

Deep Learning with Python, TensorFlow, and Keras

Description

This course provides fundamentals of deep learning concepts and models are provided by means of the Keras and TensorFlow and it details how deep learning models work and which tools can be used for deep learning development. Throughout the course, students will learn the applications of deep learning models in the areas of supervised learning, transfer learning, reinforcement learning and unsupervised learning.

Entry-level programming knowledge is required for participation in the course.

Delegates will learn

- Basic Deep Learning Architecture
- Convolutional Neural Networks
- Recurrent Neural Networks
- Transfer Learning – Reinforcement Learning
- Unsupervised Learning

Outline

Basic Deep Learning Architecture

- Why everybody talks about Deep Learning and AI?

- Amazing Examples of Deep Learning
- Overview of Machine Learning Basics
- Perceptron and Biological Inspirations
- What is Artificial Neural Network?
- Feedforward Artificial Neural Network Architecture
- Deep Artificial Neural Network Architectures
- Nonlinear Activation Functions
- Loss functions
- Lion Tamer: Backpropagation and Gradient Descent
- Overview of Keras and TensorFlow
- Keras basics: Layers and Sequential Models
- Visualization with TensorBoard

Convolutional Neural Networks

- Representation Learning and ANN
- Image Data and Computer Vision Difficulties
- Feature Engineering and Deep Learning Models
- Convolution Process
- Deep Convolutional Neural Network (CNN) Architectures
- Overfitting and Regularization
- Overfitting and Regularization of Convolutional Neural Networks
- MaxPooling, Dropout
- Model Training Techniques: Stochastic Gradient Descent and Mini Batch
- What does CNN learn? CNN Visualization
- CNN Implementation with Keras

Recurrent Neural Networks

- ANN, CNN and Sequence Data
- Time as a sequence
- Recurrent Neural Network Architectures
- Vanishing and Exploding Gradient Problem
- Long-Short Term Memory (LSTM) Models
- What does LSTM learn?
- Catastrophic Forgetting
- Alternative RNN Models
- Text Translation and Encoder - Decoder Structure
- LSTM Implementation with Keras

Transfer Learning - Reinforcement Learning

- Deep Learning Models and Data Finding Problem
- Artificial Intelligence and Removing Human Intervention
- What is Transfer Learning?
- Transfer Learning Application in Image Processing with Keras
- Transfer Learning Application in Text Classification with Keras
- Towards Artificial General Intelligence
- What is Reinforcement Learning?
- Deep Learning Models and Reinforcement Learning
- Dynamic Programming and Q-Learning
- Q-Learning Application with Keras and TensorFlow (We play Atari!)

Unsupervised Learning

- Deep Learning as Unsupervised Modeling Tool
- Autoencoder and Dimension Reduction
- Autoencoder and Data Denoising
- Variational Autoencoder
- Variational Autoencoder with Keras
- Game Theory and Generative Adversarial Networks (GAN)
- GAN and Statistical Distribution Modeling
- GAN and Artistic Deep Learning Applications
- GAN Application (Generating Human face) with Keras and TensorFlow

Prerequisites

Entry-level programming knowledge is required for participation in the course.