

CECS-590-01/CECS-590-51

Introduction to Deep Learning Algorithms and Methods

Spring 2020

Instructors:

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Office Hours: Tuesday, Friday 3:00 pm – 4:00 pm, or Available by appointment

Text Books:

1. Chollet, F. (2017). Deep learning with python. Manning Publications Co.

Course Description:

Deep Learning is part of the Artificial Intelligence and Machine Learning techniques. The main advantage from Deep Learning is that allows to obtain representations from data and media without the need of the manual introduction of features or rules. Thus it constitutes a flexible framework to learn from data. This course presents the basic concepts and applications from Deep Learning Techniques, from the mathematical concepts to real world applications.

Course Objectives:

At the end of the semester the successful student will be able to:

1. Understand the fundamentals of Deep Learning Techniques.
2. Handling data (text, image, audio, etc) to prepare it for Machine Learning applications.
3. Understand the basic mathematical concepts that support Deep Learning techniques.
4. Identify and use different Deep Learning architectures depending on the task and data type
5. Design and Implement and report results obtained from Machine Learning
6. Methods
7. Evaluate meaningful state of the art literature.

Grading, Assignments, Exams, and Policy:

1. Assignments: You will be given 4 assignments. These assignments will be distributed as 1 programming assignments, 1 mathematical modeling assignment, 1 data interpretation and reporting and 1 analysis and report from state of the art articles. These assignments constitute the **40%** of your grade, each assignment corresponds to the **10%**. All assignments must be submitted via blackboard and in the specified format. **Assignments submitted by email won't be accepted. Assignment dates in the calendar below are tentative.**

2. There will be one final project that will represent the **60%** of your grade. On this project you should solve a real problem from a public dataset. There will be 2 revisions during the term and a final presentation. Each revision constitutes the **15%** and the final presentation the **30%**.

4. The grading scale is as follows:

100 = A+,
99.99 - 90.00 = A,
89.99 - 85.00 = B+,
84.99 - 80.00 = B,
79.99 - 75.00 = C+,
74.99 - 70.00 = C,
69.99 - 65.00 = D+,
64.99 - 60.00 = D and
59.99 - 0 = F

4. There won't be grading curve.

Collaboration and Cheating Policy:

Students are encouraged to cooperate in studying and to learn from each other or seeking knowledge from a variety of sources such as journals, magazines, or the web. However, **all submitted assignments must be original and the result of the individual's own work**. Cheating or copying of assignments or exams will not be tolerated and will be pursued.

Title IX/Clery Act Notification:

Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain **confidential** support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).

Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is **not confidential** under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.

For more information, see <http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure>

Calendar:

Week	Class Date	Topic	Chapter	Assignment Post	Due
1	1	Getting Started	1, 2		
	2	What is Deep Learning		Python Review and Practice	
2	3	ANN Mathematical Blocks		Experiment with ANN	
	4	ANN Mathematical Blocks			
3	5	ANN Mathematical Blocks	3	Math Blocks Assignment	
	6	Hands-on Deep Learning			
4	7	Hands-on Deep Learning			
	8	Hands-on Deep Learning			
5	9	Hands-on Deep Learning	4	Project Assignment	
	10	Selection, Tuning and Evaluation		First Review	
6	11	Selection, Tuning and Evaluation		Second Review	
	12	Selection, Tuning and Evaluation		Final	
7	13	Selection, Tuning and Evaluation	5, 6, 7		
	14	Interpreting your results		Data Interpretation	
8	15	DL Applications			
	16	DL Applications			
9	17	DL Applications			
	18	DL Applications			
	March 9-15	Spring Break			
10	19	Expanding your Data Set	8		
	20	Expanding your Data Set			
11	21	Expanding your Data Set		Expand and Tune Model	
	22	DL Discussions			
12	23	DL Discussions			
	24	DL Discussions		Analysis of Deep Learning Paper	
13	25	Conclusions	9		
	26	Conclusions			
14	27	Conclusions			
	28	Review of Projects			
RD	Tuesday, April 21	Reading Day			
Final	April 22-28	Final Projects			