABSTRACT

Wearable devices recognize a limited set of gestures due to the small size of the device. The actions associated with a given gesture are typically pre-configured and non-editable, thus limiting the functions that the user can perform. This disclosure describes techniques that enable wearable device users to map gestures available via a wearable device to specific tasks, e.g., performed by a virtual assistant. Once configured, input of the gesture results in the associated command being passed to a virtual assistant, provided by the wearable device or a separate paired device, as if it were spoken by the user at the instant at which the user performed the gesture.

KEYWORDS

- Gesture input
- Gesture interaction
- Configurable gestures
- Wireless earbuds
- Smartwatch
- Fitness tracker
- Wearable device
- Task invocation
- Virtual assistant
- Voice command

BACKGROUND

Wearable devices, such as smartwatches, wireless earbuds, fitness trackers, etc., include functionality for users to interact using gestures. For instance, users can perform gestures such as a single tap or multiple taps, a short press or long presses, directional swipes, etc. Each gesture triggers a corresponding function associated with the action, such as initiating or pausing music playback, turning noise cancelation on or off, adjusting volume, invoking a virtual assistant, etc.

Owing to the small sizes of these devices, the space available for users to perform gestures on the device is typically fairly limited. For instance, the space available to perform gestures on wireless earbuds is typically only as big as a person's fingertip. Moreover, the actions associated with a given gesture are typically pre-configured and non-editable, thus limiting the tasks that the gestures can invoke.

In contrast, virtual assistants activated by voice offer users the flexibility to perform a wide variety of tasks using voice commands, such as "Read the news," "Tell me about the next appointment on my calendar," "Turn the TV on," etc. However, for each task, a user must invoke the virtual assistant and speak the task-specific command. While users can use shortcut voice commands to group multiple tasks, the user still must provide spoken input to initiate the virtual assistant to perform the group of tasks and cannot initiate tasks simply via gestures.

DESCRIPTION

This disclosure describes techniques that enable users to customize the functions performed by the available interactive gestures. For example, some users can assign a gesture to initiate voice playback of the news by a virtual assistant, others can perform the same gesture to know about their next appointment, still others can use the gesture to turn an appliance on or off, and still others can assign it to receive spoken information on the status of their workout, e.g.,

heart rate, distance traveled when running, etc. When a user performs the gesture, the associated custom task is then automatically presented as a command to a virtual assistant. The virtual assistant performs the task by executing the command as if the user issued it as a voice command at that particular moment.

To invoke commands in this manner, users specify an initial configuration to map gestures available on the wearable device to different tasks by performing the gesture. The configurable gestures can be pre-selected for the device or users can be presented a menu of available gestures. Users can then specify the task to associate with the gesture in text or voice form. The user can also provide the virtual assistant necessary permissions, e.g., to access user data if necessary to fulfill the task. Optionally, the setup operation can enable users to perform the gesture and test whether it is successful in performing the intended task. When satisfied with the configuration, the user can save it on the wearable device and/or on a more powerful paired device, such as a smartphone.

Once configured, subsequent use of the gesture results in the associated text or voice command being passed to a virtual assistant as if it were spoken by the user at the instant at which the user performed the gesture. The virtual assistant can then execute the command as usual and provide the results back to the user in appropriate visual and/or audio format. For example, a user can choose to configure the triple tap gesture on a pair of earbuds to receive information about the next appointment in the calendar via virtual assistant voice response played via the earbuds. Whenever the user triple taps the earbuds, the virtual assistant can access the user's calendar to retrieve the information about the immediately upcoming entry and deliver it to the user in spoken form via the earbuds.

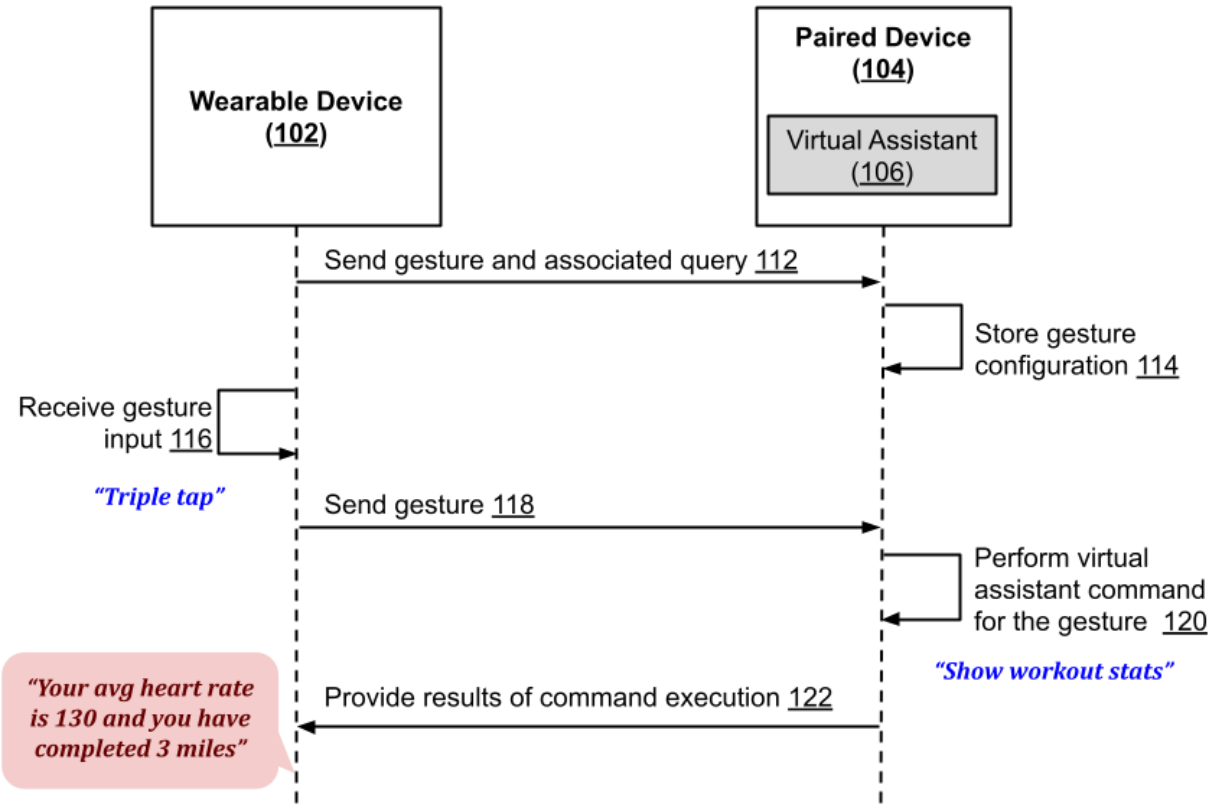

Fig. 1: Customizing gesture interaction on wearables to invoke a virtual assistant

Fig. 1 shows an example of operational implementation of the techniques described in this disclosure. A wearable device (102) such as wireless earbuds or other device that supports gesture-based interaction is paired with a more powerful primary device (104), such as a smartphone, that provides virtual assistant (106) functionality. A user performs setup (112) to configure the command associated with a gesture. The setup can be initiated or performed on the wearable device and/or the paired primary device. The configuration of the feature and the associated command is stored (114) on the paired device.

When the user subsequently performs (116) the gesture, it is relayed (118) to the paired device. The paired device executes (120) the configured command to invoke the virtual assistant. The results of executing the command by the virtual assistant are relayed back (122) to the user.

In the example shown in Fig. 1, the user has configured the “triple tap” gesture to initiate the command “show workout stats” and provided appropriate permissions for the virtual assistant to access corresponding data, e.g., data from one or more sensors of the wearable device and/or the smartphone. The virtual assistant provides the requested information via audio played back via the wireless earbuds.

While Fig. 1 shows audio playback, the results provided by the virtual assistant can be relayed back to the user in any suitable form, depending on the capabilities of the wearable device. For example, wireless earbuds can deliver results in audio form using text-to-speech (TTS), smartwatches can display the results as text and/or images, etc.

Users can change the command associated with any available gesture by changing the configuration settings at any time, which provides flexibility to adjust the operation to suit their evolving needs and practices. With user permission, the virtual assistant can be provided via any suitable device, such as a smartphone paired with the wearable device that receives the user gestures. Alternatively, or in addition, the virtual assistant can be provided via the wearable device itself, if the device is capable of locally supporting virtual assistant functionality.

The techniques described in this disclosure can be implemented on any wearable device that supports gesture-based interactions, such as earbuds, fitness trackers, smartwatches, etc. The techniques can be integrated with any device, platform, or application capable of providing virtual assistant functionality. Implementation of the techniques described in this disclosure enables virtual assistant functionality to be invoked via gestures, thus enhancing the user experience (UX) of such interaction as well as improving the utility of virtual assistants.

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 gestures, user's virtual assistant commands, 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 techniques that enable wearable device users to map gestures available via a wearable device to specific functions, e.g., performed by a virtual assistant. Once configured, input of the gesture results in the associated command being passed to a virtual assistant, provided by the wearable device or a separate paired device, as if it were spoken by the user at the instant at which the user performed the gesture.