Emotion-Suffused Messaging

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ABSTRACT

One well-recognized problem with messaging is the lack of emotional context. In face-to-face or audio/video communication, nuance is communicated via body language, syllable stress, etc. There are currently no provisions for such expression in messaging. This can lead to confusion or disconnects between participants in a messaging conversation. Some of this disconnect is ameliorated by the use of emojis or other expressive elements. However, such elements have to be deliberately inserted by a participant in their messages.

This disclosure presents techniques that detect, with user permission and consent, the emotional context of a message sender. When the context is reliably detected, a subtle background image that is reflective of the sender’s emotions is automatically added (when user permits) to the message. For ease of interaction, such permission is obtained, e.g., at initial setup of a messaging application, and is modifiable at any time. Further, message senders are provided with options to delete the background image or replace it with an image of their choice.

KEYWORDS

- Texting
- Emoji
- Expressive interface
- Emotional context
- Emotional expression
- Machine learning
- Emotion recognition
BACKGROUND

One well-recognized problem with messaging is the lack of emotional context. In face-to-face or audio/video communication, nuance is communicated via body language, syllable stress, etc. There are currently no provisions for such expression in messaging. This can lead to confusion or disconnects between participants in a messaging conversation. Some of this disconnect is ameliorated by the use of emojis or other expressive elements. However, such elements have to be deliberately inserted by a participant in their messages. Users who often compose their messages on the go find it cumbersome to add emotional context via emoji, and therefore, such context is left out from their messages.

DESCRIPTION

This disclosure describes techniques to automatically understand, with user permission, the user’s emotional context at a time of message creation. The user’s emotional context is used to append, with user permission, an unobtrusive and subtle backdrop image to the message. Such emotion-triggered backdrop imagery is faded compared to the text of the message, and does not detract from the text of the message or call attention to itself. Rather, it modulates, supports, and contextualizes the meaning of the text. Message senders are provided with options to delete the background image or replace it with an image of their choice.

Per techniques of this disclosure, background imagery that suffuses a message is based on culturally-accepted conventions for emotive imagery. For example, an image of a heart (♡) is used to indicate love; an image of a thunderstorm (⛈) used to indicate anger; an image of a smiling face (☺) is used to indicate happiness or humor, etc. In any case, as the practice of
background emotive imagery becomes commonplace, it is anticipated that users will come to recognize corresponding symbolisms.

Background imagery that clearly indicates the sender’s emotional state could be derived from a number of sources that are compatible with messaging systems, e.g., the rich communication services (RCS) standard, over-the-top (OTT) messaging services, etc.

Fig. 1: An example message with background emotive imagery

Fig. 1 illustrates an example messaging interface, per techniques of this disclosure. In a mobile messaging application (100), a user composes a message (102). With user permission and consent, data from one or more sensors, e.g., cameras, of the mobile device, as well as the textual content of the message, are used to detect the emotional context of the user, e.g., as one of anger. With the user’s permission, a background image conveying anger, e.g., a thunderstorm (104) is automatically inserted.
The receiving user at the other end of the conversation replies with a soothing message (106). The receiver’s device sensors detect, with receiver’s permission, that the mood on that end of the conversation is evidently one of tempered optimism. A corresponding image, that of a rising sun (108), is inserted as background. The original sender’s anger vanishes upon reading their interlocutor’s message, as the reply (110) indicates. Rather, a new emotion is now detected and an appropriate background image of a rain-cloud (112) is inserted.

Fig. 2: Generating a background image that matches emotional context of a message

Fig. 2 illustrates an example of generating a background image that matches emotive content of a message, per techniques of this disclosure. With user permission and consent, the user’s emotional context is detected (202). For example, when the user permits, an on-board camera is used take images or video of the user while composing the message. Emotion-recognition models can then be used with the images/video as input to detect the emotional state of the user. Emotion recognition is based on machine-learning (ML) models, that can be implemented as multi-layer neural networks, e.g., a long short-term memory (LSTM) neural network. Other types of models, e.g., recurrent neural networks, convolutional neural
networks, etc., and techniques such as support vector machines, random forests, boosted decision
trees, etc., can also be used.

For example, the ML model may compare the images/video with an image/video of the
user at an initial time when the message composition starts, and provide the detected emotional
context/state to the messaging application. The messaging application takes the recommendation
from the ML models and determine the appropriate image. For example, the text “I'm
disappointed in your actions” may be automatically recognized as not ordinarily associated with
a positive emotion. In this manner, the appropriate emotion to display is determined.

The messaging application automatically inserts the background image for the message
(204). When emotional context is not determined with sufficient confidence, or if the context
does not correspond to any image for insertion, no image is inserted, or a default image may be
inserted. The background image is inserted into the message with user permission (206). The
user is also provided with options to replace the inserted image. The background image is
displayed such that it is unobtrusive (e.g., faded, displayed behind the text, etc.) and serves as an
indication of the sender’s context. Other participants in the messaging conversation can focus on
their messages, while subconsciously becoming aware of the sender’s mood and emotional state
based on the background image. To guard against incorrect emotive imagery being sent
erroneously, users are also provided with the option to recall emotion-indicating background
imagery. A recall action, if performed, can also serve as feedback to tune the ML model.

The machine-learning model used to determine emotional context can reside on the user
device. Alternately, if the user permits, the determination of the context can be performed
partially or entirely on a different device, e.g., on a server. For example, the user device can
perform parts of the tasks, e.g., capturing an image and extracting features thereof, while a server performs other parts of the tasks, e.g., classification of the images. The user has full control over where the recognition is performed. In particular, the user can specify that all tasks be performed on the user device.

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

This disclosure presents techniques that detect, with user permission and consent, the emotional context of the user. A subtle background image that is reflective of the user’s emotions is automatically added to the message. Such automatic addition of background imagery is performed only upon permission of the user. For ease of interaction, such permission is obtained, e.g., at initial setup, and is modifiable. A user that does not agree with the automatically selected
background image is given easy options to delete the image or replace it with an image of their choice.