Certified Machine Learning Specialist (CMLS)

www.globalicttraining.com

DURATION

- 4 Days

COURSE OBJECTIVES

This specialist course on Machine Learning provides an overview of concepts, techniques, and algorithms. It covers topics such as classification and linear regression to more advanced topics such as boosting, ensemble methods, Support Vector Machines (SVM), Hidden Markov Model and Bayesian Networks

This course will introduce professionals to open source Machine Learning tools such as Rapidminer, WEKA, Jupyter notebook using packages like scikit-learn. Professionals attending the course will learn the different algorithms in some of most widely adopted Machine Learning methods such as Supervised Learning, Unsupervised Learning and Reinforcement Learning. Please refer to the attached course outline for detailed information of the course.

JOB ROLES IN NICF / TARGETED AUDIENCE

- AI Engineer
- Business Analyst
- Data Analyst
- Data Scientist
- IHL Students

PRE-REQUISITES

Participants are preferred to have some fundamental understanding / knowledge or programming

PROGRAM STRUCTURE

This is a 4-day intensive training program with the following assessment components.

Component 1. Written Examination
Component 2. Project Work Component

These components are individual based. Participants will need to obtain 70% in both the components in order to qualify for this certification. If the participant fails one of the components, they will not pass the course and have to re-take that particular failed component. If they fail both components, they will have to re-take the assessment.

COURSE STRUCTURE

Day 1	**Session 1 (9:00 – 10:30)**	**Session 2 (10:40 – 12:10)**	**Session 3 (13:10 – 16:10)**		**Session 4 (16:10 – 18:10)**
	Introduction and basic concepts in Machine learning	Introduction and basic concepts in Machine learning	Introduction to Theories used in Machine Learning		Supervised learning vs. Unsupervised learning
Day 2	**Session 1 (9:00 – 10:00)**	**Session 2 (10.10 – 12:10)**	**Session 3 (13:10 – 14:10)**	**Session 4 (14:10 – 17:10)**	**Session 5 (17:10 – 18:40)**
	Supervised learning vs. Unsupervised learning	Model selection in Machine learning	Model selection in Machine learning	Role of Weka in Machine Learning	Decision Tree and Rule mining using Weka
Day 3	**Session 1 (9:00 – 10:00)**	**Session 2 (10.10 – 12:10)**	**Session 3 (13:10 – 16:10)**	**Session 4 (16:10 – 18:40)**	
	Decision Tree and Rule mining using Weka	A Brief review on SciPy	Random Forest and Markov Decision Process algorithm	Google's Go Programming with k-nearest neighbour's algorithm	
Day 4	**Session 1 (9:00 – 10:30)**	**Session 2 (10:40 – 12:40)**	**Session 3 (13:40 – 14:40)**		**Session 4 (14:40 – 17:10)**
	Google's Go Programming with k-nearest neighbour's algorithm	C 5.0 based decision tree algorithm	C 5.0 based decision tree algorithm		CMLS examination

COURSE OUTLINE

Unit 1: Introduction and Concepts of Machine Learning

- Definition of machine learning systems
- Goals of machine learning
- Machine Learning vs Traditional Statistics
- Machine learning application and challenge

Unit 2: Supervised, Unsupervised and Reinforcement learning

- Supervised learning
- Linear regression
- Logistic regression
- Correlation matrix
- K-Nearest Neighbour
- Unsupervised learning
- k-means Clustering Algorithm
- Association rule
- Principal Component Analysis
- Reinforcement learning

Unit 3: Discriminative and Generative Algorithms

- Discriminative vs Generative Algorithms
- Naïve bayes

Unit 4: Neural Network- CNN, RNN, LSTM

- Convolutional neural network (CNN)
- Recurrent Neural Network (RNN)
- Long Short-Term Memory Network (LSTM)

Unit 5: Deep Learning-activation function and learning rate

- Introduction to deep learning
- Traditional Machine learning vs deep learning
- Activation function
- Loss function
- Learning rate

Unit 6: Model selection- hyperparameters and optimization techniques

- Hyperparameters and optimization techniques
- Gridsearch
- Pessimistic Biased
- Model selection for non-probabilistic methods
- Cross validation

Unit 7: Machine Learning using WEKA

- Introduction to WEKA
- How to install WEKA
- The Knowledge Flow interface
- The Command Line interface
- Classification Rules and association Rules
- Attribute Selection and Fast attribute selection using ranking

Unit 8: Decision Tree and Rule mining using WEKA

- ID3 based decision tree algorithm
- Entropy and Information gain
- ID3 implementation using WEKA
- Association rule mining using Frequent Pattern (FP) Growth algorithm
- FP-Tree structure
- FP-Growth Algorithm
- Implementation of FP-Growth using WEKA

Unit 9: Machine Learning with Python- TensorFlow, scikit-learn, Keras

- Introduction to tensor flow
- Tensor flow library
- Sklearn library
- Keras library
- API on Linear regression
- API on logistic regression
- API on random forest
- API on support vector machine (SVM)
- API on naïve bayes
- API on k-Nearest Neighbor (kNN)
- API on k-means Clustering Algorithm
- API on convolution Neural Network (CNN)
- API on local outlier
- API on deep learning auto decoder
- API on principal component analysis (PCA)

Unit 10: Hands on using RapidMiner

- Data preprocessing
- Correlation
- Association rules
- k-means Clustering Algorithm
- Linear regression
- Logistic regression
- Neural network
- Text miming

COURSE OUTCOME

• Acquire knowledge of AI and machine learning and how it could impact your work through several real-life use case

• Acquire knowledge about Machine Learning techniques/method: Supervised, Unsupervised & Reinforcement Learning through hands-on examples

• Acquire knowledge on Deep Learning-activation function and learning rate

• Gain a solid understanding of Discriminative and Generative Algorithms

• Gain a solid understanding of key ML concepts like Principle Component Analysis (PCA), Hyperparameter tuning, Clustering, Classification, Regression, Neural Network etc.

• Get hands-on experience in using RapidMiner, SCIPY, Spark MLlib, GO, TensorFlow

WRITTEN ASSESSMENT

As part of the written examination, each participant will be assessed individually on the last day of the training for their understanding of the subject matter and ability to evaluate, choose and apply them in specific context and also the ability to identify and manage risks. The assessment focuses on higher levels of learning in Bloom's taxonomy: Application, Analysis, Synthesis and Evaluation. This written examination will primarily consist of 40 multiple choice questions spanning various aspects as covered in the program. It is an individual, competency-based assessment.

EXAM PREPARATION

The objective of the certification examination is to evaluate the knowledge and skills acquired by the participants during the course. The weightage in key topics of the course as follows:

- Introduction and Basic Concepts of machine learning (10%)
- Supervised, Unsupervised and Reinforcement learning(10%)
- Discriminative and Generative Algorithms (10%)
- Neural Network- CNN, RNN, LSTM(10%)
- Deep Learning-activation function and learning rate (10%)
- Model selection- hyperparameters and optimization techniques (10%)
- Machine Learning using WEKA (10%)
- Decision Tree and Rule mining using WEKA (10%)
- Machine learning with Python- Tensor flow, sklearn, keras (10%)
- Hands on using RapidMiner (10%)

Tools/Software used:

- scikit-learn
- NumPy
- pandas
- SCIPY
- TensorFlow
- RapidMiner