EE P 568 A Au 23: Deep Learning For Big Visual Data

Class:

Monday, 6:00–9:50 PM, ECE 037. Classes are only offered in person.

Prerequisite:

Graduate Standing. Prior coursework in machine/deep learning is not required, but a background in image processing, computer vision, linear algebra, and statistical data analysis is helpful. It assumes some programming experience, though a tutorial on basic Python and usage of Pytorch will be provided.

Course Description:

The goal of this course is to introduce students to the important Foundation of Deep Learning Theories and Laboratory Components, and practical big visual IoT data applications; What Deep Learning is, Why it has become so ubiquitous, and How it relates to concepts and terminology such as Artificial Intelligence, Machine Learning, and Artificial Neural Network. Building on this foundation, practical references and tutorials for applying a wide spectrum of proven deep-learning techniques will be offered. Essential theory is covered with useful mathematics and is illuminated with hands-on Python code.

Instructor:

Prof. Jenq-Neng Hwang, (hwang@uw.edu)

Office Hours (Mon. 2:00-5:00 pm): EEB M426 or Join
URL: https://washington.zoom.us/j/91396763564Links to an external site.

TAs:

Andy Cheng

TA Office Hours (Fri. 10:00 am-12:00 pm, Sat. 10:00 am-12:00 pm) on Zoom:

Fri.: https://washington.zoom.us/j/96569496126Links to an external site.
Sat.: https://washington.zoom.us/j/94430883704Links to an external site.

Hsiang-Wei Huang

TA Office Hours (Wed 10:00 am-12:00 pm, Thur 10:00 am-12:00 pm) on Zoom:

Wed.: https://washington.zoom.us/j/98421263331Links to an external site.
Thur.: https://washington.zoom.us/j/98821296338Links to an external site.

Lecture Notes & Homework Assignments:

You can find lecture notes in lecture notes. Assignments with due dates will be posted in Homeworks.

Grading Policy:

Homework is assigned biweekly. The overall grade for the class is accumulated from the scores of five homework (100%).

The grade for the class is assigned at the end of the quarter after the final homework is graded. All missing work is awarded zero points, so be sure to turn it in on time. The written work is expected to be neat (handwritten/typing): illegible work will not be graded. Answers to problems without supporting work or solutions will receive no credit.

Homework Policy:

You are encouraged to cooperate while doing homework, but you are expected to complete the homework on your own and to write the solutions in your own words, and not contain pieces taken verbatim from elsewhere.

Materials:

There is no required textbook for this course. Several optional materials are listed below:

- Deep Learning Book: https://www.deeplearningbook.org/Links to an external site..
- Deep Learning with Pytorch: https://pytorch.org/tutorials/beginner/deep_learning_60min_blitz.htmlLinks to an external site.
- PyTorch Official Tutorial: https://pytorch.org/tutorials/Links to an external site..

Topics & Schedule

Contents	Time
Basics of Machine Learning, Python, Colab Tutorial	1 week
Traditional Supervised Machine Learning and Applications	1 week
Multilayer Perceptrons and Backpropagation Learning	1 week
Convolution Neural Networks and Pytorch Tutorial	1 week
Practical Applications of CNNs (few shot, face ID, LTR, UDA)	1 week
Image Object Detection and Multi-Object Tracking	1 week
Image Segmentation and Human Pose Estimation	1 week
Radar and Lidar Applications	1 week
Transformers for Large Language Models and Visual Applications	1 week
Generative Adversarial Networks and Diffusion Models for Image Generation	1 week