KOENIG
step forward

KOENIG SOLUTIONS · COURSE OUTLINE

Deep Learning Course (with Keras & TensorFlow)

Learn to build and tune deep learning models with TensorFlow and Keras, from neural networks to CNNs, RNNs and autoencoders.

14
MODULES

86
TOPICS

COURSE OVERVIEW

This course introduces TensorFlow and the foundations of deep learning, covering linear and logistic regression before moving into deep neural networks, convolutional networks and recurrent networks including LSTMs. It continues with restricted Boltzmann machines and autoencoders, then revisits artificial and deep neural networks using Keras and TensorFlow, including activation functions, backpropagation, optimisation and regularisation. Later modules address optimisation algorithms, batch normalisation, hyperparameter tuning and interpretability, followed by convolutional neural networks, recurrent networks with GRUs, and autoencoders for applications such as anomaly detection.

WHO THIS COURSE IS FOR

- **Data Scientists**
- **Machine Learning Engineers**
- **AI Developers**
- **Software Developers**
- **Data Analysts**

LEARNING OBJECTIVES

- Explain core concepts of deep learning and its applications
- Implement linear and logistic regression with TensorFlow
- Build deep neural networks using Keras and TensorFlow
- Apply convolutional networks for image classification tasks
- Develop recurrent networks such as LSTM and GRU models
- Analyse optimisation algorithms including Adam and RMSprop
- Describe restricted Boltzmann machines and their training
- Implement autoencoders for tasks such as anomaly detection

COURSE SYLLABUS

14 Modules, 86 Topics

Section 1 - Deep Learning with Tensor Flow

01

Welcome

TOPICS

Welcome! · Learning Objectives

02

Introduction to Tensorflow

TOPICS

Introduction to TensorFlow · TF2x and Eager Execution · Tensorflow Hello World · Linear Regression With Tensorflow · Logistic Regression With Tensorflow · Intro to Deep Learning · Deep Neural Networks

03

Convolutional Networks

TOPICS

Intro to Convolutional Networks · CNN for Classifications · CNN Architecture · Understanding Convolutions · CNN with MNIST Dataset

04

Recurrent Neural Network

TOPICS

The Sequential Problem · The RNN Model · The LSTM Model · LTSM Basics · Applying RNNs to Language Modeling · LSTM Language Modelling

05

Restricted Boltzmann Machines (RBM)

TOPICS

Intro to RBMs · Training RBMs · RBM with MNIST

06

Autoencoders

TOPICS

Intro to Autoencoders · Autoencoder Structure · Autoencoders

Section 2 - Deep Learning with Keras and Tensor Flow

01

Course Introduction

TOPICS

Introduction

02

AI and Deep Learning Introduction

TOPICS

- What is AI and Deep learning
- Brief History of AI
- **Recap:** SL, UL and RL
- **Deep learning:** successes last decade
- **Demo & discussion:** Self driving car object detection
- Applications of Deep learning
- Challenges of Deep learning
- **Demo & discussion:** Sentiment analysis using LSTM
- Fullcycle of a deep learning project
- Key Takeaways
- Knowledge Check

03

Artificial Neural Network

TOPICS

- Biological Neuron Vs Perceptron
- Shallow neural network
- Training a Perceptron
- **Demo code:** Perceptron (linear classification) (Assisted)
- Backpropagation
- Role of Activation functions & backpropagation
- **Demo code:** Backpropagation (Assisted)
- **Demo code:** Activation Function (Unassisted)
- Optimization
- Regularization
- Dropout layer
- Key Takeaways
- Knowledge Check
- Lesson-end Project (MNIST Image Classification)

04

Deep Neural Network & Tools

TOPICS

- **Deep Neural Network:** why and applications
- Designing a Deep neural network
- How to choose your loss function?
- Tools for Deep learning models
- Keras and its Elements
- **Demo Code:** Build a deep learning model using Keras (Assisted)
- Tensorflow and Its ecosystem
- **Demo Code:** Build a deep learning model using Tensorflow (Assisted)
- TFlearn
- Pytorch and its elements

05

Deep Neural Net Optimization, Tuning, Interpretability

TOPICS

- Optimization algorithms
- SGD, Momentum, NAG, Adagrad, Adadelta, RMSprop, Adam
- Batch normalization
- **Demo Code:** Batch Normalization (Assisted)
- Exploding and vanishing gradients
- Hyperparameter tuning
- Interpretability

06

Convolutional Neural Network

TOPICS

- Success and history
- CNN Network design and architecture
- **Demo code:** CNN Image Classification (Assisted)
- Deep convolutional models

07

Recurrent Neural Networks

TOPICS

- Sequence data
- Sense of time
- RNN introduction
- LSTM (retail sales dataset kaggle)
- **Demo code:** Stock Price Prediction with LSTM (Assisted)
- **Demo code:** Multiclass Classification using LSTM (Unassisted)
- **Demo code:** Sentiment Analysis using LSTM (Assisted)
- GRUs
- LSTM Vs GRUs

08

Autoencoders

TOPICS

- Introduction to Autoencoders
- Applications of Autoencoders
- Autoencoder for anomaly detection
- **Demo code:** Autoencoder model for MNIST data (Assisted)

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

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