Measuring Affect in HCI: Going Beyond the Individual

N. Sadat Shami
Information Science Program
Cornell University
301 College Ave.
Ithaca, NY 14850 USA
sadat@cornell.edu

Jeffrey T. Hancock
Information Science Program
Cornell University
301 College Ave.
Ithaca, NY 14850 USA
jeff.hancock@cornell.edu

Christian Peter
Fraunhofer Institute for
Computer Graphics
Joachim Jungius Str. 11
18059 Rostock, Germany
cpeter@igd-r.fraunhofer.de

Michael Muller
Collaborative User Experience
IBM TJ Watson Research Center
1 Rogers St., Cambridge, MA
02142 USA
michael_muller@us.ibm.com

Regan Mandryk
Department of Computer Science
University of Saskatchewan
176 Thorvaldson Building
110 Science Place
Saskatoon, SK, S7N 5C9, Canada
regan@cs.usask.ca

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Abstract
The measurement of affect in HCI research is a challenging and complex issue. Although a number of techniques for measuring affect have been developed, a systematic discussion of their effectiveness and applicability in different contexts remains lacking, especially in social contexts with multiple users. As computing shifts to increasingly collaborative and ubiquitous models, it is important to discuss affect measurement beyond the individual level. This workshop will provide a forum where designers, practitioners, and researchers can 1) introduce novel methods of affect measurement that go beyond physiological and self-report measures, 2) advance our understanding of existing measurement methods and how they can be expanded, and 3) critically evaluate issues of affect measurement.

ACM Classification Keywords
H.5.2. [User Interfaces]: Evaluation/methodology; H.5.3 [Information interfaces and presentation]: Group and Organization Interfaces - *Computer Supported Cooperative Work*.

General Terms
Design, Measurement, Human Factors

Keywords
Affect, emotion, measurement, groups, collaborative computing.

Introduction

It is well established that affect influences human cognition and behavior in such aspects as creativity and problem solving [12, 16], motivation [5], attention [6], memory [14], and social behavior [1]. Affect in the context of interactions between computers and users has also been of deep interest to HCI researchers and practitioners [17, 18].

One of the key challenges of evaluating affective interfaces and interactions lies with measuring affect. Different terms have been used to describe the measurement of affect such as sensing, detection and recognition. Here we use 'measurement' as an umbrella term to signify all these. Traditionally, two categories of affect measurement techniques have been used: physiological measures and self-report. Physiological measures involve looking into such signals as facial expressions, vocal tone, skin conductance, heart rate, blood pressure, respiration, pupillary dilation, electroencephalography (EEG) or muscle action, to determine the intensity and quality of an individual's internal affective states. Concerns with physiological measures involve the difficulties relating to (1) setup, invasiveness, and analysis and (2) the association of specific physical responses with a particular type of emotion because of individual variability [4].

Self-report measures involve a plethora of affect inventories: verbal descriptions of an emotion or emotional state, rating scales, standardized checklists, questionnaires, semantic and graphical differentials and projective methods. Criticisms of self-report methods include the possibility that they draw attention to what the experimenter is trying to measure, that they fail to measure mild (low intensity) emotions, and that they are not construct valid [13].

New challenges with affect measurement have emerged with the evolution of computing from single-user-single-computer to multiple users interacting through various technologies. This shift is reflected in the emergence of the field of Computer Supported Cooperative Work (CSCW) and Ubiquitous Computing. Conventional models of emotion have assumed that affect is an internal, strictly individual phenomenon [3]. Yet, when dyads or groups of individuals interact through technology, a number of interesting questions arise. For instance, does a "group affect" [7] emerge from the affective experiences of the group's members? When members of a group experience different affect, how do these divergent experiences combine into a group affect? Is group affect more than the sum of individual group member's affect? How does the group perceive and track this emergent quality? Is co-location necessary for the emergence of group affect? What cues are effective in face-to-face engagements, and what cues are effective in remote or computer-mediated engagement? How do cultural differences in affect influence group experiences, and the emergence of group affect?

The conversation around affect measurement has already started within the CHI community. The CHI '05 workshop on evaluating affective interfaces addressed evaluation strategies for affective interfaces [10]. One of the identified critical issues of the highly successful SIG on emotion research in HCI at CHI '07 was affect

measurement [2]. This workshop thus aims to continue this conversation through addressing the issues and challenges of affect measurement when moving from the individual to the dyadic and group levels of analysis. As computing moves to an increasingly collaborative and ubiquitous model, it is timely to address affect measurement beyond the individual. Balancing the art of designing affective interfaces and the science of measurement also fits in well with the theme of this year's conference.

Goals

HCI researchers have recently started to develop various techniques for measuring affect [e.g. 11, 15]. However, a systematic discussion of their effectiveness and applicability in different contexts remains missing. Furthermore, techniques for measuring the affect of dyads or groups interacting through technology have received little research attention. The goals of this workshop are to act as a forum where designers, practitioners and researchers can introduce novel methods of affect measurement that go beyond physiological and self-report measures, to examine ways that existing measurement methods can be expanded, and to critically evaluate issues around affect measurement in shared environments. While the specific issues the workshop will address will be determined by paper submissions rather than a priori by workshop organizers, examples of some issues include:

Yours, mine or ours
Is "group affect" merely a summary of individual group member affect or do we need measurement methods beyond the individual? How is affect transferred from one group member to another through emotional contagion, behavioral entrainment and interaction synchrony [9]? How do we measure such transfer processes?

Implicit measures
A method that overcomes many of the criticisms of self-report and physiological measures of affect measurement are implicit measures such as analysis of linguistic cues [8]. What other implicit measures can the HCI community utilize?

Objective and subjective measures
In what contexts are objective measures of emotion [e.g. 15] and more subjective measures of emotion [e.g. 11] useful? Can there be a common ground between the two? A structured conversation between researchers using these different measures holds great promise for the community.

Mild emotions, mixed emotions and single emotions
Majority of measurement techniques focus on single emotions or an umbrella of emotions generally referred to as positive or negative affect. Is there measurement techniques that can measure subtle (low intensity) emotions or different emotions experienced simultaneously?

Cross cultural applicability
What are the cross-cultural issues associated with affect measurement? Are there measurement techniques that can be reasonably applied across cultures?

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