

Tensorflow

Duration: 5 Days

Course Outlines:

Introduction

- Introduction to TensorFlow
- Architecture of Tensorflow
- Installation on Local Machine
- Using TensorFlow in Google Colab
- Working with Tensors and Operations
- Keras Low level api

Introduction to Artificial Neural Networks

- From Biological to Artificial Neurons
- Different activation functions
- What is perceptron?
- Multilayer perceptron and back propagation
- Working with sequential api
- Working with the functional api
- Using callbacks
- Tensorboard for visualization

Training Deep Neural Nets

- Challenges of Deep Neural Networks'
- Vanishing and Exploding gradients
- Glorot and He Initialization
- Non-Saturating Activation Functions
- Different activation functions effect on deep neural nets
- Batch normalization
- Reusing the pre-trained layers in Neural nets
- Faster optimizers
- L1 and L2 regularization
- Dropouts and their purposes

Loading and preprocessing the data

- The data api
- Chaining transformations
- Pre-processing the data
- TFR record format and compressed files
- Introduction to protocol buffer
- Processing the Input features
- TF transform
- Tensorflow datasets project

Computer Vision using CNN

- Inspiration to the CNN
- Architecture of CNN
- Convolution layers in CNN
- Filters in CNN
- Pooling layer in CNN
- Depth pooling in CNN
- Different architectures of CNN

Processing Sequences using RNN

- Single neuron RNN
- Working with RNN neural network
- Input and Output Sequences in RNN
- Introduction to Deep RNN
- Forecasting using RNN
- Unstable gradient problem
- Architecture of LSTM
- Architecture of GRU

Natural Language Processing

- Introduction to Natural Language processing
- Shakespear text generation using char RNN
- Stateless and stateful RNN
- Concept of sentiment analysis
- Encoder and Decoder Network for Neural Machine Translation
- Pre-processing required for encoder and decoder
- Concept of Beam Search
- Overview of attention mechanism

Representative Learning and Generative Learning using Autoencoders and GANs

- Introduction to Autoencoders and GAN
- Efficient data representation
- Dimensionality reduction using autoencoders
- Introduction to stacked autoencoders
- Training one autoencoder at a time
- Recurrent autoencoders
- Sparse autoencoders
- Generative adversarial networks
- Deep Convolutional GANs

Reinforcement Learning

- Introduction to reinforcement learning
- Learning to optimize rewards
- Policy Search
- Introduction to OpenAI Gym
- Neural Network Policies
- Credit Assignment Problem
- Markov Decision Process
- Q Learning
- Deep Q Learning

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