

Intro to Deep Learning Class Syllabus

Description

Artificial Intelligence serves numerous applications in our everyday lives. Deep Learning, a subset of Artificial Intelligence, has proven promising for many applications, including language translation, autonomous driving, medical diagnosis, art generation, and much more. In this class, we will examine neural networks, the fundamental algorithm behind most Deep Learning models.

Through learning Gradient Descent, backpropagation, and doing a hands-on project, you will gain valuable stepping stones which you can use to try out your own Deep Learning projects.

Because we will be using Google Colab, you will need a Google account. We will dive into the mathematics behind Deep Learning, so it is recommended that you have taken Algebra or an equivalent. Additionally, it would be helpful if you had some programming experience, but this is not necessary.

Logistics

- Tuition: \$90
- Duration: 6 weeks
- Class Times: Thursday, 4:30 pm to 6:00 pm
- Classes Start Date: Thursday, June 17
- Homework: A typical week's homework will include review problems relating to the topics taught in class.

Intro to Deep Learning Class Syllabus

Class 1
Introduction
<ul style="list-style-type: none">• What is Deep Learning?
<ul style="list-style-type: none">• Applications of Deep Learning
<ul style="list-style-type: none">• Deep Learning v.s. Other Machine Learning Algorithms
<ul style="list-style-type: none">• Linear Regression

- Computing the Hypothesis

- Linear Regression Cost Function

- Parameter Update

- Gradient Descent

Class 2

- Logistic Regression

- Logistic Regression Hypothesis

- Applications of Logistic Regression

- Logistic Regression Cost Function

- Neural Networks

- Neural Network Hypothesis

Class 3

Vectorization

- A Vector

- A Matrix

- Vectorization

Class 4

- Finish Vectorization (from Class 3)

- Parameter Update Formulas

Introduction to Python, NumPy, and Matplotlib

- Basics of Python

- Data Types

- Defining Variables

○ Printing Outputs
○ Operations with Integers
○ Slicing through String and Lists
○ Conditions
○ If, Elif, and Else Statements
○ For Loops
○ While Loops
● NumPy Arrays
○ Defining Vectors and Matrices
○ Operations with NumPy Arrays
○ Size and Shape of an Array
○ Accessing Elements of an Array
○ Special NumPy Arrays
○ Statistics of an Array
○ Transpose of an Array
Class 5
● Finish Basics of Python and NumPy Arrays (from Class 4)
● Plotting with Matplotlib
Hands-on Implementation
● Implementation Part I
○ Google Colab Setup
○ Importing Data
○ Linear Regression Hypothesis Function

- Linear Regression Cost Function

- Linear Regression Parameter Update

- Linear Regression Gradient Descent

- Logistic Regression Hypothesis Function

- Logistic Regression Cost Function

- Logistic Regression Parameter Update

- Logistic Regression Gradient Descent

Class 6

- Implementation Part II

- Finish Logistic Regression Implementation (from Class 5)

- Neural Network Hypothesis Function

- Neural Network Cost Function

- Neural Network Parameter Update

- Neural Network Gradient Descent

- Q&A and Class Feedback