

Course Title: Deep Learning

An Institute Elective Course (UG3 / UG4)

By: Dr. Snehasis Mukherjee

Course Level: L1

L-T-P-C: 3 - 1 - 0 - 4

Pre-requisite: Data Structure, Basic Probability/Statistics, a good working knowledge of any programming language (python, matlab, C/C++), Linear algebra, Machine Learning.

1. Outline: Nowadays, the amount of data is growing exponentially. Most of the big IT companies like Google, Microsoft, Amazon, Facebook, etc. are working over various aspects of data analysis techniques to process and handle the data efficiently. In this scenario, deep learning techniques are showing promising efficiency in processing and classifying several kinds of data, ranging from image, video to audio, text, language and many more.

2. Objectives: The goal of deep learning course is to provide a hands on knowledge on applying deep learning techniques to handle large data. **This is a project-based course**, in which student will implement the deep learning algorithms.

3. Course Outline (Topics): The following list of topics is tentative. Based on available time slots, some topics may be dropped or added or reordered.

Overview of Deep Learning techniques: Deep forward network, Regularization, Optimization, CNN, RNN, Methodology, Applications

Advanced topics: Autoencoders, Probabilistic models for deep learning, Generative models

4. Books/References:

Ian Goodfellow et al., Deep Learning, MIT Press.

5. Grading Policy:

Assignments and term project should include explanatory/clear comments as well as a short report describing the approach, detailed analysis, and discussion/conclusion. Note that the grading policy may change based on the number of registration in the course.

15% Mid-Exam-1

15% Mid-Exam-2

30% End-Exam

15% Assignments/Quizzes

25% Term Project

7. Industry Impact:

Most of the big IT companies like Google, Microsoft, Amazon, Facebook, etc. are working over various aspects of data analysis based on deep learning techniques. Many startups also came up in recent years in this domain. Deep learning also has very strong relevance in Robotics, AI and Industrial Automation. It can be utilized very effectively in smart manufacturing. Followings are the Most relevant Applications of deep learning in Industries: Automotive, Retail, Financial Services, Healthcare, surveillance, smart cities and many more.

8. List of Companies Working On Related Topics:

The major IT companies like NVIDIA, Google, Microsoft, Amazon, Facebook, etc. are working on deep learning. The general topics of interest include image recognition, object detection, image segmentation, face recognition, medical image analysis, biometric systems, smart manufacturing, robotics, healthcare, smart transportation, speech processing, NLP, etc.

Course Plan Submitted By

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