MAIS 202

Accelerated Introduction To Machine Learning

A course offered by the McGill AI Society

1. Introduction

Welcome to the first iteration of MAIS 202: Accelerated Introduction to Machine Learning! Designed by the executive team of the McGill Artificial Intelligence Society, MAIS 202 offers an extensive introduction to machine learning through lectures, assignments, and projects. This course is meant for undergraduates at McGill with basic foundations in mathematics (Calculus, Linear Algebra) and programming (Python). While this course is intended for lower-year undergraduates with an expressed interest in machine learning, upper year students who have been previously unable to take AI related courses *(e.g. ECSE 415, COMP 424, COMP 551)* are welcome to apply!

2. Instructors + TA's

Your course instructors for MAIS202 are Isaac Chan (isaac.chan@mail.mcgill.ca) and Frank Ye (frank.ye@mail.mcgill.ca). The class will consist of two hours of lectures a week.

Joined by our course lecturers are two Design Project Leaders, Tiffany Wang (tiffany.wang@mail.mcgill.ca) and Daoud Piracha (daoud.piracha@mail.mcgill.ca), and several teaching assistants who will provide homework feedback and hold office hours to answer questions.

3. Pre-requisites

Minimum: Introductory calculus, linear algebra, basic python proficiency, and ability to demonstrate long-term commitment outside of the McGill classroom.
Helpful: Knowledge of basic probability and statistics
Anti-requisites: This course is not meant for those who have already taken upper-year coursework in machine learning, computer vision, natural language processing, or artificial intelligence.

4. Course Completion Requirements

To be featured on McGill AI's website and meet industry engineers and recruiters at the conclusion of the course, you must have done the following:

1. Attendance to all lectures is mandatory. Since there are only eight lectures, you are allowed to miss one unexcused lecture.
2. All assignments are mandatory, and you must pass all of them to pass the course
3. You must submit a final project
4. A supplemental blog post discussing your final project

5. Takeaways from MAIS 202:

1. Theoretical and Hands-On Skills Required for ML Research and Industry
2. Real-time mentorship and feedback
3. Personal projects to put on your resume
4. Networking with a community of ML enthusiasts

6. Schedule

Week #	Lecture Topics	Homework	Project Deliverables
1: Week of January 21st	1. Introduction to the course 2. Data manipulation + visualization in Python	*HW1 Assigned*: Python and data visualization; Sklearn pipelines	Final Project Introduction (1-2hrs)
2: Week of January 28th	1. Linear and logistic regression 2. Gradient descent	**HW1 Due** *HW2 Assigned*: Polynomial Regression and Gradient Descent	**Deliverable 1:** Project Proposal Due
3: Week of February 4th	1. Feed forward neural nets and backpropagation 2. Bias/variance tradeoff 3. Good training practices	**HW2 Due** *HW3 Assigned*: Pytorch intro & feed-forward NN	
4: Week of February 11th	1. Dimensionality reduction (PCA, autoencoders, t-SNE) 2. Feature Extraction	**HW3 Due** *HW4 Assigned:* Word Embeddings	**Deliverable 2:** Training Report
5: Week of February 18th	1. CNNs 2. Computer Vision fundamentals	**HW4 Due**	
6: Week of February 25th	1. Style transfer	*HW5 Assigned*: Deep Dream	**Deliverable 3:** Finalized Training Results + Development Plan
Reading Week: Work on final projects. Adversarial Examples homework is optional.			
7: Week of March 11th	1. RNNs/LSTM	**HW 5 Due**	
8: Week of March 18th	1.Seq2Seq 2.Encoder-Decoder architecture		
9: Week of March 18th	**Final project presentations**		**Deliverable 4:** Final Project Presentation

7. Homework and TA Contact Information

Homework 1: Python + Data Visualisation; Sklearn Pipelines	
Megan Kairiss	megan.kairiss@mail.mcgill.ca
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Homework 2: Pytorch Intro; Feed-forward NN	
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Homework 5: Deep Dream Algorithm	
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