

Artificial Intelligence & Machine Learning & Deep Learning with TensorFlow

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Python(FREE)

In our Artificial Intelligence & Machine Learning & Deep Learning Training, you will be able to learn the basic concepts of TensorFlow, the main functions, operations and the execution pipeline. Starting with a simple “Hello Word” example, throughout the course you will be able to see how TensorFlow can be used in curve fitting, regression, classification and minimization of error functions. This concept is then explored in the Deep Learning world. You will evaluate the common, and not so common, deep neural networks and see how these can be exploited in the real world with complex raw data using TensorFlow. In addition, you will learn how to apply TensorFlow for backpropagation to tune the weights and biases while the Neural Networks are being trained. Finally, the course covers different types of Deep Architectures, such as Convolutional Networks, Recurrent Networks.

Goal: In this course, you’ll get knowledge about Artificial Intelligence, Machine Learning, Deep Learning and understand how Deep Learning solves real world problems. This will going to be the totally project - based learning and research oriented. ***You will get the knowledge about how to write research papers and present in conferences.***

Module-0 : Prerequisites -Python

Goal: In this module, you’ll get a complete knowledge of python and it’s libraries which are going to be used in better understanding in problem solving of Deep Learning and Machine Learning.

Topics:

- Getting Started with python
- Data Types and Variables
- Operators
- Structural Data Types-Lists, Tuples, Strings & Dictionaries
- Conditional Code
- Loops and Iterations
- Functions
- Files I/O
- Accessing Web Data

Module-1 : Python Libraries for Data Science

Topics:

- Python Libraries for Data Scientists-
 - Numpy
 - Scipy
 - Pandas
 - Scikit-learn
 - Matplotlib
 - Seaborn
- Reading Data; Selecting and Filtering the Data; Data manipulation, sorting, grouping, rearranging
- Plotting the data

- Descriptive statistics
- Inferential statistics

Module-2 : Machine Learning

- **The Math behind Machine Learning: Linear Algebra**
 - o Scalars
 - o Vectors
 - o Matrices
 - o Tensors
 - o Hyperplanes
- **The Math Behind Machine Learning: Statistics**
 - o Probability
 - o Conditional Probabilities
 - o Posterior Probability
 - o Distributions
 - o Samples vs Population
 - o Resampling Methods
 - o Selection Bias
 - o Likelihood
- **Algorithms of Machine Learning**
 - o Regression
 - o Classification
 - o Clustering
 - o Reinforcement Learning
 - o Underfitting and Overfitting
 - o Optimization

Module-3 : Introduction to Deep Learning

- Deep Learning: A revolution in Artificial Intelligence
- Limitations of Machine Learning
- What is Deep Learning?
- Advantage of Deep Learning over Machine learning
- 3 Reasons to go for Deep Learning
- Real-Life use cases of Deep Learning

Module-4 Understanding Fundamentals of Neural Networks using Tensorflow

Goal: In this module, you'll get an introduction to Neural Networks and understand it's working i.e. how it is trained, what are the various parameters considered for its training and the activation functions that are applied.

Topics:

- How Deep Learning Works?
- Activation Functions
- Illustrate Perceptron
- Training a Perceptron
- Important Parameters of Perceptron

- What is Tensorflow?
- Tensorflow code-basics
- Graph Visualization
- Constants, Placeholders, Variables
- Creating a Model
- Step by Step - Use-Case Implementation

Module-5 Deep Dive into Neural Networks using Tensorflow

Goal: In this module, you'll understand backpropagation algorithm which is used for training Deep Networks. You will know how Deep Learning uses neural network and backpropagation to solve the problems which Machine Learning cannot.

Topics:

- Understand limitations of A Single Perceptron
- Understand Neural Networks in Detail
- Illustrate Multi-Layer Perceptron
- Backpropagation – Learning Algorithm
- Understand Backpropagation – Using Neural Network Example
- MLP Digit-Classifer using TensorFlow
- TensorBoard
- Summary

Module-6 Master Deep Networks

Goal: In this module, you'll get started with the TensorFlow framework. You will understand how it works, its various data types & functionalities. You will learn to create an image classification model.

Topics:

- Why Deep Learning?
- SONAR Dataset Classification
- What is Deep Learning?
- Feature Extraction
- Working of a Deep Network
- Training using Backpropagation
- Variants of Gradient Descent
- Types of Deep Networks

Module-7 Convolutional Neural Networks (CNN)

Goal: In this module, you'll understand convolutional neural networks and its applications. You will understand the working of CNN, and create a CNN model to solve a problem.

Topics:

- Introduction to CNNs
- CNNs Application
- Architecture of a CNN

- Convolution and Pooling layers in a CNN
- Understanding and Visualizing a CNN
- Transfer Learning and Fine-tuning Convolutional Neural Networks

Module-8 Recurrent Neural Networks (RNN)

Goal: In this module, you'll understand Recurrent Neural Networks and its applications. You will understand the working of RNN, how LSTM are used in RNN, what is Recursive Neural Tensor Network Theory, and finally you will learn to create a RNN model to solve a problem.

Topics:

- Intro to RNN Model
- Application use cases of RNN
- Modelling sequences
- Training RNNs with Backpropagation
- Long Short-Term memory (LSTM)
- Recursive Neural Tensor Network Theory
- Recurrent Neural Network Model

Module-9 Restricted Boltzmann Machine(RBM) and Autoencoders

Goal: In this module, you'll understand RBM & Autoencoders along with their applications. You will understand the working of RBM & Autoencoders, illustrate Collaborative Filtering using RBM and understand what are Deep Belief Networks.

Topics:

- Restricted Boltzmann Machine
- Applications of RBM
- Collaborative Filtering with RBM
- Introduction to Autoencoders
- Autoencoders applications
- Understanding Autoencoders

Module-10 Keras

Goal: In this module, you'll understand how to use Keras API for implementing Neural Networks, the goal is to understand various functions and features that Keras provide to make the task of neural network implementation easy.

Topics:

- Define Keras
- How to compose Models in Keras
- Sequential Composition
- Functional Composition
- Predefined Neural Network Layers
- What is Batch Normalization
- Saving and Loading a model with Keras

- Customizing the Training Process
- Using TensorBoard with Keras
- Use-Case Implementation with Keras

Module-11 TFlearn

Goal: In this module, you'll understand how to use TFlearn API for implementing Neural Networks, the goal is to understand various functions and features that TFlearn provide to make the task of neural network implementation easy.

Topics:

- Define TFlearn
- Composing Models in TFlearn
- Sequential Composition
- Functional Composition
- Predefined Neural Network Layers
- What is Batch Normalization
- Saving and Loading a model with TFlearn
- Customizing the Training Process
- Using TensorBoard with TFlearn
- Use-Case Implementation with TFlearn

Module-12 Computer Vision

Goal : In this module, you'll about classical image analysis techniques such as Edge detection, watershed, distance transformations using the OpenCV library .Here you'll explore the evolution of image analysis ,from classical deep learning techniques.

Objectives - At the end of this module, you should be able to:

- Introduction to computer vision and Image Processing
- Image processing using OpenCV
- Video processing and Image extraction using OpenCV
- Convolutional Features for visual recognition
- Object ,Face and Gestures Detection using Haar Cascade Classifier
- Object Tracking and Action Recognition

Module-13 Hands-On Project

Goal : In this module, you should learn how to approach and implement a Machine project end to end, the instructor from the industry will share his experience and insights from the industry to help you kickstart your career in this domain. At last we will be having a QA and doubt clearing session for the students.

Objectives - At the end of this module, you should be able to:

- How to approach a project
- Hands-On project implementation
- What Industry expects
- Industry insights for the Machine Learning domain
- QA and Doubt Clearing Session