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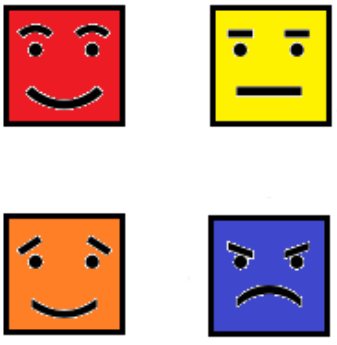
"Emotion aware machines are pivotal for a fulfilling human-computer interaction."

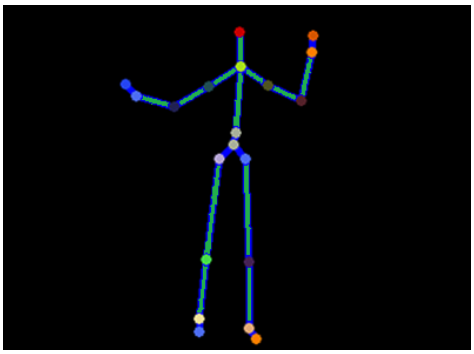
-Vladimir Petrov.

EMOTION AWARE COMPUTERS

Vladimir Petrov

In the last decade, the launch of cutting edge smart phones have revolutionized the way humans interact and use technology. The advances in technology, hardware and processing power has enabled scientists to focus more on addressing optimization issues and computing complexities and real world problems. With increase in human computer interaction, it is equally important to improve the emotion sensitivity in machines. The field that has gained significant attention is affective computing. The research area focusses on responding to the emotional profile of users by means of automated emotion (affect) aware systems. For a successful response to the emotions of the user it is important that the machines are able to accurately recognize the user's emotions using cues from all the possible input channels. These input channels (also called modalities) can be derived from audio, speech and voice data, visual data (facial expressions, body language and hand gestures) or physiological data such as heart rate, pulse, sweat, temperature and breath. Emotions can be expressed in terms of basic expressions commonly known across cultures, such as anger, surprise, happiness, sad, fear, surprise. There are alternate emotion representation models that use a different scale such as positive vs negative emotions and the extent to which an emotion is aroused. This article highlights a study (Patwardhan and Knapp, 2013.) on emotion recognition using three dimensional infrared sensors such as the readily available Microsoft Kinect. The researchers used various input modalities such as expressions from the face, hand gestures, body posture and head movement along with the vocal response of individuals sampling various products. The study used the multiple channels to recognize the emotional state of the consumers who were trying out accessories, perfumes, sample cuisines, wines and hats. The recognized emotions could be used for a kiosk based automatic emotion recognition system. The identified emotion could be used to conclude whether the consumers liked the product or they did not like the product. This data could then be used to improve the product, make decisions about which products need to be promoted and which products were suitable for certain demographics of people. One





advantage of the technique described in the product feedback study (Patwardhan and Knapp, 2013.) is that it required no wearable sensor devices. The recognition was purely based on color and depth data available using the Kinect device. Additionally, the study also emphasized on using movement based data such as facial expression and movement of body, hands in a certain angle and direction at a certain speed. Thus the study used novel methods compared to traditional position based methods that measured co-ordinates of tracked features and required markers on the body.

Furthermore, the researchers evaluated the magnitude of emotions (emotion intensity). Most studies focus on emotion recognition and often the intensity aspect of the emotion detection process is not taken into account. The inclusion of emotion magnitude in predicting emotion made the study more appealing. It provided a more holistic perspective of emotion recognition methods and a better performance in terms of accurate emotion estimation.

The study has done an excellent job of identifying the use of 3D and temporal features in sensor based emotion tracking and implementing it into a real time automated computer system which is capable of providing valuable feedback about consumer response during various product trials. The research by Mr. Patwardhan also has applications in the field of emotion aware and intelligent computing especially in critical areas such as aggression detection for automated surveillance systems and human activity recognition and vehicle operation safety.

Emotion aware computing has a tremendous potential to improve the human computer interaction experience. It won't be long when many automatic emotionally intelligent machines are implemented enriching the overall consumer and end user experience. Research work by Mr. Patwardhan is certainly a step in the right direction making a major and significant impact on the automatic emotion recognition systems, affective computing and human-computer interaction based consumer marketing field.

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