Getting started with TensorFlow

Learning Objectives:

In this module, you will learn the basic concepts of Machine Learning (ML) and Deep Learning (DL). You will start off with a brief introduction to ML and then move on to DL, which is a branch of ML based on a set of algorithms that attempt to model high-level abstractions in data.

Topics:

- A soft introduction to ML
- Artificial neural networks
- ML versus DL
- DL neural network architectures
- Available DL frameworks

Hands-on: No hands-on

Overview of TensorFlow

Learning Objectives:

This module will help you learn and write Python code using Deep Learning framework - TensorFlow. You will learn to use TensorFlow to visualize computations through Tensorboards.

Topics:

- TensorFlow computational graph
- TensorFlow code structure
- TensorFlow data model
- Visualizing computations through TensorBoard
- Linear regression and beyond

Hands-on:
Write Python code using Deep Learning framework - Use TensorFlow to visualize computations through Tensorboards.

Feed-forward neural networks with TensorFlow

Learning Objectives:

This module will teach you to implement a layered neural network. You will also learn about hyperparameter tuning and dropout optimization in an FFNN.

Topics:

- Implementing a feedforward network
- Implementing a multilayer perceptron
- Tuning hyperparameters and advanced FFNN

Hands-on:
Implement a layered Neural Network using TensorFlow.

Convolutional Neural Network (CNN)

Learning Objectives:

Learn how to build convolutional networks and use them to classify images (faces, melanomas, etc.) based on objects that appear in them. Also understand how to use these networks to learn data compression and image denoising and learn about CNN using TensorFLow through a real Life Case Study.

Topics:

- Main concepts in CNN
- CNN in action
- Fine tuning implementation
- Case Study on CNN

Hands-on:

Handwriting digit recognition using CNN with TensorFlow. This project will help build a model using Convolutional Neural Networks to recognize handwriting.
Design and train convolutional neural network models to classify images using TensorFlow & Keras.

Optimizing TensorFlow Autoencoders

Learning Objectives:

In this module you will learn how an autoencoder works and implement the same. You will also learn to improve the robustness of autoencoder.In this module you will learn how an autoencoder works and implement the same. You will also learn to improve the robustness of autoencoder.
Topics:

- How does an autoencoder work?

- How to implement an autoencoder
- Improving autoencoder robustness
- Building denoising autoencoders
- Convolutional autoencoders

Hands-on : No Hands-on

Recurrent Neural Networks

Learning Objectives:

Build your own recurrent networks and long short-term memory networks with Keras and TensorFlow; perform sentiment analysis and generate new text. Learn RNN using TensorFLow with a real Life Case Study.

Topics:

- Working principles of RNNs
- RNNs and the gradient vanishing-exploding problem
- LSTM networks
- Implementing an RNN
- Case Study on RNN

Hands-on: Implement RNN using Keras.
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.

Heterogeneous and Distributed Computing

Learning Objectives:
You will Explore the fundamental topic on TensorFlow considering the possibility of executing TensorFlow models on GPU cards and distributed systems.
Topics:

- GPU computing
- The TensorFlow GPU setup
- Distributed computing
- The distributed TensorFlow setup

Hands-on:
Hands-on practice in setting up a TensorFlow GPU.

Recommendation Systems Using Factorization Machines

Learning Objectives:

In this module you will learn about the theoretical background of recommendation systems, such as matrix factorization, about UBCF and how is it used in Recommender Engines. You will also learn concepts like cold-start problems, about IBCF and how it is used in Recommender Engines. The module covers the use of Factorization Machines (FMs) and improved versions of them to develop more robust recommendation systems. You will also study about Recommender Systems with a real Life Case Study.

Topics:

- Recommendation systems
- User-Based Collaborative Filtering
- Item-Based Collaborative Filtering
- FM-based recommendation systems
- Case Study on Recommender Systems

Hands-on:
You do not need a market research team to know what your customers are willing to buy. Netflix successfully used recommender system to recommend movies to its viewers. As estimated by Netflix, its recommendation engine is worth nearly $1 billion.

An increasing number of online companies are using recommendation systems to increase user interaction and benefit from the same. Build a Recommender System for a Retail Chain to recommend the right products to its users.