IT Certification Guru PVT.LTD

Deep Learning Syllabus 2019

About the Course

The goal of this course is to give learners basic understanding of modern neural networks and their applications in computer vision and natural language understanding. The course starts with a recap of linear models and discussion of stochastic optimization methods that are crucial for training deep neural networks. Learners will study all popular building blocks of neural networks including fully connected layers, Convolutional and Recurrent layers. Learners will use these building blocks to define complex modern architectures in TensorFlow and Keras frameworks. In the course project learner will implement deep neural network for the task of image processing which solves the problem of giving a text description for an input image.

Total Time - 40 hrs

Prerequisites

_ Fundamentals of Python Programming
_ Machine Learning algorithms and applications

Course Objectives

- Students will learn the fundamentals of deep learning, and the main research activities in this field.
- Students will learn to implement, train, and validate their own neural network, and they will improve their understanding of the on-going research in computer vision and multimedia field.
- Student will have access to the current technologies used to implement the deep learning algorithms.

Course Structure

1 Deep Learning Course

1.1 Introduction to Deep Learning

Min Time - 4 hrs

1.1.1 Introduction
1.1.2 Artificial Intelligence vs. Machine Learning vs. Deep Learning
1.1.3 Objectives of Deep Learning
1.2 Google Tensorflow

Min Time - 8 hrs

1.2.1 What are Tensors?
1.2.2 Introduction to Tensorflow
1.2.3 Computational Graph
1.2.4 Creating a graph
1.2.5 Gradient Descent
1.2.6 Tensorboard
1.2.7 Introduction to Keras
1.2.8 Keras datatypes
1.3 Perceptron

Min Time - 4 hrs

1.3.1 Introduction to Perceptron
1.3.2 McCulloch-Pitts Model
1.3.3 Rosenblatt's Perceptron Algorithm
1.3.4 Artificial Neural Networks
1.3.5 XOR Gate
1.4 Activation Function

Min Time - 4 hrs

1.4.1 Introduction to Activation Functions
1.4.2 Sigmoid Function
1.4.3 ReLU Function
1.4.4 Softmax Function
1.5 Gradient Descent and Optimization

Min Time - 4 hrs

1.5.1 Stochastic Gradient Descent
1.5.2 Backpropagation
1.5.3 Drawbacks of ANN
1.6 Optimization and Regularization

Min Time - 4 hrs

1.6.1 Feature Selection
1.6.2 Overfitting
1.6.3 Regularization
1.6.4 Hyperparameters
1.7 Convolutional Neural Neytworks

Min Time - 4 hrs

1.7.1 Introduction
1.7.2 Steps to create a CNN
1.7.3 Applications of CNN
1.8 Recurrent Neural Neytworks

Min Time - 6 hrs

1.8.1 Sequence to Sequence Networks
1.8.2 LSTM
1.8.3 Applications of RNN
1.9 Applications of Deep Learning

Min Time - 2 hrs

1.9.1 Image Processing
1.9.2 Image Captioning
1.9.3 Video Analysis