UNIVERSITY OF SOUTH FLORIDA

Defense of a Doctoral Dissertation

Analysis of Contextual Emotions Using Multimodal Data

by

Saurabh Hinduja

For the Ph.D. degree in Computer Science and Engineering

Affective computing is a field which studies and evaluates systems which can recognize, interpret, and simulate human emotion. It is an interdisciplinary field, which includes computer science, psychology, and many others. For years, human emotion has been studied in psychology, but recently has become a prominent field in computer science. Largely, the field of affective computing has been focused on analyzing static facial expressions to recognize human emotions, without taking bias (e.g. gender, data bias), context, or temporal information into account. Psychology has shown the difficulty in this, as well as the need to incorporate this type of information. Considering this, in this dissertation, we have proposed new approaches to recognizing emotions by incorporating both contextual and temporal information, as well as approaches to mitigating bias. More specifically, this dissertation has the following theoretical and application-based contributions: (1) This is the first work to recognize multiple self-reported emotions using facial expression-based videos; (2) Proposed new approach to mitigating data bias in facial action units; (3) Multimodal, temporal fusion of physiological signals and action units for emotion recognition; and (4) New approach to recognizing context using temporal dynamics from facial action units. This dissertation has a wide range of applications in fields including, but not limited to, medicine, security, and entertainment.

Examining Committee
Achilleas Kourtellis, Ph.D., Chairperson
Shaun Canavan, Ph.D., Major Professor
Rangachar Kasturi, Ph.D.
Jeffrey F. Cohn, Ph.D.
Marvin J. Andujar, Ph.D.
Pei-Sung Lin, Ph.D.
Elizabeth Schotter, Ph.D.

Tuesday, March 23, 2021
1:00 PM (EST)
Online (MS Teams)
Please email for more information
saurabhh@usf.edu
THE PUBLIC IS INVITED

Publications

1) S. Srivastava, S. Aathreya, **S. Hinduja**, Sk R. Jannat, H. Elhamdadi, and S. Canavan "Recognizing Emotion in the Wild using Multimodal Data", *International Conference on Multimodal Interaction, 2020*
2) D. Fabiano, S. Canavan, H. Agazzi, **S. Hinduja**, and D. Goldgof. "Gaze-Based Classification of Autism Spectrum Disorder", *Pattern Recognition Letters, 2020*
3) **S. Hinduja**, S. Canavan, and L. Yin, "Recognizing Perceived Emotions from Facial Expressions", *Face and Gesture Recognition, 2020*
4) **S. Hinduja**, S. Canavan, and G. Kaur. "Multimodal Fusion of Physiological Signals and Facial Action Units for Pain Recognition", *Face and Gesture Recognition, 2020*
5) **S. Hinduja**, and S. Canavan. "Real-time Action Unit Intensity Detection", *Face and Gesture Recognition, 2020*
6) S. Aathreya, **S. Hinduja**, and S. Canavan. "Three-level Training of Multi-Head Architecture for Pain Detection", *Face and Gesture Recognition, 2020*
7) **S. Hinduja**. "Mitigating bias in Empathy Detection". *International Conference on Affective Computing & Intelligent Interaction, 2019*
8) **S. Hinduja**, Md T. Uddin, Sk R. Jannat, A. Sharma, and S. Canavan. "Fusion of Hand-crafted and Deep Features for Empathy Prediction". *Face and Gesture Recognition, 2019*

Robert Bishop, Ph.D.
Dean, College of Engineering

Dwayne Smith, Ph.D.
Dean, Office of Graduate Studies

Disability Accommodations:
If you require a reasonable accommodation to participate, please contact the Office of Diversity & Equal Opportunity at 813-974-4373 at least five (5) working days prior to the event.