



Louisville Section and Life Members Affinity Group Technical Meeting

Date: Wednesday, March 24, 2021

Time: Presentation at 7:00 PM

Location: IEEE WebEx Virtual Meeting
RSVP to Andy Dozier for Logon Details

Price: FREE!!

RSVP: Andy Dozier, Section Secretary
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Topic: Measurement of student engagement in the STEM classroom using machine learning and biometrics

Speaker: Prof. Dr. Christopher Foreman, Engineering Fundamentals Department, J.B. Speed School of Engineering

Abstract:

The measurement of student engagement in STEM courses is investigated using machine learning and biometrics to measure the emotional and behavioral states of students in the classroom. The approach collects multi-dimensional biometrics via camera and wristband monitors of facial expressions, eye gaze, hand/head/body movement, and heart rate. From these data, a software model is trained to classify student engagement. Engagement is classified from behavioral and emotional states with cognitive engagement inferred by machine learning. The ability to measure student engagement in real time can be used by the instructor to tailor the presentation of material in class, identify course material that engages and disengages with students, and identify students that are engaged, or

disengaged and at risk of failure. Further, this approach allows quantitative comparison of teaching methods, such as lecture, flipped classrooms, classroom response systems, etc. such that an objective metric can be used to close the loop on teaching evaluation.

This work has been funded by the NSF.

Speaker Biography:

Prof. Dr. Chris Foreman teaches engineering mathematics and performs research in student engagement in STEM courses at the University of Louisville Speed School of Engineering. He has performed data analysis and advised on artificial intelligence approaches to detect types of engagement in students during various teaching approaches. Dr. Foreman has previously worked at Purdue University in power and energy, and prior to academia has approximately 15 years in the power generation industry where he also deployed artificial intelligence in industrial control systems.