

IE 69000-006 Sensing Approaches For HF Res - 18728

Spring 2019

MWF 3:30 pm - 4:20 pm GRIS 118

Instructor: D Yu, Ph.D., GRIS 268, dennyu@purdue.edu

Office hours: MW 4:20 pm -5:00 pm and by appointment

Textbook: No textbook. Research papers will be provided by instructor and students.

This course is to

- 1) introduce the impact of selected human factors constructs (e.g., human performance, muscle fatigue, workload, situational awareness, attention, etc.),
- 2) review the state-of-the-art sensing techniques and metrics used to quantify these constructs,
- 3) critically investigate and directly apply sensing techniques in a laboratory setting to collect and discuss primary data, and
- 4) identify the areas for future research directions.

This is a PhD-level course where students must demonstrate ability to conduct research and take a deep dive into the data and data interpretation. **Course topics and deliverables should be used to augment your own research** (so please don't hesitate to provide feedback anytime to instructor on topics/directions/applications of interest).

Students are expected to take active roles in class to lead the review and discussion of research papers. During the semester, students may be required to attend seminars/workshops in related topics or visit human factors events outside of the regular scheduled lecture time. Equivalent hours of lecture will be omitted as appropriate.

Course topics:

I. Human factors overview – State of the science

II. Physiological sensing techniques (potential list)

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|---|---|
| <input type="checkbox"/> Activity tracking (fitness trackers) | <input type="checkbox"/> Galvanic skin response |
| <input type="checkbox"/> Force capability | <input type="checkbox"/> Audio sensing |
| <input type="checkbox"/> Muscle fatigue | <input type="checkbox"/> Electroencephalography |
| <input type="checkbox"/> Motion capture | <input type="checkbox"/> Eye-tracking |
| <input type="checkbox"/> Gait and balance | <input type="checkbox"/> RFID tracking and interactions |
| <input type="checkbox"/> Heart rate variability | |

III. Select application environments (potential list)

- Patient simulation (potential day trip to IU Health Hospital)
- Driving simulation (pending)

Grading Policy:

30% Participation in class

40% Presentations/technology tutorials/short reports

30% Team project (may require travel to field environments to study with workers directly.

Students are responsible for the transportation if needed.)

Notes:

- Independent study dates (no lecture):
 - 1/18
- No classes
 - 1/21 – MLK Day
 - 3/11-3/15 – Spring Break
- Participation quantified by frequent random sampling of attendance (posted on blackboard). Student's allowed 4 drops. Limited attendance "make-ups" may be available
- Goal is to have at least 2 external guest speakers (attendance for guest speakers are mandatory, i.e., not droppable)
- Team project (especially the report) will be graded in "conference" review style by instructor and/or guest reviewers
 - Conference papers reviewed as "Accepted for Oral" gets an A
 - IEEE, CHI, or HFES format are acceptable; check with instructor if another conference is preferred
 - Poster-style presentations may be acceptable (check with instructor)
- Friday lectures will occasionally occur in the Healthcare Ergonomics Analytics Laboratory
 - There will be approximately 3-4 data collection sessions (1-3 hours needed and equivalent lecture hours may be omitted)

Course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. The information about changes in this course will be posted on Blackboard.