Detecting emotion with force sensitive touchscreens

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ABSTRACT

1. INTRODUCTION

Affective computing as introduced by Picard[4] in 1995 lays a foundation for computers and technology to incorporate the recognition and expression of emotions. It can provide better performance when assisting humans or enhance the computers ability to make decisions. It does not have the goal of making computers more human-like, but it is more practical in nature; make computers function with intelligence and sensitivity towards its users[5]. Since, the measuring of emotion has been a subject of research and several different angles have been discovered to approach it.

1.1 Physiological detection

One angle uses physiological signals of the human body to measure and detect emotion. In a review by Wioleta[10], eight studies were collected that measure emotion using one or more physiological signals combined. These signals are *EEG, skin conductance, blood volume pulse, temperature, heart rate, blood pressure, respiration, EMG,* and *ECG.*

1.2 Facial detection

Facial detection of emotion incorporates the measurement of facial muscle movement, voice or speech [8], and also includes the eye as point of detection, i.e. movement, blinking, and pupil dilation [7]. By connecting facial muscle movement to visual display of emotions, Ekman et al. [2] conclude with a basic set of six mutually exclusive emotions that could be recognized. Expanding, De Silva et al. [6] found that several emotions are expressed by either visual or auditory cues, or both, meaning that some eomtions can be recognized by visual cues alone, auditory cues alone, or need a combination of both to be detected accurately.

1.3 Posture/gestures emotion detection

Other means of detection emotions involve the tracking and interpretation of posture and gesture. Wallbott et al. [9] concluded in 1998 that there are, in some cases, distinctive patterns of movement and postural behavior that have a strong correlation to emotions. In other cases, they mention that in absence of patterns there are still distinctive features from which emotion could be inferred. Coulson et al. [1] researched static body postures and the recognition of emotions from these body postures by participants. It showed that disgust is a tough emotion to recognize but anger and sadness had over 90% correct detection rates. Furthermore, happiness and surprise were two emotions that were often confused. Another, more applied research is that of Gao et al. [3], where the application of gestures on touch screens was successfully linked to emotional states with the use of a game. The emotional states that were tested for are: excited, relaxed, frustrated and bored, and accuracy of detection reached at minimum 69%.

2. RESEARCH QUESTION

From the related work can be concluded that most types of detection of emotions are invasive, either requiring constant monitoring with sensors attached to the body or by constant recording of audio and visual data. The touch screen is a technology a lot of people interact with every day, where they deliberately choose to participate in those interactions. Using touch screen presses as indicators for emotional state would be a unintrusive way of detection emotion without the need for constant monitoring. Subsequently, this leads to the following research question:

Can force sensitive touch screen devices be used to tell more about the mood of the user?

Research done on physical keyboards, pressure seems linked to emotion. However, keyboard on a desk and typing with two hands is not fully comparable to typing on a touch screen. Also, emotion detection with touch screens using gestures, but not when tapping, so room for exploration in that area.

- Description of background.
- Explanation of why research was necessary.
- Description of how research will be undertaken.

3. METHODS

- Overview of the research.
- Report of who took part and where.
- Report of what procedures were used.
- Report of what materials were used.
- Report of any statistical analysis used.

4. RESULTS

- Report of findings.
- Reference to any diagrams used.

5. DISCUSSION

- Summary of main purpose of research.
- Review of most important findings.
- Evaluation of findings.
- Explanation of findings.
- Comparison with other researchers findings.
- Description of implications and recommendations.

6. REFERENCES

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