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April 2022

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Recommended Citation

n/a, "Surfacing Resources for Emotional Support based on the User's Inferred State of Mind", Technical Disclosure Commons, (April 13, 2022)

https://www.tdcommons.org/dpubs_series/5067



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Surfacing Resources for Emotional Support based on the User's Inferred State of Mind

ABSTRACT

Users may issue queries to a virtual assistant, search engine, or other technological interface to seek help when experiencing acute emotional distress. Current approaches surface relevant information, such as the number for a local helpline, that can help connect the users to resources to deal with the matter. Currently, such information is surfaced if a spoken query to a voice-based virtual assistant contains specific trigger words related to mental health and emotional well-being. Such a simplistic approach lacks a nuanced understanding of the user's context and state of mind when issuing the query. This disclosure describes techniques to infer the user's state of mind when issuing a query to a voice-based virtual assistant. The user's state of mind inferred with permission in combination with the content of the query is used to surface supportive resources most relevant to the query. A model can be trained to infer emotional states of mind across a diversity of cultures, languages, genders, ethnicities, etc.

KEYWORDS

- Virtual assistant
- Voice UI
- Smart speaker
- Emotional well-being
- Mental health
- Emotional support helpline
- User context

BACKGROUND

People are increasingly attentive to their mental health and place greater importance on seeking support for their emotional well-being. There has been a global rise in those who report suffering from mental health issues such as stress, anxiety, depression, self-harm, etc. These

matters are exacerbated by adverse external circumstances, such as economic uncertainty, extended pandemics, etc.

As a large proportion of the global population has access to the Internet and mobile devices, users often turn to technology to seek help when experiencing acute mental health challenges. For instance, users may ask a virtual assistant for help with specific mental health challenges or emotional problems. When users issue queries indicative of emotional distress, the current approach is to surface relevant information, such as the number for a local helpline, that can help connect the users to professionals, organizations, or information sources that can help them deal with the matter.

Currently, such information is surfaced if a spoken query to a voice-based virtual assistant includes specific trigger words or phrases related to mental health and emotional well-being. Such a simplistic approach lacks a nuanced understanding of the user's context and state of mind when issuing the query. As a result, current solutions can lead to situations where a user's query is inappropriately deemed to be serious, thus resulting in incorrectly suggesting mental health resources, which risks confusing or unduly causing alarm to the user.

DESCRIPTION

This disclosure describes techniques, implemented locally on a user's device and with specific user permission, to infer the user's state of mind when issuing a query to a voice-based virtual assistant, based on the voice query and the available context. The user's inferred state of mind in combination with the content of the query is used to surface supportive resources most relevant to the query. Also, the virtual assistant can tailor its response to the user based on the inferred state of mind, e.g., adjust a tone and/or content of the response to provide suitably

configured response to a cheerful or happy user that is different from that for a neutral or sad user that issues the same or similar voice query.

The user's voice when issuing the query is analyzed with a suitably trained machine learning model, such as a neural network. The output of the model can indicate the state of mind associated with the characteristics of the user's voice when issuing the query. For instance, the model can be used to infer whether the user's voice suggests that the user is experiencing distressing emotions, such as sadness, anger, stress, etc. or happy emotions. For example, a user who issues a query while crying can be deemed to be emotionally distressed.

Based on the content of the query and the corresponding inferred emotional state of mind, the user can be offered appropriate supportive information if necessary. For example, a user issuing a query related to stress or self-harm, issued in a depressed voice, can be directed to an appropriate local helpline while another user asking about stress in an agitated voice can be shown information on mechanisms to cope with stress.

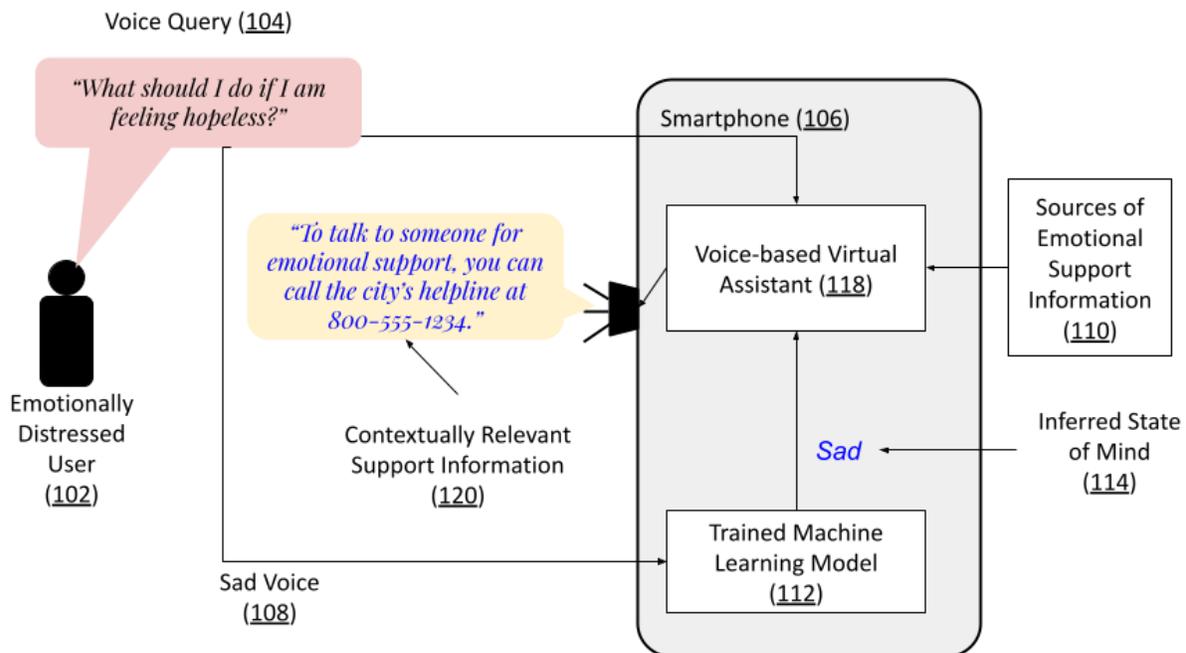


Fig. 1: Providing relevant emotional support information based on voice characteristics

Fig. 1 shows an example of a user issued query and a corresponding response from a voice-based virtual assistant. An emotionally distressed user (102) issues a query about hopelessness (104) in a sad voice (108) to a voice-based virtual assistant (118) on the user's smartphone (106) or other device. The query is analyzed via a trained machine learning model (112) to generate an inferred state of mind (114) based on voice characteristics. In Fig. 1, the output of the model indicates that the user's state of mind was inferred as "sad." Since the combination of the content of the query and the user's state of mind indicate that the user is emotionally distressed, various sources of emotional support information (110) are accessed to select and deliver appropriate and contextually relevant information for emotional support (120) that can help address the user's emotional need.

With user permission, the model can be trained to infer emotional states of mind across a diversity of cultures, languages, genders, ethnicities, etc. For instance, in some cultural contexts, loud voices can indicate anger while in others loud speech can be considered the norm. Similarly, the suggested support information in response to a query to seek help issued under emotional distress can point to official resources that are locally relevant as far as possible. For instance, distressed users seeking to call someone can be directed to a helpline located in their own towns or nearby.

Voice queries issued while experiencing emotional distress can result in the users first being asked about their well-being (e.g., "Are you ok?") and then being asked whether they wish to know about relevant support resources. For instance, depending on the content of the query and the state of mind inferred with permission from the voice, users can be asked whether they would like to know about mechanisms to cope with their emotional challenge or whether they would like to talk to a professional. Users can then choose their desired option to obtain the

corresponding information. For example, if a user wishes to talk to a professional, the user can be provided the number for the local helpline that deals with the matter at hand.

The techniques described in this disclosure can be implemented within a voice-based virtual assistant provided via any device, such as a smartphone, smart speaker, etc. Further, the techniques can be integrated within any application or platform that includes functionality to search for information on emotional well-being and mental health. Implementation of the techniques can help connect users with contextually appropriate support resources to deal with emotional distress, thus supporting their mental well-being.

CONCLUSION

This disclosure describes techniques to infer the user's state of mind when issuing a query to a voice-based virtual assistant. The user's state of mind inferred with permission in combination with the content of the query is used to surface supportive resources most relevant to the query. A model can be trained to infer emotional states of mind across a diversity of cultures, languages, genders, ethnicities, etc.