Course Logistics

Deep Generative Models

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My Introduction

Personal Info

- Assistant Professor at Electronics Research Institute.
- My Office: Room 206, Second floor, Electronics Research Institute
- Email: s_amini@sharif.edu

Research Field

- Trustworthy machine learning
- Generative modeling
- Speech and audio processing

Head Assistants

Figure: Borna Khodabandeh
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Figure: Amir Abbas Afzali
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Course Timeline

Number	Date	Tpoics	Coursework	Deadline
1	1404-07-19	L00 - Logistics		
2	1404-07-21	L01 - Introduction and Foundations		
3	1404-07-26	L01 - Introduction and Foundations		
4	1404-07-28	L02 - Deep Autoregressive Models	HW1 Release (L01 to L02)	
5	1404-08-03	L02 - Deep Autoregressive Models		
6	1404-08-05	L02 - Deep Autoregressive Models		
7	1404-08-10	L03 - Variational Autoencoders		
8	1404-08-12	L03 - Variational Autoencoders		HW1
9	1404-08-17	L03 - Variational Autoencoders	HW2 Release (L03)	
10	1404-08-19	L03 - Variational Autoencoders		
11	Makeup Class 1	L04 - Normalizing Flow Models		
12	1404-08-24	L04 - Normalizing Flow Models	HW3 Release (L04)	
13	1404-08-26	L04 - Normalizing Flow Models		
14	1404-09-01	L05 - Generative Adversarial Nets		HW2
15	Makeup Class 2	L05 - Generative Adversarial Nets		
16	1404-09-08	L05 - Generative Adversarial Nets	HW4 Release (L05)	HW3
17	1404-09-10	L05 - Generative Adversarial Nets		
18	1404-09-15	L06 - Energy-based Models		
19	1404-09-17	L06 - Energy-based Models		
20	1404-09-22	L06 - Energy-based Models	HW5 Release (L06)	HW4
21	1404-09-24	L06 - Energy-based Models		
22	Makeup Class 3	L07 - Diffusion Models		
	1404-09-29	Midterm		
23	1404-10-01	L07 - Diffusion Models		
24	1404-10-06	L07 - Diffusion Models	HW6 Release (L07 to L09)	HW5
25	1404-10-08	L07 - Diffusion Models		
26	1404-10-15	L07 - Diffusion Models		
27	1404-10-20	L08 - Inverse Problems		
28	1404-10-22	L08 - Inverse Problems		
29	1404-10-29	L09 - Evaluation Methods		

Syllabus Overview

Objectives

- Foundational understanding of deep generative models
- Working with different types of generative models suitable for different types of modalities
- Training and optimization procedures
- Real-world applications

Prerequisites

First: We will have ~ 2 sections to quickly review some prerequisites in Probability and Statistics. The prerequisites are:

- Probability and Statistics
- Linear Algebra
- Machine Learning and Deep Learning

Syllabus Overview

Others

- Presentations are tailored toward the theory
- Homeworks: Theory Part + [Programming Part (Toy Datasets)] + [Programming Part]
- The Programming part is skewed toward image-related tasks.

This course is NOT

- Introduction to deep learning
- Introduction to Probability and Statistics
- General purpose graphical generative models

Grade Distribution

Activity	Percentage
Project	20
Homeworks	30
Midterm	20
Final	30

Course Policies

Extra Credit

Extra credit will be assigned to **active** class participation (up to 5%).

Course Attendance

Attendance is essential for learning objectives in this course due to the extensive material we'll cover. However, there's no formal attendance mandate.

Course Policies

Late Submissions

- You can use a total of 10 permissible late days for all homework assignments.
- You can use a maximum extension of 3 days for any single homework.
- Assignment grade reduces by 0.95 compounding factor for each day overdue beyond allowed late days.
- Solutions released 3 days post-deadline; homework not accepted afterward.

Academic Honesty Statement

Academic Honesty Statement

- Please avoid academic dishonesty including:
  - Cheating
  - Fabrication
  - Plagiarism
  - Facilitating Dishonesty
- Sanctions for acts of academic dishonesty.
- Make sure to contact me whenever you have questions regarding *Academic Honesty*

Academic Honesty Statement

Cheating

- The course graders, TA and me are so strict about cheating so:

  Don't Try Us Please!

- Missing a question, homework or even dropping the course is a much better way than cheating and accepting the risk.
- Pay attention! If you look at the solution on the web or your friend's homework, your mind is biased toward those writing and you are at the risk of being identified as a cheater.
- Just search or talk with your classmates about high-level ideas.
- All homework series, midterms and final will be precisely checked for possible cheating.

Course Materials

Books

- Murphy, K. P. (2023). *Probabilistic machine learning: Advanced topics.* MIT press.
- Bishop, C. and Bishop, H. (2023). *Deep Learning: Foundations and Concepts.* Springer.
- Tomczak, J. M. (2022). *Deep Generative Modeling.* Springer.

Online Courses

- Ermon, S. (2023). *Deep Generative Models [CS236].* Stanford University.
- Abbeel, P. and Chen, P. and Ho, J. and Srinivas, A. (2020). *Deep Unsupervised Learning [CS294-158-SP20].* University of California, Berkeley.

LMS and Contacting Me

Learning Management Systems

For this course, we will use:

- *CW* for course materials, contacting us (me and TAs) and gradings.

Contacting Me

- Office hours: Sunday - 14 to 15 PM (Please coordinate with me through email.)
- If the office hours do not work for you, please send me an email to arrange another time if possible.