
Ubiquitous Emotion Recognition with Multimodal Mobile Interfaces

Shaun Canavan

University of South Florida
Tampa, FL, USA
scanavan@usf.edu

Marvin Andujar

University of South Florida
Tampa, FL, USA
Andujar1@usf.edu

Lijun Yin

Binghamton University
Vestal, NY, USA
lijun@cs.binghamton.edu

Anton Nijholt

University of Twente
Enschede, The Netherlands
a.nijholt@utwente.nl

Elizabeth Schotter

University of South Florida
Tampa, FL, USA
eschotter@usf.edu

Abstract

In 1997 Rosalind Picard introduced fundamental concepts of affect recognition [1]. Since this time, multimodal interfaces such as Brain-computer interfaces (BCIs), RGB and depth cameras, physiological wearables, multimodal facial data and physiological data have been used to study human emotion. Much of the work in this field focuses on a single modality to recognize emotion. However, there is a wealth of information that is available for recognizing emotions when incorporating multimodal data. Considering this, the aim of this workshop is to look at current and future research activities and trends for ubiquitous emotion recognition through the fusion of data from various multimodal, mobile devices.

Introduction and Background

Recently, the use of mobile devices has become increasingly popular in the field of emotion recognition [2, 3, 4, 5, 6, 7]. With the creation of large spontaneous multimodal databases [8, 9, 10], there has been a recent push towards using multimodal data for affect recognition. Along with this push, BCI technologies are becoming more ubiquitous and affordable, which has allowed researchers, designers, and developers to extend affective BCI research in human-computer interaction with an emphasis on multimodal interaction [11, 12]. By leveraging different

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UbiComp/ISWC'18 Adjunct, October 8–12, 2018, Singapore, Singapore
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ACM ISBN 978-1-4503-5966-5/18/10.
<https://doi.org/10.1145/3267305.3274139>

measurement tools, such as cameras [13, 14] and physiological sensors (brain, heart, muscle, etc.) [15], we will be able to more accurately classify emotions. Investigation into this can help us advance how these measurements obtained in mobile devices (i.e., phones, tablets, watches, etc.) can be used for user feedback for self-regulation. Therefore, the purpose of this workshop is to spark a conversation on how to advance such measurements, specifically for emotion recognition and not mood, with mobile devices and wearables. With the multidisciplinary nature of ubicomp, this workshop is a natural fit.

Goals of the Workshop

This workshop will leverage ubiquitous devices (e.g., brain, face, thermal, and other physiological data) to decode emotion for multimodal interaction and expose their work to researchers who use other measurement tools (e.g. eye tracking). The workshop aims to address questions on multimodal ubiquitous emotion recognition. The topics of the workshop focus on the following questions with respect to emotion recognition:

1. What inter-correlations exist in multimodal data?
2. How can ubiquitous devices be leveraged to create reliable multimodal applications?
3. How can we facilitate the collection of ubiquitous multimodal data?
4. What are some of the challenges associated with these research questions?

Audience

This workshop targets researchers in BCI, affective computing, psychology, and in Human-Computer Interaction (HCI) who are interested in recognizing ubiquitous emotions with mobile devices, through the fusion of multiple modalities. To facilitate recruitment,

the workshop organizers, who have experience organizing workshops and special issues in affective computing, BCI, and HCI will use their extensive research networks and mailing lists (e.g., SIGCHI).

Workshop Structure

The workshop will be open and take place over 1 day, including two sessions of invited talks, and two interactive break-out sessions for discussions and brainstorming the future of ubiquitous emotion recognition.

1. Introduction by the organizers
2. Papers Presentation: Session 1
3. Break 1
4. Papers Presentation: Session 2
5. Lunch/Break 2
6. Use Cases brainstorm in small teams
7. Break 3
8. Use Cases discussion
9. Closing remarks from the organizers

We invite workshop candidates to submit a position paper of 4 pages in the SIGCHI Extended Abstract format. Submissions should be sent to scanavan@usf.edu with "UERMMI 2018 submission" as email subject. The submission deadline is July 27th by 11:59pm EST. Accepted papers will be selected by the organizers based on relevance to theme. Participants will be notified of acceptance on or before August 17th.

Planned Outcomes

The workshop has the following planned outcomes:

1. Discuss creation of metrics for ubiquitous multimodal emotion recognition.
2. Develop ideas and collaborations for future research directions in the field.

- Promote interdisciplinary research across affective computing, BCI, psychology, and other physiology-related fields from a ubiquitous computing perspective.

Organizers

Shaun Canavan (Main Contact Person) received his PhD in Computer Science from Binghamton University. He is an Assistant Professor in the Computer Science and Engineering Department at the University of South Florida. His research focuses on Affective Computing, Human-Computer Interaction, Biometrics and VR/AR. He won an AWS Machine Learning Research Award for studying multimodal human emotion analysis using deep neural networks. He has 18 publications in top conferences and journals, as well as has a patent for his invention on estimating hand pointing direction. He is currently serving on multiple technical committees for conferences and journals, as well as demo chair for Face and Gesture 2019.

Marvin Andujar received his Ph.D. in Human-Centered Computing from the University of Florida. He is an Assistant Professor in the Computer Science and Engineering Department at the University of South Florida. He is leading a research lab on Brain-Computer Interface with an emphasis on Human-Computer Interaction. Marvin's research concentration is on Affective Brain-Computer Interfaces (aBCIs) where he measures attention levels with wearables electroencephalographic (EEGs) to provide feedback to users for self-regulation. His work led to a research grant from Intel granted by the CEO to pursue work on BCI and Brain-Controlled Drones. He co-founded the world's first Brain-Drone Race. He has co-organized two workshops at CHI 2018.

Lijun Yin is a Professor of Computer Science, Director of Graphics and Image Computing Laboratory, and Co-director of Seymour Kunis Media Core, T. J Watson School of Engineering and Applied Science at the State University of New York at Binghamton. He received his Ph.D. in computer science from the University of Alberta, Canada. His research focuses on computer vision, graphics, HCI, and multimedia. His research has been funded by the NSF, AFRL/AFOSR, NYSTAR, and SUNY Health Network of Excellence. Dr. Yin received the prestigious James Watson Investigator Award of NYSTAR (2006) and SUNY Chancellor Award for Excellence in Scholarship and Creative Activities (2014). He holds 2 US patents and has published over 120 papers in technical conferences and journals.

Anton Nijholt received his PhD in computer science from the Vrije Universiteit in Amsterdam. He held positions at various universities, inside and outside the Netherlands. In 1989 he was appointed full professor at the University of Twente in the Netherlands. His main research interests are human-computer interaction with a focus on entertainment computing, affect, humor and brain-computer interfacing. He edited various books, most recently on playful interfaces and brain-computer interaction. He is co-editor of the Handbook on BCI that appeared in 2018 (Taylor & Francis). Nijholt, together with many of the more than fifty PhD students he supervised, wrote hundreds of and conference papers on these topics and acted as program chair and general chair of large international conferences on affective computing (ACII), intelligent virtual agents (IVA), multimodal interaction (ICMI), advances in computer entertainment (ACE), entertainment computing (ICEC), et cetera. He organized several workshops on affective

BCI in conjunction with the Affective Computing conference

Elizabeth Schotter received her Ph.D. in Cognitive Psychology at the University of California, San Diego. She is an Assistant Professor in the Psychology Department at the University of South Florida and PI of the Eye Movements and Cognition Lab. Her research uses state-of-the-art eye tracking and computational modeling to study cognitive processing, attention, and perception. She has published on the impact of technology on the reading process (e.g., for speed reading) and has been interviewed for WIRED and KPBS/NPR. She was awarded a Select Speaker Award from the *Psychonomic Society*, an Early Career Award from the *Society for Experimental Psychology and Cognitive Science (American Psychological Association Division 3)* and is currently Co-PI on an NSF Grant on Attention in Games and Decisions.

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Call for Participation

Description:

The 1st workshop on Ubiquitous Emotion Recognition with Multimodal Mobile Interfaces (UERMMI 2018) is organized at Ubicomp 2018 to gather researchers on Brain-Computer Interfaces (BCI), affective computing, psychology, and in Human-Computer Interaction (HCI) who are interested in recognizing emotions with mobile devices through the fusion of multiple modalities. This workshop will leverage ubiquitous devices (e.g., brain, face, thermal, and other physiological sensors and data) to decode emotion for multimodal interaction and expose their work to researchers who use other measurement tools (e.g. eye tracking). The workshop aims to address questions specifically on *multimodal emotion recognition not directly related to mood*.

Topics of interest include but are not limited to:

- Inter-correlations between ubiquitous multimodal data as it relates to emotion recognition
- Leveraging ubiquitous devices to create reliable multimodal applications for emotion recognition
- Facilitation and collection of ubiquitous multimodal data for emotion recognition
- Investigation into the challenges associated with these topics.
- *NOTE:* Topics that explore mental and digital health are not topics of interest for this workshop

Applications include but are not limited to:

- Quantified-Self and Self-regulation
- Engagement Measurement
- Lie Detection
- Smart human-machine interfaces

- Intelligent transportation systems
- Video games
- Immersed Virtual Experiences

Workshop details:

The workshop will be open and take place over 1 day, including two sessions of invited talks, and two interactive break-out sessions for discussions and brainstorming the future of ubiquitous emotion recognition. Workshop candidates are invited to submit a position paper of 4 pages in the SIGCHI Extended Abstract format. Submissions should be sent to scanavan@usf.edu with "UERMMI 2018 submission" as email subject.

Important dates:

Paper submission: July 27th, 2018

Decision to authors: August 17th, 2018

Organizers:

Shaun Canavan, University of South Florida
Marvin Andujar, University of South Florida
Elizabeth Schotter, University of South Florida
Lijun Yin, Binghamton University
Anton Nijholt, University of Twente