**Artificial Intelligence for Text and NLP**

**Title:** Artificial Intelligence AI for Text and NLP

**Duration:** 3 Days

**Pre-requisite:**

* Python experience
* Basic understanding of Machine Learning

**Audience:**

This course is designed for Software Architects, Developers, Data Engineer, Data Analyst and Machine Learning Engineer.

**Short Description:**

Most of the data collected these days are unstructured. A large and vital part of this unstructured data is in a text format. AI and Deep Learning techniques enable the use of text for a wide range of applications including language understanding and translation. This course will teach you how to build models for text, natural language and other sequence data.

**Long Description:**

Most of the data collected these days are unstructured. A large and vital part of unstructured data is in a text format. AI and Deep Learning techniques enable the use of text for a wide range of applications including language understanding and translation. This course will teach you how to build models for text, natural language and other sequence data. You will learn how to build Recurrent Neural Networks, (RNNs) and variants such as Long Short-Term Memory (LSTMs), to apply sequence models to various problems such as natural language processing (NLP). You will implement these models from the ground up using Keras/TensorFlow. You will learn Keras/TensorFlow by initially building a shallow neural network, and then sequentially building various Deep Learning architectures, with a focus on building sequence models which specialize in exploiting text and language data. Much of what you’ll learn is done through hands-on exercises.

**Learning Objectives:**

After this course, you will be able to:

* Compare AI vs ML vs DL
* Understand TensorFlow and Keras
* Understand sequence algorithms
* Understand Recurrent Neural Networks (RNN)
* Understand use cases for Recurrent Neural Networks
* Understand RNN variants such as Long short-term memory (LSTM)
* Discuss text and language processing applications for AI
* Do natural language processing (NLP)
* Do sentiment analysis
* Understand the fundamental techniques through AI Demos and hands-on labs

**Topic Outline:**

Course Introduction

Compare AI vs ML vs DL

Introduction to neural networks

The math behind neural networks

Activation functions

Vanishing gradient problem and ReLU

Loss functions

Gradient descent

Back propagation

Understanding the intuition behind neural networks

Introducing Perceptrons

Single Layer linear classifier

Step Function

Updating the weights

Linear separability and XOR problem

Hidden Layers: Intro to Deep Neural Networks and Deep Learning

Hidden Layers as a solution to XOR problem

The architecture of deep learning

Introducing Keras/TensorFlow

What is Keras?

Using Keras with a TensorFlow Backend

Lab: Using Keras to implement a neural network

Introducing TensorFlow

TensorFlow intro

TensorFlow Features

TensorFlow Versions

GPU and TPU scalability

Lab: Setting up and Running TensorFlow

The Tensor: The Basic Unit of TensorFlow

Introducing Tensors

TensorFlow Execution Model

Lab: Learning about Tensors

Recurrent Neural Networks in Keras/TensorFlow

Introducing RNNs

RNNs in TensorFlow

Lab: RNN

Long Short-Term Memory (LSTM) in TensorFlow

Text processing elements

TF-IDF

Word2vec

Tokenizers, n-grams

Stopword removal

Sentiment analysis

Text processing pipelines

Natural Language Processing

What is NLP?

Sensory Acuity

Behavioral Flexibility

NLP Techniques

NLP and Deep Learning

Word2vec

Learning word embedding

The Skip-gram Model

Building the graph

Training the model

Visualizing the embeddings

Optimizing the implementation

Text classification with TensorFlow

Automatic translation (seq2seq)

Text generation with RNN

Named entity extraction with RNNs (sequence modeling)

Bidirectional LSTM with attention

Natural Language Processing pipelines

Conversational AI

Introduction to the Rasa framework

Generating natural language

Understanding natural language

Chatbots

References and Next steps

**Structured Activity/Exercises/Case Studies:**

* Keras Hands-on
* TensorFlow Hands-on
* Using TensorFlow to create an RNN
* Sentiment analysis project
* Natural Language Processing project

**Training material provided:** Yes (Digital format)