**Syllabus for CS4981 ML Production Systems**

Instructor: Dr. RJ Nowling

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Office hours: TBD

**What You'll Learn This Quarter**

Students will design, implement, deploy, and operate a machine learning-powered service, including components for data processing, model training, modeling serving, model evaluation, and monitoring. Technologies and design patterns for streaming and batch data processing as well as storage systems will be introduced.

**Outcomes**

On successful completion of this course, the student will:

* Design, implement, deploy, and operate a machine learning-powered RESTful service and supporting backend systems
* Design and implement data processing systems that use batch and stream processing patterns and technologies for ingesting and processing event data
* Apply design patterns and data storage systems to design and implement data storage services to support batch and streaming data processing, model training, and model evaluation
* Create distributed systems to support model training and evaluation
* Automate and monitor model training, evaluation, deployment, and operation
* Evaluate and compare architectures of ML-powered systems

**A person smiling for the camera

Description automatically generatedAbout Your Instructor**

I was born in Ft. Lauderdale, FL. In 2010, I moved to South Bend, IN for graduate school. I met my wife during that time, and we moved to Milwaukee in January 2015 for her to pursue an amazing career opportunity. At the time, I was working remotely as a software engineer in industry. From May 2014 – August 2018, I worked in industry as a "big data" software engineer at Red Hat, Inc. and a "data science engineer" at an online advertising company called AdRoll, Inc.

Last Fall was the start of my fifth year of teaching at MSOE. My specialties include data science, machine learning, and algorithms / data structures. I really enjoy teaching these classes along with the introductory programming sequence.

I maintain an active research program in genomics. I combine traditional bioinformatics techniques with machine learning to answer questions about structural variations and functional properties of insect genomes. I collaborate with faculty at the Medical College of Wisconsin, University of Tennessee—Knoxville, and other large research institutions. MSOE students regularly work with me on these projects. Please come talk with me if you are interested in learning more about participating in research during your time at MSOE.

Since moving to Milwaukee, I've became an avid cyclist. During the summers, you'll often find me on the Oak Leaf Trail. My wife and I have two dogs. I enjoy taking them to the dog park. In my free time, I build LEGO kits and read books on history, philosophy, sociology, and social work.

**Learning Activities and Materials**

**Canvas**

You access the MSOE Canvas instance here:

<https://msoe.instructure.com/>

All assignments will need to be submitted as PDFs (lab notebooks, etc.) and zip files through Canvas.

## Textbook

*Designing Machine Leanring Systems*, Chip Huyen, O’Reilly.

**Programming Assignments**

Your solutions to the programming projects will be submitted through Canvas. Within the Canvas section of the class, you should select the “Content” tab, and the projects will be posted as assignments. **Projects should be completed in groups of 2 or 3.** Only one group member needs to submit to Canvas. Projects will be graded primarily using demos in-lab.

**Exams**

There will be a single final exam that will mainly test knowledge of topics presented in lectures.

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| **Grades**   |  |  | | --- | --- | | **Item** | **Percentage** | | Projects | 80% | | Final Exam | 20% | | **Grading Scale**   |  |  | | --- | --- | | **Letter Grade** | **Percentage Needed** | | A | >=93% | | AB | >=89% | | B | >=85% | | BC | >=81% | | C | >=77% | | CD | >=74% | | D | >=70% | | F | <70% | |

**Plagiarism**

All work submitted by you is expected to be your own writing unless explicitly allowed in the assignment (it will be clearly written). **Copying and pasting code from other students, the internet or any other sources other than the professor or textbook is considered plagiarism and is not allowed.**  **If copying and pasting is discovered, it will cause the both the person who submitted copied code and the person they obtained the code from to earn a 0 on the lab/assignment, and depending on the circumstances, it may cause the submitter to earn a 0 in the course.** IF YOU ARE UNSURE if “borrowing” code is allowed, please ask. It is better to ask for permission than forgiveness in this instance.

All cases of suspected plagiarism or cheating will be submitted to the Vice President of Academics and may become part of your permanent academic record as per campus policy.

## Special Accommodations

If you require special accommodations, please notify the instructor within the first three (3) weeks of the quarter to ensure adequate time to provide appropriate accommodations.

**Tentative Schedule**

See Canvas.