IUFC23S: Intel Powered Foundation Course in Machine Learning

Intel-Unnati @ Saintgits

October, 2023

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Office Hours: M-F 12.30-1:30 pm
Class Hours: M-F 9.00 am-4:15pm
Contact No.: 9447609301
Lab Location: Administrative Block (2nd floor)

Lab Room: Hi-Tech Lab
Lab Hours: F 1.00 pm-4.30 pm

Course Overview

Intel Powered Foundation Course in Machine Learning Certification Program is a focused and hands-on training course designed for individuals interested in gaining a strong foundation in classical machine learning algorithms within the domains of supervised and unsupervised learning. This 60-hour certification program covers essential concepts, tools, and practical skills using Intel's OneAPI platform.

Target Audience

- Programmers, engineering students, and data scientists aiming to master classical machine learning techniques
- Technology enthusiasts interested in building a strong foundation in supervised and unsupervised learning using Intel's OneAPI.

Course Objectives

- Understand the core principles of classical machine learning, including supervised and unsupervised learning.
- Develop proficiency in Python programming for machine learning.
- Explore classical machine learning algorithms such as linear regression, decision trees, k-means clustering, and more.

- Learn how to leverage Intel's OneAPI for optimized machine learning computations. Gain practical experience in data preprocessing, model training and evaluation.
- Analyze and interpret model results and performance metrics.
- Obtain a recognized certification in Classical Machine Learning with Intel's OneAPI.

Course Outcomes

Upon successful completion of this certificate programme, the participant will be able to:

1. showcase a comprehensive understanding of classical machine learning algorithms, enabling them to select and apply appropriate techniques to real-world problems effectively.
2. achieve a high level of proficiency in Python programming, allowing them to efficiently manipulate and analyze data, develop machine learning models, and work seamlessly with Intel's OneAPI platform.
3. proficiently set up, configure, and utilize Intel's OneAPI platform for machine learning tasks, taking advantage of its optimized computing capabilities and efficient resource management.
4. skillfully train, optimize, and fine-tune machine learning models using Intel's OneAPI, ensuring that models are fine-tuned for optimal performance.
5. participants will effectively evaluate machine learning models using various performance metrics and proficiently deploy these models in a production environment, leveraging Intel's OneAPI for scalability and efficiency.

Prerequisites

- Basic programming knowledge (Python is recommended).
- Familiarity with mathematics, including linear algebra and statistics.
- Access to a computer with internet connectivity.

Course Structure

Syllabus

Module 1- Introduction to Machine Learning (4 Hours)
Understanding machine learning concepts,supervised vs. unsupervised learning, use cases and applications
Module 2-Python and Data Preparation for Machine Learning (6 Hours)
Python basics and libraries for machine learning, data preprocessing and feature engineering,

introduction to Intel's OneAPI.

Module 3- Supervised Learning (8 Hours)

Regression models- Linear regression, Classification models- logistic regression, decision trees, ensemble methods, and SVM, model training and optimization with OneAPI.

Module 4- Unsupervised Learning (6 Hours)

Clustering (k-means, hierarchical clustering),dimensionality reduction (PCA), anomaly detection.

Module 5- Model Evaluation and Deployment (6 Hours)

Performance metrics and evaluation techniques, Deployment strategies with Intel's OneAPI, Scaling for production.

Capstone Project (30 Hours)

Through this capstone project, the participants will gain hands-on experience in developing a practical machine learning solution using Intel's OneAPI for predictive maintenance. The project will demonstrate their ability to provide ML solutions in real-world scenarios, a valuable skill for a career in data science or machine learning engineering.

Assessment and Certification

This course will be executed in the form of an off-line hands-on training. There will be short quiz, assignments and final capstone project on selected themes. The participants with at least 75% score in the assessments will be eligible for the intel-unnati certificate in *Intel powered Foundation Programme in Machine Learning*.

Lab

The lab sessions will be in Intel OneAPI cloud platform.

Capstone Project

In this capstone project, participants will apply their knowledge of classical machine learning algorithms and leverage Intel's OneAPI to develop a predictive maintenance system for a manufacturing environment. The goal is to predict equipment failures before they occur, allowing for proactive maintenance and minimizing downtime.

Key Tasks

Data Collection and Pre-processing: Collect historical sensor data from manufacturing equipment and pre-process it to make it suitable for machine learning.

Feature Engineering: Identify relevant features from the sensor data to build predictive models.

Model Selection and Training: Select classical machine learning algorithms such as regression, decision trees, or support vector machines and train models on the prepared dataset.

Performance Evaluation: Evaluate model performance using appropriate metrics to ensure reliable predictions.

Integration with Intel's OneAPI: Incorporate Intel's OneAPI for efficient model training and inference.

Real-time Predictions: Implement the predictive model in a real-time environment to monitor equipment health continuously.

Deployment: Deploy the predictive maintenance system in the manufacturing facility to enable proactive maintenance.

Reporting and Alerts: Generate reports and alerts when the model predicts potential equipment failures.

Grading Policy

The typical CCE grading scale will be used. The organizers reserve the right to curve the scale dependent on overall class scores at the end of the course. Any curve will only ever make it easier to obtain a certain letter grade. The grade will count the assessments using the following proportions:

- **60%** of your grade will be determined by submission of course work sheets/Tasks (15% each).
- **10%** of your grade will be determined by performance in quiz/periodical assessment.
- **30%** of your grade will be determined by your end project report submission.

Course Policies

Attendance Policy

Attendance is expected in all hands-on and lab sections.

Policies on Incomplete Grades and Late Assignments

If an extended deadline is not authorized by the instructor or the course coordinator, an unfinished incomplete grade will automatically change to an F after proper notifications. 'Incompletes' that change to F will count as an attempted assignment on transcripts. The burden of fulfilling an incomplete grade is the responsibility of the participant.

Late assignments will be accepted for no penalty if a valid excuse is communicated to the instructor before the deadline. After the deadline, assignments will be accepted for a 50% deduction to the score up to 1 day after the deadline. After this any assignments handed in will be given 0.

Academic Integrity and Honesty

Participants are required to comply with the institution policy on academic integrity.