Foundations of Deep Learning

Learning Objectives:
Learn about the basics on which Deep Learning has been constructed
Topics Covered:

- Loss function
- Cross entropy
- K-nearest neighbour algorithm
- Minimizing the error - Regression problem

Hands-on: No hands-on

Neural Networks Basics

Learning Objectives:
Learn the basics of neural networks and understand the biological inspiration behind the same. Learn to use vectorization to speed up your models. Learn to build a neural network with one hidden layer, using forward propagation and backpropagation. Understand the key computations underlying deep learning, use them to build and train deep neural networks, and apply it to computer vision.Hands-on session on a real-life case study.
Topics Covered:

- What is Neural Network?
- The Biological Inspiration
- Multilayer Perceptrons
- Gradient Descent
- Vectorization
- Shallow Neural Networks
- Activation Functions
- Back Propagation Algorithm
- Deep L-layer neural network
- Forward Propagation in a Deep Network
- Case Study: Neural Networks

Hands-on:
The dataset lends itself to a some very interesting visualizations. One can look at simple things like how prices change over time, graph and compare multiple stocks at once, or generate and graph new metrics from the data provided. From these data informative stock stats such as volatility and moving averages can be easily calculated. Can you develop a model that can beat the market and allow you to make statistically informed trades? Using Base Neural Network and Neural Network with Hidden layers, Activation function, Solver and Learning Rate , predict close value of stock.

Introduction to Deep Learning

Learning Objectives:
Understand industry best-practices for building deep learning applications. Learn to effectively use the common neural network "tricks", including initialization, L2 and dropout regularization, Batch normalization, gradient checking. Be able to implement and apply a variety of optimization algorithms, such as mini-batch gradient descent, Momentum, RMSprop and Adam, and check for their convergence.Learn Keras for Classification and Regression in Typical Data Science Problems. Learn about different layers in KERAS and set it up. Hands-on session on a real-life case study.

Topics Covered:

- Hyperparameters tuning
- Batch Normalization
- Optimization algorithms
- Deep Learning frameworks
- Weight initialization
- Deep Learning architecture
- Introducing Keras
- Artificial Neural Networks (ANN)
- Case Study: Artificial Neural Networks (ANN)

Hands-on:
Apply Deep Learning framework - Keras to create a Neural Network, train models and monitor the same.Project research will be aimed at the case of customers' default payments in Taiwan. From the perspective of risk management, the result of predictive accuracy of the estimated probability of default is proven to be more valuable than the binary result of classification - credible or not credible clients.

Computer Vision

Learning Objectives:
Learn to implement the foundational layers of CNNs (pooling, convolutions) and to stack them properly in a deep network to solve multi-class image classification problems.

Topics Covered:

- Convolutional Neural Networks (CNN)
- Building blocks of CNN
- Image Processing using CNN
- Pre processing and semantic segmentation
- Object localization and detection
- Introducing Tensorflow
- Case Study: Convolutional Neural Networks (CNN) using TensorFlow

Hands-on: No Hands-on

Object Detection

Learning Objectives:
Learn how to apply your knowledge of CNNs to one of the toughest but hottest field of computer vision: Object detection.

Topics Covered:

- Object localization
- Object detection
- Feature Extraction

Hands-on: No Hands-on

TensorFlow

Learning Objectives:
Get introduced to TensorFlow, a library. Learn to build a Neural Networks using Tensorflow. Hands-on session on a real-life case study

Topics Covered:

- Introducing Tensorflow
- Case Study: Convolutional Neural Networks (CNN) using TensorFlow

Hands-on:
Apply Deep Learning framework - TensorFlow to create a Neural Network and train models and monitor the same. Work on a project involving handwriting digit recognition using CNN with TensorFlow. This project will help build a model using Convolutional Neural Networks to recognize handwriting.

Sequence Models

Learning Objectives:
Learn about recurrent neural networks. This type of model has been proven to perform extremely well on temporal data. It has several variants including LSTMs, GRUs and Bidirectional RNNs, which you are going to learn about in this section. Hands-on session on a real-life case study.

Topics Covered:

- Recurrent Neural Networks (RNN)
- Backpropagation through time
- Different types of RNNs
- Language model and sequence generation

- Gated Recurrent Unit (GRU)
- Long Short Term Memory (LSTM)
- Bidirectional RNN
- Deep RNNs
- Case Study: Recurrent Neural Networks (RNN)

Hands-on:
A time series is a sequence taken at successive equally spaced points in time. Thus it is a sequence of discrete-time data. Using Long-Short Term-Memory (LSTM) build a time series model to forecast the future values

Natural Language Processing (NLP)

Learning Objectives:
Learn to use word vector representations and embed layers to train recurrent neural networks with outstanding performances in a wide variety of industries. Examples of applications are sentiment analysis, named entity recognition and machine translation. Hands-on session on a real life case study.

Topics Covered:

- Syntax and Parsing Techniques
- Statistical NLP and text similarities
- Text summarization techniques
- Real-Life Case Study

Hands-on:
Stock market prediction has been an interesting research topic for many years. Finding an efficient and effective means of studying the market perceptions found its way in different social networking platforms such as Twitter. With proper tools and the help of technology, meaningful and precious information can be gathered, analyzed, and utilized in different areas like in the movement and performance of the stock market.