IISc 2020
CSA 250: Deep Learning Course Syllabus
M W 11:00-12:30pm

Description:

Machine learning approaches that are based on multiple layers of latent variables have come to be known as deep learning. Students will learn concepts, architectures and implementations underlying deep learning practice and deep learning research. Topics include feedforward networks, generalization capability, optimization, architectures (convolutional networks, recurrent neural networks), representation learning, generative models (variational and adversarial networks) and practical implementation issues.

Student Expectations:

1. Students will be required to implement four projects using deep learning frameworks such as Tensorflow/Keras or Pytorch.
2. Students will be expected to study the materials that will be discussed in class that day. The topics for each week are described at the end of the course syllabus. Each lecture will conclude with either a practicum or a quiz on the topic of the week.

Prerequisites:

An introductory course on Machine Learning, with a syllabus such as http://www.cedar.buffalo.edu/~srihari/CSE574

Course Materials:

The principal reading material are the lecture slides posted in Piazza. They are selections from a more complete set at: http://www.cedar.buffalo.edu/~srihari/CSE676

Some details are also available in the textbook: Goodfellow, Bengio and Courville, Deep Learning, MIT Press, 2016.

Instructor: Sargur N. Srihari Email: srihari@iisc.ac.in
TAs: Anirban Biswas (anirbanb@iisc.ac.in) Office Hours: T Th 4-5pm
Lokesh N. (lokeshn@iisc.ac.in) Office Hours: M W 4-5pm
Aditya Challa (aditya.challa.20@gmail.com) Office Hours T Th 3-4pm

Course Details

1. You are expected to attend all lectures and to complete all readings ahead of the lectures. Students should sign up for Piazza at the URL: piazza.com/iisc.ernet.in/spring2020/csa250. Any updated lecture slides will be posted there prior to class.
2. Please read department policy on academic dishonesty; this will be enforced strictly.

Important Dates:

January 6	First Day of Class
January 27	Project 1 Due
February 25	Project 2 Due
March 25	Project 3Due
April 15	Project 4 Due
	Last Lecture

Grading:

Quizzes	30%
Projects (4)	40%
Final exam	30%

COURSE SYLLABUS/SCHEDULE

Lecture Dates	Readings*	Topics	Lecturer	Deliverables
Week 1	Chapter 1	Introduction	SNS	
Week 2	Chapters 2,3,4	Prob Theory, Linear Algebra Numerical Computation	SNS	
Week 3	Chapter 5	ML Basics	SNS	
			TAs	Project 1 Due
Week 4	Chapters 6	Deep Feedforward Networks	SNS	
		Backpropagation	SNS	
Week 5	Chapter 7	Regularization	SNS	
Week 6	Chapter 8	Optimization	SNS	Project 2 Due
Week 7	Chapter 9	CNNs	SNS	
	Chapter 10	RNNs		
Week 8	Chapters 11	Practical Methodology	SNS	
Week 9	Chapters 12	Applications	SNS	
Week 10	Chapters 13,14	Linear Factor Models	SNS	Project 3 Due
		Autoencoders		
Week 11	Chapter 15,16	Representation Learning	SNS	
		Structured Prob. Models in DL		
Week 12	Chapter 17	MonteCarlo Methods	SNS	
Week 13	Chapters 20,22	Deep Gen Models (GANs)	SNS	
				Project 4 Due
Week 14				

* Readings are from lecture slides.