**Artificial Intelligence for Text and NLP**

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

**Duration:** 3 Days

**Pre-requisite:**

* Basic knowledge of command line Linux editors (VI / nano)
* Basic understanding of Machine Learning
* Python experience as applied to the Data Science/Machine Learning space

**Audience:**

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

**Short Description:**

Most of the data collected these days are unstructured data and mainly in text format. To make sense of this data special techniques using Big Data and Artificial Intelligence. With the rise of assists like Alexa, Siri and Google Home, Natural Language Processing (NLP) has become critical to make interactions between human and machine. Artificial Intelligence for text and NLP gives them a practical level of experience, achieved through a combination of about 50% lecture, 50% demo work with student’s participation.

**Long Description:**

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Artificial Intelligence and Machine Learning course helps in awareness about AI & Machine Learning patterns and use cases in real world. Along the way, you’ll get an understanding of Machine Learning and Artificial Intelligence concepts. Demystify the difference between AI vs ML vs DL along with usage patterns. You would expand your vocabulary in the AI to understand techniques like Classification, Clustering and Regression. Finally, we would do a AI hands-on to illustrate tools for text and NLP processing and next steps.

**Learning Objectives:**

After this course, you will be able to:

* Compare AI vs ML vs DL
* Understand TensorFlow and Keras
* Discuss how to identify which kinds of technique to be applied for specific use case
* Understand CNN and RNN techniques
* Do natural language processing
* Do sentiment analysis
* Understand use cases for Recurrent Neural Networks
* Discuss text processing and NLP application for AI
* NLP Fundamentals and techniques
* Understand usage of tools through a AI Demo and hands-on labs.

**Topic Outline:**

Course Introduction

History and Background of AI and ML

Compare AI vs ML vs DL

Introduction to neural networks

The math behind neural networks

Back propagation

Understanding the intuition behind neural networks

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

Introducing Perceptrons

Single Layer Linear Perceptron Classifier With TensorFlow

Linear Separability and Xor Problem

Activation Functions

Softmax output

Backpropagation, loss functions, and Gradient Descent

Lab: Single-Layer Perceptron in TensorFlow

Hidden Layers: Intro to Deep Learning

Hidden Layers as a solution to XOR problem

Distributed Training with TensorFlow

Vanishing Gradient Problem and ReLU

Loss Functions

Lab: Feedforward Neural Network Classifier in TensorFlow

High-level Tensorflow: tf.learn

Using high-level TensorFlow

Developing a model with tf.learn

Lab: Developing a tf.learn model

Lab: CNN apps

Introducing Keras

What is Keras?

Using Keras with a Tensorflow Backend

Lab: Example with a Keras

Recurrent Neural Networks in 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

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

Linear models and SVM

Working with Unicode

Automatic translation (seq2seq)

Text generation with RNN

Named entity extraction with RNNs (sequence modeling)

Bidirectional LSTM with attention

Transformer architecture

Context-aware representations using pretrained language models (ELMo, BERT, ULMFiT)

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:**

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

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