Importance of Emotion Awareness for Emotional Well-Being and for Improvement of Social Communications

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The ability to feel emotions is known to be an intrinsic property of the human beings. At every moment of our life we unconsciously response emotionally to everything what happens to us. In turn these emotional states may define how we behave and perceive the situations we are going through. Therefore, we should not underestimate the role of emotions for any side of our life. In our research we aim to give the machines an ability to recognize and understand human emotions to make them able to assist people in coping with everyday emotional overload.

But how a computer can be of help to us in this highly intellectual issue when even a person cannot solve it on his own?

First of all, a computer can play a role of emotional mirror making a user aware of his own emotion and thus providing him with extra power to decide whether he wants to feel this emotion or to overcome it. People may feel irritated because of a long waiting in a traffic jam and they can transfer their annoyance to other people without even being aware of it. Being informed, they could calm down by having five minutes of breathing techniques. A person aware of his own emotion is able to be cautious to it if necessary, e.g. for a reviewer at a conference it is important to be fair in his evaluation whereas being in a bad mood he may tend to judge everything stricter than necessary.

Second, a computer can play a role of emotional mediator making other people aware of someone's emotion when the social help in overcoming the emotion is needed, e.g. a depressed person may want to speak with his friends who will support him or remind him about something good in his life, but he may be too shy to ask them for help directly.

Third, a computer itself can play a role of the user's friend for pseudo-social psychological help, e.g. showing a funny picture in a right moment or providing an appropriate wise citation. Special applications could adjust decisions to the user's emotion, e.g. not recommending romantic movie to a girl who has just split with her boyfriend or not annoying a user by giving him hard learning tasks when he is frustrated.

A machine combining all mentioned capabilities will be a powerful assistant for improvement and support of our emotional well-being. Moreover, we suggest that having enough memory it can store the emotion flow for years constructing an affective diary of a user life for the following analysis (e.g. finding hidden cycles and correlations) and for the user's memory. With a goal of making a user acquainted with the stored past emotions Muse [1] and AffectAura [2] systems were already created. However, they both do not provide any conclusions on the captured data leaving its analysis and interpretation to a user.

Supplied with a model of emotional responses and advices (either hard-crafted or learned from the Web), a computer could also help us with emotion management giving advice on what should we do to cope with the emotion (e.g. suggesting a five minute break to overcome frustration) or giving an appropriate feedback to the user (e.g. showing support or sympathy). Picard and Klein [3] suggest that such a machine can satisfy user emotional needs which are difficult or impossible to satisfy in another way (e.g. the need in companionship for lonely people).

These affective computer applications require an incorporation of the high precision methods for the automatic emotion recognition based on the information available to a machine. One way to capture the experience of emotion is to follow the changes in the body of a user. This includes the analysis of physiological data (e.g. body temperature or skin conductivity), however its acquisition requires the presence of additional sensors attached to the user, e.g. a wrist-bracelet or even more intrusive scanners for brain electroencephalograms. Face and posture features are also indicative of felt emotions, but extra sensors are still required and have to be pointed at a user. In speech people express emotions nonverbally with the prosodic features, but at the same time they consciously share the emotion through verbal communication by stating directly how and why they feel. The information transferred verbally

is the main component of both written and spoken conversations and can be represented in the text format, thus making text one of the essential sources for emotion recognition. Via text not only can we disambiguate the categories of emotions, but we also can capture the underlying causes of these emotions as stated by the user or the things on which the user concentrates when the emotion is being elicited. This information should not be dismissed from the emotion recognition system which should be able to detect and process it correctly.

Furthermore, the emotion-provoking events described in the text could be used as the indicators of specific expressed emotions, e.g. in the phrase "I got a job position" the most probable emotions are happiness and relief. Our social nature incites us to share what have happened to us, especially if the situation was emotional. Thus, description of emotional events should be common in conversation between close people. The ability to capture and classify these events into emotions provides an additional way to detect the shared emotions even when no explicit emotional terms are used. However, attachment of emotion categories to a specific event is challenging due to its high context-dependency. It may vary based on the user affective appraisal to objects or on the different details of the event (e.g. where it happened and how expected it was). Currently available systems of automatic affective diary [1, 2] do not support the full-fledged text analysis either disregarding text analysis at all or limiting themselves to the basic key-spotting techniques, not mentioning the lack of analysis of underlying emotional events.

We aim to focus on the detection and categorization of emotional events. For this goal we develop the structure in which the events can be extracted from the text with current available natural language processing methods. The components of this structure should detect the valence of event, referred side of life, participating people, location, factuality and time of described event. To construct the text-based emotion recognition model the large-scale repository of events annotated with emotions should be created. We aim to obtain it with automatic techniques of language analysis from the Web blog posts in which emotions are likely to be expressed and which cover a large variety of the emotion-eliciting events. For the Japanese language such methods allowed to construct a repository of a million sentences annotated with emotions [4].

Given the specific event representation and the constructed event repository, an appropriate model of emotion classification can be developed. We expect that such a model will not only improve the accuracy of emotion recognition due to higher coverage of emotion presence and possibility to refine emotion based on event information, but will also provide a machine with information about the emotional events themselves giving the structured event details for the following analysis and reasoning.

To conclude, we believe that for our emotional well-being it is essentially important to be aware of our own emotions. We suggest that a machine equipped with a reliable emotion recognition mechanism is appropriate for saving a history of our emotions, for analyzing them, and for providing the basic psychological help and support to us. To achieve the adequate quality, the emotion recognition system should be able to detect emotions from all available channels of emotion experience and emotion expression. We address the problem of textual emotion recognition from the writer's side meaning that we aim to capture the emotion that a writer wants to share through text. The emotions can be transferred via any text that the user inputs into the computer for sharing with other people: emails, instant chat messages, blog or social network posts, etc. Thus, no extra sensors are needed to process this information. We focus on the detection of emotion-provoking events description in our emotion recognition model. This way allows not only to improve the quality of emotion recognition system, but also to extract additionally the emotion causes for the following discovery of emotional patterns.

References

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