CSC485B Machine Learning for Robotics - Spring 2023

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Instructor: Dr. Ned Lecky
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Class: TR 12:30 – 13:45
Location: Beaumont 314
Office Hours: W 13:00 - 16:00 or by request

Catalog Description

This is an introductory special topics course on current computing trends in robotic applications, including basic Machine Learning (ML), the use of PyTorch, embedded ML for control applications, and the use of Deep Learning (DL) for control.

Tentative References

Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow 3rd Edition
by Aurélien Géron ISBN-13: 978-1-098-12597-4

Machine Learning with PyTorch and Scikit-Learn
by Sebastian Raschka et al ISBN-13: 978-1-80181-931-2

Intro to ML for Robotics Applications by Adrian Rosebrock
www.pyimagesearch.com/start-here/

Deep Learning for Robotics, Intel
www.intel.com/content/www/us/en/developer/learn/course-deep-learning-robotics.html

Objectives

1. To expand Python skills in the machine learning and robotics disciplines.
2. To develop machine learning and deep learning understanding with respect to robotic applications.
3. To develop techniques for applying and simulating ML and DL systems in the robotic applications space.

Your Responsibilities

Reading Assignments
Reading assignments will be assigned for each class.

Programming Assignments
There will be weekly programming assignments.

Quizzes
There will be occasional short in-class quizzes.

Projects
There will be midterm and final projects in lieu of in-class exams.

Grading

Grades will be computed as follows:

Programming Assignments 35%	Assigned regularly, due in 1-2 weeks
Quizzes 15%	In class from time to time
Midterm Exam 25%	Exam covering in-class topics and coding
Final Project 25%	Student-proposed ML-heavy project

Final grades will be converted to letters as follows:

Average	Letter
93 – 100	A
90 – 92.99	A-
87 – 89.99	B+
83 – 86.99	B
80 – 82.99	B-
77 – 79.99	C+
73 – 76.99	C
70 – 72.99	C-
67 – 69.99	D+
60 – 66.99	D
< 60	F

Academic Integrity

Always give credits to your sources. If you have any doubts ask the instructor before you submit your work, it is too late after it has been submitted. Each instance of academic dishonesty will result in both a zero for the assignment and a full letter grade reduction in the course grade.

It is expected that all students enrolled in this class support the letter and the spirit of the Academic Honesty Policy as stated in the college catalog.

Accommodations

It is the policy of the College that any student requiring accommodations of any kind to fully access this course must be registered for accommodations with the Student Support Services office located in the Angell College Center.

If you need any accommodations for this course, please contact Student Support Services at (518) 564-2810.

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Daily Schedule

Tentative class schedule is as follows. Check for up-to-date information on the Moodle.

Week	Class	Date	Topic
1	1	T 1/31	Student discussions, background, possibilities
	2	R 2/2	Python Background and Intro to ML
2	3	T 2/7	Classifiers
	4	R 2/9	
3	5	T 2/14	Regression
	6	R 2/16	
4	7	T 2/21	Neural Networks
	8	R 2/23	
5	9	T 2/28	Image Processing
	10	R 3/2	
6	11	T 3/7	Intro to ML for Robotics Applications
	12	R 3/9	
7	BREAK	T 3/14	
	BREAK	R 3/16	
8	13	T 3/21	
	14	R 3/23	
9	15	T 3/28	Midterm Exam
	16	R 3/30	
10	17	T 4/4	Deep Learning for Robotics
	18	R 4/6	
11	19	T 4/11	
	20	R 4/13	
12	21	T 4/18	
	22	R 4/20	
13	23	T 4/25	Special Topics and Wrap-up
	24	R 4/27	
14	25	T 5/2	
	26	R 5/4	Final Project Discussion
15	27	T 5/9	Final Project Discussion
	28	R 5/11	Final Project Discussion
Final Week		TBD	Final Projects Due