Towards incorporating affective feedback into context-aware intelligent environments

‘ *D. P. Saha, T. L. Martin, and R. B. Knapp*

This paper talks about a user study conducted to observe the effects of techno-stress using Galvanic Skin Response, Instantaneous Heart Rate and Heart Rate Variability(derived from ECG). The goal of this research is to study how affective feedback from the user can be used to improve context aware environment.

The authors want to use implicit feedback based on behavioral and physiological cues in order to conserve user's cognition. Another point to be noted is that the authors want the system to have zero false positives to avoid deteriorating services provided by the system.

The model uses SVM classifier to predict the techno-stressed state. Its performance improves when trained using data from both the experiments.

This is a pilot study conducted to create implicit communication between the system and the user. The study also points that using lab simulated stressors are useful for training ground truth. The study has encouraging results which if experimented upon with different kind of sensors (for detecting techno-stress) might be able to produce a better classifier which might help the system become more context-aware.

Affective Feedback in a Virtual Reality based Intelligent Supermarket

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In this paper, which is a continuation of the previous one, the authors build a Virtual Reality based environment to create the and test the control loop for affective feedback. The experiment is a Virtual Reality supermarket where a user has to collect a things from a grocery list which is dynamically changed. The experiment is conducted in the wizard of oz fashion, wherein the experimenter deliberately makes the user take a longer convoluted path to object, thus inducing techno-stress.The paper also shows a good application of a VR environment for conducting user studies.

Electrodermal activity is recorded to test if technostress is induced due to incorrect behavior of the CAIE environment. This data accurately shows the difference in the IPR(Inter phasic response which is a measure of EDA) for the different events (CS - Correct service, WS - Wrong Service). These significant difference in the IPR represent the technostress induced and the ability of the environment to record it (implicitly, without user's active cognition)

This experiment provides a basis for future applications which can use the physiological indicators of the stress caused due to service provided by the environment. Although the authors do not create a user specific profile for detecting stress, I believe this can be done to identify even more user-dependent features which can be used to alter the feedback loop to make sure the services provided to the user are even more context dependent.

Towards Defining a Quality-Metric for Affective Feedback in an Intelligent Enviornment

‘ *D. P. Saha, T. L. Martin, and R. B. Knapp*

This paper is a continuation of the previous two papers describing the affective feedback loop. This paper talks about defining a qualitative variable which can assigned to the feedback generated from the pyschophysiological responses. They propose a metric based on EDA and analyse different approaches discussed in the literature and come up with their own algorithm for the same.

The metric proposed uses the baseline from the sonic impluse stimulus which is then used to generate a error function which further creates a quality term Q_eda. A cutoff on this term is used to determine confidence in this measure.

Using the data from the previous paper, the authors are able to test their hpyothesis and are able to create a quality metric empirically, if not accurately. This score makes them improve teir capacity to explain the physiological responses and provide a context to them. This work can be further improved upon to create a more user-independent metric which can be used in context aware enviroments to improve their performance.