Announcing the Final Examination of Avonie Parchment for the degree of Doctor of Philosophy

Time & Location: November 1, 2018 at 12:00 PM in Partnership III 227

Title: PSYCHOPHYSIOLOGY MEETS COMPUTER SCIENCE: PREDICTING THE MAGNITUDE OF PARTICIPANT PHYSIOLOGICAL RESPONSE WITH MACHINE LEARNING

The present inquiry uses methods from psychophysiology and machine learning to reduce overall error in classification models in the future. The field of psychophysiology, though rooted in decades of experimentation, has never reached the same level of precision as some aspects of medical inquiry. In fact, while some medical regression models, when determining some way to classify a patient's illness based on certain symptoms, can result in highly significant results with large effect sizes, equal levels are virtually unheard of in psychophysiology. The present investigation attempts to unravel some part of this mystery, especially concerning methods that match participant state with physiological response. Of particular focus are two areas: baseline research and experimental data analysis methods. The role of baselining techniques in relation to overall quality of response stems from the Law of Initial Value that indicates some relationship between baseline and experimental response. Though this relationship has been historically investigated and found to be lacking for many physiological measures, experimental condition heart rate response has been consistently shown to rely heavily on baseline response. This finding influences the second half of the present inquiry, which deals with the overall analysis of experimental data and the role that traditional statistics could play in the present problem. This dissertation compares logistic regression and support vector models to help inform researchers as to how to choose a method to flag potentially highly influential cases that may greatly skew data and make modeling difficult. Additionally, demographic characteristics are given in order to help identify these influential cases in the future before modeling.

Major: Modeling and Simulation

Educational Career:
Bachelor's of English and Psychology, BA, 2010, Rutgers College
Master's of Modeling and Simulation, MS, 2014, University of Central Florida

Committee in Charge:
R. Paul Wiegand, Chair, Modeling and Simulation
Gerald Matthews, Institute for Simulation and Training
Xin Yan, Statistics Department
Julian Abich, Quantum Improvements Consulting
Adams Greenwood-Ericksen, Full Sail University

Approved for distribution by R. Paul Wiegand, Committee Chair, on October 15, 2018.

The public is welcome to attend.