Technology & Visual Arts

AIDI 1009 Neural Networks

Monday, 11am – 12pm EST

Course Description: Neural networks are computational models that utilize a series of algorithms or nodes which mimic the way the human-brain functions. These nodes work together to process and identify relationships between complex data. Neural networks can self-learn or be trained by observing data sets. Students will learn how to prepare data, select and design a neural network, then test and make predictions using the network.

Instructor: Archit Garg

Office Hours: Mon 11am – 12pm EST

Contact Information: archit.garg@georgiancollege.ca

Resources: We do not have a single textbook, depending on the topic the instructor will use presentations/notes to illustrate the examples. Supplementary reading material will be provided for each topic to learn and understand the topics.

Expectations for Success:

Students are expected to have the following background:

- Familiarity with the basic probability theory.
- Familiarity with the basic linear algebra.
- Machine Learning background is recommended.

Projects will be involving programming and understanding of concepts described in lectures.

Note: You are welcome to share all reading materials and have discussions, but answers to anything that is submitted for grading (exercises, exams, code) must be yours, and yours only.

Evaluation/Grading Rubric

Project 1	20% of the overall grade
Project 2	20% of the overall grade
Project 3	20% of the overall grade
Exam 1	20% of the overall grade
Exam 2	20% of the overall grade

Schedule of Activities:

Week	Date(mm/dd)	Lesson	Assignment/Exam	Due Date
1	01/09	Evolution of ANNs and MP Neuron		
2	01/16	Logic Gates with MP Neuron and Single Layer Perceptron		
3	01/23	Perceptron Learning rule & Multi-layer perceptron		
4	01/30	Intro to the PyTorch framework and its features		
5	02/06	Introduction to Neural Networks and Optimization	Project-1	Mon 6th Feb 11:59pm EST
6	02/13	Scaling Optimization and Stochastic Gradient Descent		
7	02/20	Training Neural Networks(SGD Variations & Losses)		
	02/27	**Reading Week- No Classes**		
8	03/06	Exam - 1	Exam - 1	Mon 6th Mar, 11 am – 1pm EST
9	03/13	Training Neural Networks Contd.(Activation Functions, Weight Initialization, Data	Project-2	Mon 13th Mar 11:59pm EST

		Augmentation, Early Stopping)		
10	03/20	Dropout, Batch Normalization +Intro to CNNs		
11	03/27	CNNs continued(Transfer Learning, Pretrained Architectures)		
12	04/03	RNNs and LSTMs	Project-3	Mon 3rd Apr, 11:59pm EST
13	04/10	Advanced Deep Learning Topics		
14	04/17	Exam - 2	Exam - 2	Mon 17th Apr, 11am – 1pm EST

The sequence and content of this syllabus may change due to unanticipated opportunities or challenges, or to accommodate the learning styles of the students.

Due to extenuating circumstances and to accommodate the need for this program to be offered remotely, there may be some modifications to the evaluation/assessment. This has been approved by the Dean of Technology & Visual Arts (TVA), as directed by the Vice President, Academic.