Dissertations

# Computational Affect Detection for Education and Health



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Date of Award
9-2011

Document Type
Open Access Dissertation

Degree Name
Doctor of Philosophy (PhD)

Degree Program
Computer Science

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Keywords
affect detection, intelligent tutoring systems, linear classifiers, multimodal sensors, speech prosody, visual tracking

Subject Categories
Computer Sciences

Abstract
Emotional intelligence has a prominent role in education, health care, and day to day interaction. With the increasing use of computer technology, computers are interacting with more and more individuals. This interaction provides an opportunity to increase knowledge about human emotion for human consumption, well-being, and improved computer adaptation. This thesis explores the efficacy of using up to four different sensors in three domains for computational affect detection. We first consider computer-based education, where a collection of four sensors is used to detect student emotions relevant to learning, such as frustration, confidence, excitement and interest while students use a computer geometry tutor. The best classier of each emotion in terms of accuracy ranges from 78% to 87.5%. We then use voice data collected in a clinical setting to differentiate both gender and culture of the speaker. We produce classifiers with accuracies between 84% and 94% for gender, and between 58% and 70% for American vs. Asian culture, and we find that

classifiers for distinguishing between four cultures do not perform better than chance. Finally, we use video and audio in a health care education scenario to detect students' emotions during a clinical simulation evaluation. The video data provides classifiers with accuracies between 63% and 88% for the emotions of confident, anxious, frustrated, excited, and interested. We find the audio data to be too complex to single out the voice source of the student by automatic means. In total, this work is a step forward in the automatic computational detection of affect in realistic settings.