

Mid-semester feedback

CSC 461: Machine Learning

Fall 2022

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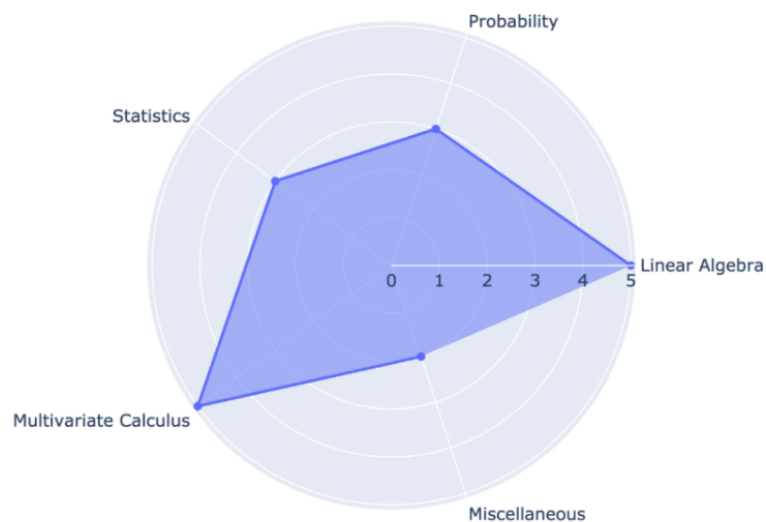
Prerequisites

Should I take this class?

- Requires more **math** than traditional CS courses
- Programming experience is **required**
consider taking this course at a later time if necessary
- Less emphasis on “how to use this library”
 - ✓ focus on understanding/implementing major algorithms
- High grades require high effort
 - ✓ long and challenging assignments/exams

Math resources

- Linear Algebra Review and Reference
 - ✓ <http://cs229.stanford.edu/summer2019/cs229-linalg.pdf>
- Review of Probability Theory
 - ✓ <http://cs229.stanford.edu/summer2019/cs229-prob.pdf>
- Computational Linear Algebra for Coders
 - ✓ <https://github.com/fastai/numerical-linear-algebra>
- Mathematics for Machine Learning
 - ✓ <https://gwthomas.github.io/docs/math4ml.pdf>



Machine Learning

<https://www.analyticsvidhya.com/blog/2019/10/mathematics-behind-machine-learning/>

Python/Numpy resources

- Google's Python Class
 - ✓ <https://developers.google.com/edu/python/>
- From Python to Numpy
 - ✓ <https://www.labri.fr/perso/nrougier/from-python-to-numpy/>
- Python Numpy Tutorial
 - ✓ <http://cs231n.github.io/python-numpy-tutorial/>

Grading

Programming assignments

- Still working on it ...
 - ✓ should finish soon
 - ✓ grading takes significantly more work
- Kaggle and assignment 3
 - ✓ very low number of submissions
 - ✓ not really exciting results
 - ✓

(old) Grading

- **Assignments (25%)**
 - ✓ ~6 Homework Assignments
- **Midterm Exam (25%)**
- **~~Technical Presentation (20%)~~**
 - ✓ ~~groups of 2~~
- **Final Project**
 - ✓ progress report (5%)
 - ✓ final report (15%)
 - ✓ presentation (10%)

(new) Grading

- **Assignments (30%)**
 - ✓ ~6 Homework Assignments
- **Midterm Exam (30%)**
 - ✓ second Midterm Exam (keep highest score)
 - ✓ covers everything until the week before the exam
 - ✓ applied on Nov 21st
- **Final Project (40%)**
 - ✓ progress report (5%)
 - ✓ final report (15%)
 - ✓ poster presentation (10%)
 - ✓ GitHub repo with the source code (10%)

Final Projects

Final project

- **Group composition**
 - ✓ 2-3 students per group
- **Deliverables**
 - ✓ progress report (Nov 16th)
 - ✓ final report (Dec 20th)
 - ✓ poster presentation (Dec 21st)
 - ✓ GitHub repository with all the code (Dec 20th)

Topics

- Implement some interesting machine learning application
- Reproduce an academic paper
- Tweak an existing ML algorithm to solve a particular type of problem
- Your own graduate/undergraduate research



Final Project

‣ Considerations

- ✓ pick a publicly available dataset (can also collect your own)
- ✓ define your ML goals and methods
- ✓ pick a good framework and learn it

‣ Inspiration

- ✓ visit cs229 project list (<http://cs229.stanford.edu/projects.html>)
- ✓ visit SOTA (<https://paperswithcode.com/sota>)

Outstanding projects

- Demonstrated knowledge of Machine Learning (theory/practice)
- Significant implementation effort (awesome final product, produces at least one WOW)
- Novelty (can't find this online)
- Use of interactive tools such as:
 - ✓ huggingface, gradio, etc.

straight A in this course

Progress report

- Title
- Team members
- Introduction
 - ✓ provide context and existing work for the problem
- Problem Definition
 - ✓ precisely define what is the ML problem
- Data
 - ✓ provide detailed description of data
- Methods
 - ✓ provide a clear pipeline of the methods used for solving the problem
- Preliminary Results (optional)

Final report

- Title
- Team members
- Introduction
- Problem definition
- Data
- Methods
- Experiments
- Conclusion