CS 5453: Empirical Methods

Instructor: Andrew H. Fagg

Many subareas of computer science and engineering are inherently empirical. Whether one is designing network routing algorithms, designing robots to navigate across harsh terrains, tuning database search parameters, or employing a machine learning algorithm to solve a robot control problem, there exist a number of common steps in the research process. These include: the proper construction of experimental questions, the design of methods to get at these questions, and the evaluation of the empirical results. In this graduate-level course, we will discuss the formulation of empirically-testable hypotheses as applied to different sub-fields of computer science, engineering, neuroscience and psychology; the design of experiments in order to test these hypotheses; and a range of statistical methods that are available for the evaluation and analysis of experimental results.

Topics will include:

- Data Analysis
- Experiment Design
- Statistical Methods
- Hypothesis Testing
- Measuring System Performance
- Model Construction

Student responsibilities include:

- Reading for each class session
- Writing short responses to a small number of specified readings
- Performing several homework assignments
- Performing a class project that will make use of some of the methods of study in a research project in which you are already engaged
- Presenting your class project to the class

Readings:

- Various papers from the literature

Where: Felgar Hall 334

When: T/Th 1:30-2:45

Prerequisites: Statistics (Math 4743, Math 5743, Math 4753, or IE 3293) and permission of the instructor.

In order to grant permission, I am looking for research experience or an advanced course in some empirical area (for example: networks (CS 4133/5133/G5143/G6143), robotics (CS 4023/5023), operating systems (CS 4113/5113), machine learning (CS G5033), artificial intelligence (CS G4013), database management (CS G4513), computer architecture (CS G5633))

Links
• Syllabus
• Semester Schedule
• Lecture Notes
• Projects
• Some statistical tools

fagg.cs.ou.edu

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