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Personalized Music Playback Via A Virtual Assistant

ABSTRACT

Virtual assistant applications support various commands related to music playback, such as playing specific songs, skipping songs, changing volume, etc. Although the available music-related commands cover operations that provide basic playback control, the commands do not cover personalized music-related operations for individual users, e.g., interpreted based on the user's current or historical context and relevant data. This disclosure describes techniques that enable users to provide music playback related commands to a virtual assistant that are interpreted in a personalized manner such that the user experience of music playback and of the use of the virtual assistant is enhanced. For example, the user can provide complex commands that incorporate contextual information, without necessarily identifying individual content items, and the virtual assistant can determine matching content automatically.

KEYWORDS

- Music playback
- Personalized command
- Contextual interpretation
- Personalized playlist
- Context awareness
- Recommender system
- Audio event recognition
- Virtual assistant
- Smart speaker

BACKGROUND

People often control their music consumption using a virtual assistant, e.g., available on a device such as a smartphone, a smart speaker, etc. Virtual assistants support various commands related to music playback, such as playing specific songs, skipping songs, changing volume, etc. Users can issue such commands using any suitable interaction mechanism, such as voice, touch,

gesture, etc. Although the available music-related commands cover operations that provide basic control over playback, the commands do not cover personalized music-related operations based on the user's preferences as inferred from the user's current and historical context and other relevant data.

DESCRIPTION

This disclosure describes techniques that enable users to use a virtual assistant to control music consumption by issuing commands that are interpreted in a personalized manner. For example, a user can ask a virtual assistant to play music according to commands such as “play my favorite songs while cooking,” “play the music I listened to when I was working on document X,” “play a song similar to the ones I heard at the party last weekend,” etc.

The interpretation of such commands can be based on current and historical contextual information and other relevant data, obtained with user permission. To that end, relevant contextual information can be obtained at a time the user listens to music. For instance, an audio event recognition system can execute in parallel with music playback and can infer concurrent activities, such as cooking, party, etc., based on environmental sounds. If the user permits, the inferred contextual information can be stored along with the music playlist that includes metadata on the user's explicitly stated music requests and preferences. Such contextual information can be stored locally on the user's device and for a limited period of time, e.g., for a week, etc. The user can specify whether the information can be stored and can also specify the expiry criteria. At a later time, when the user issues a music playback command, the playlist and contextual information is combined and matched with the command to determine the song(s) or other audio (e.g., podcasts) that the user command corresponds to.

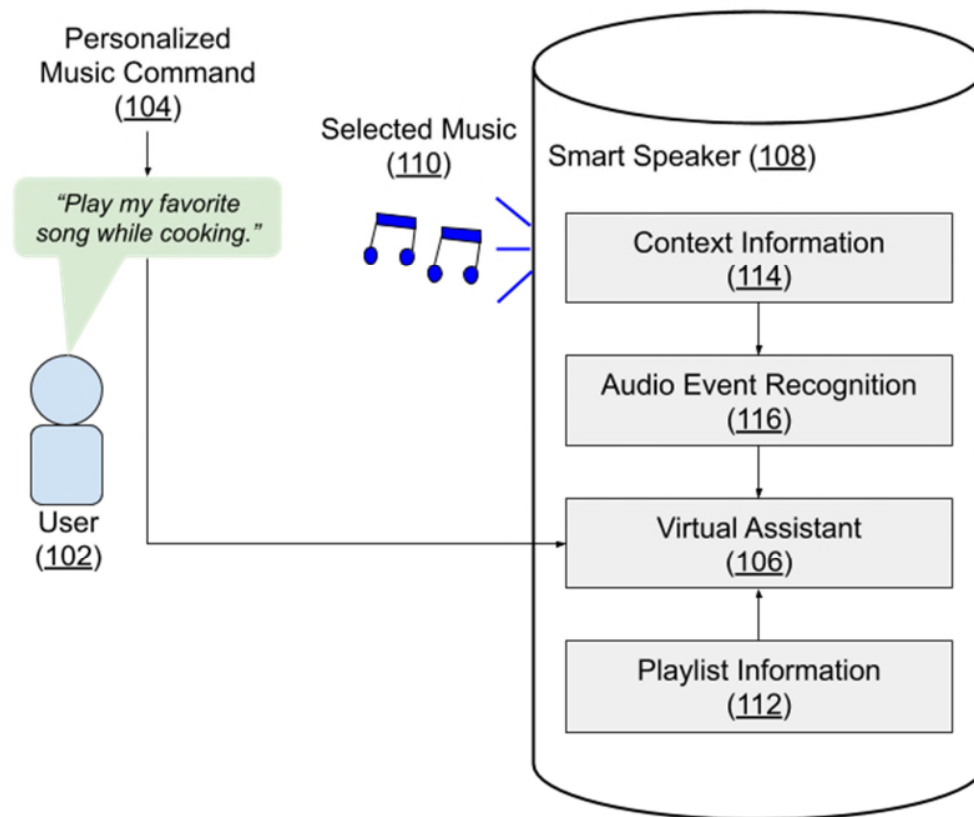


Fig. 1: Personalized music playback using a virtual assistant

Fig. 1 shows an operational implementation of the techniques described in this disclosure. A user (102) issues a command to play personalized music (104) (or other audio) to a virtual assistant (106) available via the user's smart speaker (108). With the user's permission, current and historical information regarding the user's context (114) and music playlist (112) is accessed and provided to the virtual assistant. If the user permits, the context is analyzed by use of an audio event recognition module (116) to infer activities that occur concurrently with the music playback. The playlist and context information is employed to determine the music that best matches the user's request and the corresponding music (110) is played via the smart speaker. While Fig. 1 illustrates the same device as receiving the command and playing the music, any combination of devices can be used, e.g., command interpretation by a smartphone and music

output by a smart speaker or another audio playback device controlled by the virtual assistant on the smartphone, etc.

If the user permits, the techniques described above can be also take into account additional contextual information to enable inferences regarding the user's music preferences. For instance, with user permission, digital signal processing (DSP) techniques can be employed to identify music the user listens to via various channels such as radio, television, alternate devices, devices owned by others, etc. Additionally, with permission, the context related to the user's music consumption can be derived based on relevant information such as metadata from the user's smartphone, calendar entries, apps used during music playback, etc.

The various pieces of contextual information can provide semantic understanding that is taken into account in the personalized interpretation of music-related commands by the virtual assistant. For instance, the contextual connections can support music-related user commands, such as "play the dinner playlist from two days ago," "play the upbeat song I heard at the store yesterday," "play the song I listen to most often," etc. Besides recommendations and commands connected to musical content, the operation can be expanded beyond the basic set of music-related controls to include more sophisticated user requests such as adjusting crossfading between songs, changing device brightness or other display settings based on the genre of the currently playing music, etc.

The described techniques can be implemented to support any music-related application or service that can be controlled via a virtual assistant. Users can issue personalized music-related commands using any suitable technique for interacting with a virtual assistant, such as voice, graphical user interface, etc. The device that incorporates the virtual assistant functionality can be the same or different from the one that plays music. Implementation of the techniques

described in this disclosure can enhance the user experience (UX) of music consumption as well as of interaction with a virtual assistant.

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 music playback history, user's context, user commands provided to a virtual assistant, 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 users to provide music playback related commands to a virtual assistant that are interpreted in a personalized manner such that the user experience of music playback and of the use of the virtual assistant is enhanced. For example, the user can provide complex commands that incorporate contextual information, without necessarily identifying individual content items, and the virtual assistant can determine matching content automatically. Contextual information is obtained with user permission and utilized to obtain semantic understanding used to interpret music-related commands.