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Voice-based responses customized to user personality

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ABSTRACT

People are known to have different personality types, each corresponding to its own typical behaviors and preferences. Personality type can influence how an individual perceives received messages, e.g., voice-based responses from a digital assistant. However, current digital assistants provide speech out that is not customized to the user's personality. This disclosure presents techniques for applications that provide voice-based user interact to adapt the messages communicated to a user to suit the personal characteristics of the user. User's personality is inferred with specific user permission and is based on one or more user-permitted factors. For users that do not provide permission or where the factors are insufficient, default messages are used. A trained machine learning model is utilized to infer user personality and preferred communication style based on the user-permitted factors. The inferred style is then applied to adapt information content and delivery via a voice user interface.

KEYWORDS

- Voice UI
- Personalization
- Personality type
- User characteristics
- Smart speaker
- Voice assistant
- Personal digital assistant
- Interface customization

BACKGROUND

People are known to have different personality types, each corresponding to its own typical behaviors and preferences. For example, conscientious individuals may be more sensitive to managing time and following procedures while extroverted individuals may place emphasis on social interactions. Individuals of different personality types may prefer to communicate in a manner that matches the preferences of that trait. As a result, a person's personality traits may influence how the individual perceives received messages, including those from the technological applications such as virtual assistants or personal digital assistants. Many applications, including personal digital assistants, utilize voice user interfaces to interact with users. However, in current applications, messages are not formulated and delivered in a manner customized to the user's personality.

DESCRIPTION

This disclosure presents a solution to adapt the messages communicated via voice UI to suit the personality of the user. The techniques are deployed with specific user permission, such that no determination of user personality or customization of the messages is performed if the user denies such permission.

If the user permits, a trained machine learning model is utilized to analyze the user's prior interactions with the application, such as the messaging style of the user's queries. In addition, with the user's permission, the model may take as input the user's context measured via one or more sensors of the user's device as well as features, preferences, and information pertaining to the user's account with the application or service provider, if applicable. The output of the model is a classification that indicates the suitable style for the current operational interaction according to the user's individual traits determined by the model. For example, the model may classify the

user into a category such as ‘thinker,’ ‘harmonizer,’ ‘imaginative,’ ‘persistent,’ ‘rebel,’ etc. where each category is matched with a particular style of voice communication.

The classification output by the model is applied to adapt the information that is to be communicated such that the content is delivered in a style that that matches the inferred trait. For instance, a response to a request to schedule a meeting can be handled differently for different types of users, with a thinker being asked whether a conflicting meeting should be moved to accommodate the request. In contrast, a rebel may be informed that the conflicting meeting is moved to accommodate the request with the assumption that the individual would prefer to work out the schedule change with the attendees of the moved meeting.

Similarly, interaction with different types of users may emphasize different aspects. For example, a morning welcome message from a personal digital assistant to a user identified as a harmonizer may state “Good morning. I hope you had a good night. Take your time to get ready; you have more than one hour to catch your train.” while the same greeting for a user identified as a promoter may be phrased, “Good morning. When you get ready, be sure to dress appropriately to close the client deal today.”

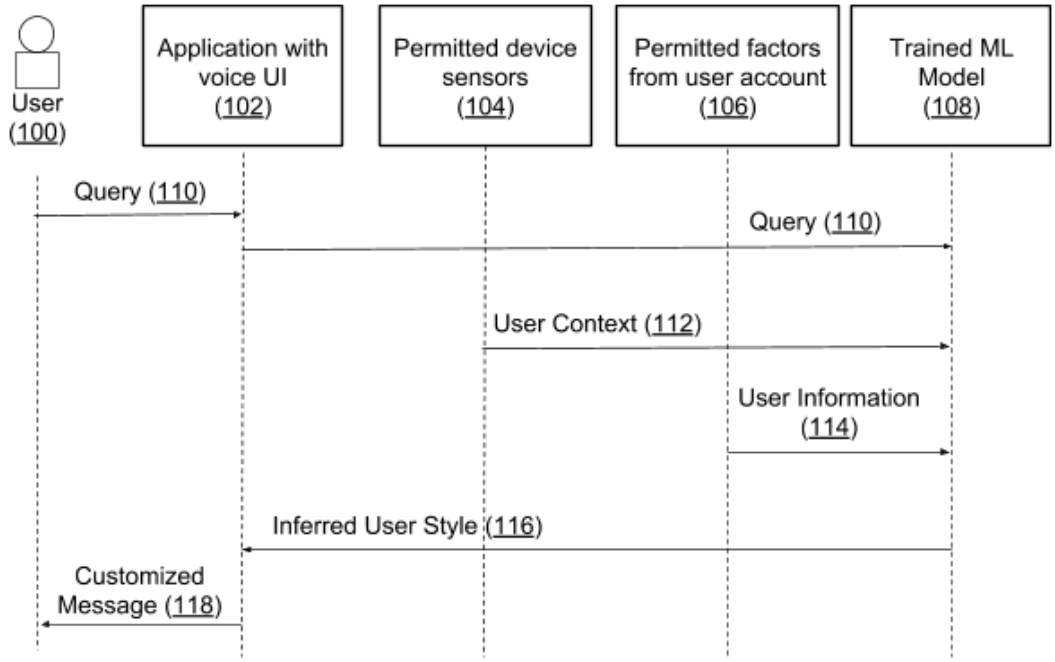

Fig. 1: Sequence of operations for personalized messages from a voice based assistant

Fig. 1 shows the sequence of operations in an example implementation of the techniques of this disclosure. A user of a device (100) issues a query (110) to an application (102) that interacts with the user via a voice-based user interface . With the user's permission, the query is provided to a trained machine learning model (108) along with the user's context (112) as detected via user-permitted device sensors (104) and user-permitted user information (114) associated with the user's account (106) with the application provider. The input is processed by the machine learning model to generate a label that indicates a suitable style (116) for responding to the user. The style information is used to select and adapt the information provided to the user as the output message (118) from the application. While Fig. 1 shows the query being sent to the ML model, it is possible that the ML model determines the inferred user style without use of the current query, e.g., based on past queries and other permitted user data.

The machine learning model may be a neural network with a classification layer as the output layer, e.g., that provides a classification for the user's personality or communication style. The model may be trained via data collected from users that provide consent to use data, e.g., prior queries, personal characteristics, account information, etc. to train the model. The training may further incorporate synthetic data generated and labeled explicitly for training purposes. Alternatively or in addition, users can be provided with mechanisms to indicate their personality types directly, e.g., by choosing from options provided by the application or selecting preferred messages from a small set of alternatives, e.g., that are designed to enable inferring the user's preferences.

A possible extension to the training and operation of the model may consider multiple possible message outputs, with each option scored for its suitability for each of the user types. Such a model can then be used as a preprocessing step to select and provide the message output that best fits the inferred preferred communication style for a current user. Further, the solution can customize canned messages 9or templates) or can generate messages from scratch to select information that is best suited for the inferred user personality to deliver the message in a suitable style and form.

The techniques of this disclosure serve to personalize and enrich the communication capabilities of applications with voice-based interactive features. In addition to improving the user experience (UX), the solution can boost the extent to which the user is receptive to the information and guidance provided by the application since the message is delivered in a manner matching the user's preferred communication style.

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 social network, social actions or activities, profession, 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

Personality type can influence how an individual perceives received messages, e.g., voice-based responses from a digital assistant. This disclosure presents techniques for applications that provide voice-based user interact to adapt the messages communicated to a user to suit the personal characteristics of the user. User's personality is inferred with specific user permission and is based on one or more user-permitted factors. For users that do not provide permission or where the factors are insufficient, default messages are used. A trained machine learning model is utilized to infer user personality and preferred communication style based on the user-permitted factors. The inferred style is then applied to adapt information content and delivery via a voice user interface.