Augmenting Computer Mediated Communication with Physiological Data

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Motivation

- Turn low-fidelity online communication into high-fidelity communication
- Potentially create higher fidelity communication than face to face communication
- Opportunity for long-distance therapy sessions
- Widespread use of computer mediated communication

Objectives

- Find which physiological measures would be beneficial to communication over the internet
- Create a better understanding of stress and emotions over computer mediated communication
- Create an affordable device
- Investigate various approaches to presenting data to those communicating

Challenges

- Setup is required for use of the device
- Potential for ethics or privacy issues

Design

- Can use color to indicate levels
- Graphs show change over time
- Data is shown in useful forms

Sensors

Galvanic Skin Response (GSR)
- Measures conductivity between points on the hand
- Stress-induced sweat will cause higher conductivity
- Easy-to-interpret output
- Relatively inexpensive sensors are available

Electrocardiogram (ECG)
- Can be used to measure heart rate
- Prone to high amounts of interference from muscles during movement
- Can have other medical uses
- Moderately expensive sensors are required

Temperature
- Certain parts of the body change temperature based on stress (Vinkers, Penning, et al.)
- Very inexpensive sensors are available

Electromyogram (EMG)
- Can be used to measure various pieces of information about muscular activity
- Stress causes muscles to become tense in a way that EMGs can capture (Lundburg, Kadefers, et al.)
- Moderately expensive sensors are required

Arduino
- Single serial connection to computer transmits sensor data
- Costs can greatly be reduced in large-scale production
- No processing done on the device

Implications

- Potential for increase in communication fidelity at low cost
- Better quality therapy and social support may be possible using inexpensive sensors
- Potential use of the device for self-regulation

Future Work

- Study how quality of therapy and social support is affected by having additional physiological data
- Evaluate other uses of the device
- Self Regulation
- Online education
- Interruptibility while working on computer

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References
