Deep Learning (with Keras & TensorFlow)

Duration: 5 Days

Course Outlines:

Section 1 - Deep Learning with Tensor Flow

Lesson 1 - Welcome
- Welcome!
- Learning Objectives

Lesson 2 - Introduction to Tensorflow
- Introduction to TensorFlow
- TF2x and Eager Execution
- Tensorflow Hello World
- Linear Regression with Tensorflow
- Logistic Regression with Tensorflow
- Intro to Deep Learning
- Deep Neural Networks

Lesson 3 - Convolutional Networks
- Intro to Convolutional Networks
- CNN for Classifications
- CNN Architecture
- Understanding Convolutions
- CNN with MNIST Dataset

Lesson 4 - Recurrent Neural Network
- The Sequential Problem
- The RNN Model
- The LSTM Model
- LTSM Basics
- Applying RNNs to Language Modeling
- LSTM Language Modelling

Lesson 5 - Restricted Boltzmann Machines (RBM)
- Intro to RBMs
- Training RBMs
- RBM with MNIST

Lesson 6 - Autoencoders
- Intro to Autoencoders
- Autoencoder Structure
- Autoencoders

Section 2 - Deep Learning with Keras and Tensor Flow

Lesson 1 - Course introduction
- Introduction

Lesson 2 - AI and Deep learning introduction
- What is AI and Deep learning
- Brief History of AI
- Recap: SL, UL and RL
- Deep learning: successes last decade
- Demo & discussion: Self driving car object detection
- Applications of Deep learning
- Challenges of Deep learning
- Demo & discussion: Sentiment analysis using LSTM
- Fullcycle of a deep learning project

Lesson 3 - Artificial Neural Network
- Biological Neuron Vs Perceptron
- Shallow neural network
- Training a Perceptron
- Demo code: Perceptron (linear classification) (Assisted)
- Backpropagation
- Role of Activation functions & backpropagation
- Demo code: Backpropagation (Assisted)
- Demo code: Activation Function (Unassisted)
- Optimization
- Regularization
- Dropout layer
- Lesson-end Project (MNIST Image Classification)

Lesson 4 - Deep Neural Network & Tools
- Deep Neural Network: why and applications
- Designing a Deep neural network
- How to choose your loss function?
- Tools for Deep learning models
- Keras and its Elements
- Demo Code: Build a deep learning model using Keras (Assisted)
- Tensorflow and Its ecosystem
- Demo Code: Build a deep learning model using Tensorflow (Assisted)
- TFlearn
- Pytorch and its elements

Lesson 5 - Deep Neural Net optimization, tuning, interpretability
- Optimization algorithms
- SGD, Momentum, NAG, Adagrad, Adadelta, RMSprop, Adam
- Batch normalization
- Demo Code: Batch Normalization (Assisted)
- Exploding and vanishing gradients
- Hyperparameter tuning
- Interpretability

Lesson 6 - Convolutional Neural Network
- Success and history
- CNN Network design and architecture
- Demo code: CNN Image Classification (Assisted)
- Deep convolutional models

Lesson 7 - Recurrent Neural Networks
- Sequence data
- Sense of time
- RNN introduction
- LSTM (retail sales dataset kaggle)
- Demo code: Stock Price Prediction with LSTM (Assisted)
- Demo code: Multiclass Classification using LSTM (Unassisted)
- Demo code: Sentiment Analysis using LSTM (Assisted)
- GRUs
- LSTM Vs GRUs

Lesson 8 - Autoencoders
- Introduction to Autoencoders
- Applications of Autoencoders
- Autoencoder for anomaly detection
- Demo code: Autoencoder model for MNIST data (Assisted