Micro Engineering Certification Program

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING WITH HARDWARE IMPLEMENTATION

Course Summary

Course Duration	8 weeks (approximately 2-3hrs/week)
Resource Person	**Dr. Pramod Kumar Naik & Team**, Director AIEDGE Technologies Pvt Ltd Bangalore.
Purpose of the course	This course provides a comprehensive introduction and focuses on data analytics and machine learning techniques, practical deep learning using MATLAB®. The course demonstrates the use of unsupervised learning to discover features in large data sets and supervised learning to build predictive models. Attendees will learn how to create, train, and evaluate different kinds of deep neural networks. They will also learn how deploy algorithms on hardware like GPU and FPGAs **This course seeks to fill all those gaps** in knowledge that scare off beginners and simultaneously apply your knowledge of Data Science and Deep Learning to real-world business problems.
Pre-requisites	There are no pre-requisites to this course.

Note:

1. This course is completely done using online collaboration methods. A part of this can be done in classroom
2. This course can be further customized based on the requirements of NTT Data.
3. Idle participants strengths for this course is 20-50 students.

This course has a comprehensive syllabus that tackles all the major components of Data Science knowledge.

Week 1	Importing image and sequence data, using convolutional neural networks for image classification, regression, and other image applications, Using long short-term memory networks for sequence classification and forecasting, Modifying common network architectures to solve custom problems, Improving the performance of a network by modifying training options, Organizing and pre-processing data, Clustering data, Creating classification and regression models, Interpreting and evaluating models, Simplifying data sets, Using ensembles to improve model performance.
Week 2	**Introduction to Artificial Intelligence** Course Introduction, Fundamentals of MATLAB, Cell Data Type, Tables and Time Tables, Converting between Different Data Types, Acquire real time data with concepts of IOT, Handling Large Data Set.
Week 3	**Data Pre-processing for Machine Learning using MATLAB** Handing Missing Values, Feature Scaling and Data Discretization, Selecting the Right Method for your Data, Concepts of Machine Learning Vs Deep Learning.
Week 4	**Machine Learning Concepts Using MATLAB** Data Pre-processing, Classification, K-Nearest Neighbor, Naive Bayes, Decision Trees Support Vector Machine.
Week 5	**Machine Learning for Data Science Using MATLAB** Discriminant Analysis, Performance Evaluation, Clustering, K-Means Hierarchical Clustering
Week 6	**Deep Learning and Neural network** Deep learning and Neural network, Classification of cancer cells using neural network. Wine classification using neural network. Object classification using Alex net, GoogleNet, ResNet. Transfer learning.
Week 7	**Introduction to AIEgde devices.** **PYNQ HARDWARE** Introduction to the PYNQ, Architecture of PYNQ, PYNQ framework, PYNQ-Z2 board, Jupyter Notebook, Interface Overlays and Hardware designs Designing Overlays Demo with Jupyter Notebook and the board.
Week 8	**NVIDIA JETSON HARDWARE** Intro to Jetson Nano, Jetson Software , Application SDKs , Getting Started with Jetson Nano, Demo on Jetson Nano - Focused on AI