ECE 302: Lecture 00 Introduction

Fall 2018

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https://engineering.purdue.edu/ChanGroup/ECE302
The Era of Big Data

Example: Image Classification

- **Data**: Training data containing cat and grass.
- **Model**: Describe the raw data using statistical models.
- **Algorithm**: Perform learning, inference and prediction.
- **Computing**: Store and execute the tasks.
The science of making sense of data!
Why study statistics?

... Using fancy tools like neural nets, boosting, and support vector machines without understanding basic statistics is like doing brain surgery before knowing how to use a band-aid...

Larry Wasserman, “All of Statistics”
ECE 302

An introductory course in probability and statistics.

Chapters in Course Note:

- Mathematics review (ch.1)
- Basic probability (ch.2)
- Discrete random variables (ch.3)
- Continuous random variables (ch.4)
- Joint distributions (ch.5)
- Large sample limits (ch.6)
- Estimation (ch.7)
- Random processes (ch.8)
- Random processes through linear systems (ch.9)
Roadmap

Data $X = [X_1, \ldots, X_N]$

Model $f_{X, \Theta}(\mathbf{x}, \Theta)$

Likelihood $f_{X|\Theta}(\mathbf{x}|\Theta)$

Prior $f_{\Theta}(\Theta)$

Estimation $\Theta$

Pattern

Prediction

Mathematical Tools

Theoretical Limits
Teaching Staff

**Instructor:** Prof Stanley Chan; MSEE 338  
Office Hour: M 4:30-5:30

**TA:** Madhuri Nagare (PhD, Image Processing); EE 208  
Office Hour: Thu 12-1pm, Fri 11am-12pm

**Grader:** Wenrui Li

**Project Assistants:** (For projects only)  
Xiangyu Qu, MSEE 370, (PhD, Deep Learning)  
Zhiyuan Mao, MSEE 370, (PhD, Deep Learning)  
Omar Elgendy, MSEE 370, (PhD, Computational Imaging)  
Office Hour: Wed 4:30-5:30, Thu 4:30-5:30
Homework 10%

- Every week. Check website for date.
- Due at 4:30pm. MSEE 330 dropbox
- Staple your homework. Otherwise ZERO
- We will drop your worst 2 homework
- First homework is up. Due Friday.
- Watch homework videos on the course website.
- Do homework. If no/little effort in homework, your grade will be F.
Project 15%

- Three Python projects
- Real applications of ECE 302
- We will not teach them in class
- You have to learn by yourselves
- Require basic programming skills
- Project assistants are available for help
Exam

- 2 mid terms (15% each); 1 final (45%)
- Closed book, closed note
- No electronics, of any kind
- Formula sheet will be given
- Exam dates are listed in the syllabus
- Evening exams
- We will cancel two lectures
- No make up exam
- **DO NOT TRAVEL BEFORE FINAL EXAM**
Grades

Curved.

Typical grades:

- **A**: $> 85$
- **B**: $75 - 84$
- **C**: $60 - 74$
- **D**: $50 - 59$
- **F**: $< 50$
Past Comments from Students

▶ “... the first day of class he said this is going to be the hardest class you’ve taken and he was not kidding ...”

▶ “... avoid Stanley Chan ...”

▶ “... thoroughly depressing and miserable is a better description for this class ...”
Office Hour Policy

- Your First Contact: Teaching Assistant
- Project / Programming: Project Assistants
- Things the above cannot help: Prof Chan

- Do NOT bring homework to my office / TAs office and work there, even if it is office hour and no other students are here.
Office Hour Policy

- **Q:** “I don’t understand topic ABC, can you explain it once more?”
  **A:** Yes, certainly.

- **Q:** “I have absolutely no idea about how to solve Problem X.”
  **A:** Please watch video first.

- **Q:** “I have some thoughts but the answer is different from my friends. Can you help me?”
  **A:** Definitely.

- **Q:** “I missed a class last week. Can you repeat the lecture for me?”
  **A:** NO!

- **Q:** “Will topic XYZ be covered in exam?”
  **A:** Check course website.
Cell Phone Policy

No Cell Phone Camera at ANY time.
Course Material Copyrights

- All course materials are for ECE 302 students only.
- Prof Chan owns the copyright, not you.
- You are legally NOT allowed to upload any ECE 302 material to commercial websites, e.g., course hero.
Plagiarism

- I respect you as adults
- Do NOT copy and paste (or any variation)
- Do NOT cheat in exams
- Do NOT steal someone's idea
- I have ZERO tolerance against plagiarism
- If you got caught for plagiarism, you will
  - Get F in the course
  - Be sent to Office of Student Rights and Responsibilities (OSRR)
  - Worst case: Be kicked out from Purdue
- If you collaborate with a friend on projects, state it clearly on your reports.
Questions?