Course Name: Azure Data Scientist Professional Certification Course

Course Overview

The "Azure Machine Learning Studio Essentials" course introduces learners to building, training, and deploying machine learning models using Azure Machine Learning Studio. Participants will explore its intuitive interface, prebuilt tools, and robust features for creating end-to-end machine learning pipelines. The course covers topics like data preparation, feature engineering, model training, and deployment, with a hands-on approach to reinforce learning. By the end, participants will gain a strong foundation in leveraging Azure Machine Learning Studio for real-world AI solutions.

Course Type

Entry-Level

Course Objectives

1. Understand the features and workflow of Azure Machine Learning Studio.

2. Set up and navigate the Azure Machine Learning Workspace and Designer.

3. Learn data preprocessing and feature engineering techniques.

4. Create, train, and evaluate machine learning models using prebuilt tools.

5. Deploy machine learning models as web services on Azure.

6. Apply learned concepts to practical projects and scenarios.

What You'll Learn

- The basics of Azure Machine Learning Studio and its workspace setup.

- Preparing and exploring data for machine learning workflows.

- Building machine learning models with Azure's prebuilt tools and algorithms.

- Training and evaluating models using Azure ML Studio.

- Deploying trained models as web services for real-world applications.

- Managing experiments and pipelines within Azure ML Studio.

Duration

9 hours

Requirements

- Access to a Microsoft Azure account with Machine Learning Studio enabled.

- A laptop/desktop with internet connectivity to access Azure services.

Prerequisites

- Basic understanding of machine learning concepts and workflows.

- Familiarity with Python programming is helpful but not mandatory.

- Knowledge of cloud services basics is recommended.

Target Audience

- Beginners and aspiring data scientists looking to explore machine learning on Azure.

- IT professionals and developers interested in integrating AI solutions into projects.

- Business analysts aiming to understand how Azure ML can automate decision-making.

- Students preparing for certifications like Microsoft Certified: Azure AI Engineer Associate.

- Organizations exploring Azure Machine Learning Studio for scalable AI model deployment.

Curriculum

Module 1: Introduction to Azure Machine Learning Studio

- Overview of Azure Machine Learning Studio

 - Setting up an Azure Machine Learning Workspace

 - Introduction to the Azure Machine Learning Designer interface

 - Data exploration and data preparation within Azure ML

 - Using prebuilt algorithms and datasets

 - Creating and running experiments in Azure ML Studio

Project:

Set up an Azure ML workspace and run a basic experiment using builtin datasets.

Module 2: Data Preprocessing and Feature Engineering

- Importance of data preprocessing in machine learning

 - Data cleaning techniques: handling missing values, outliers, and duplicates

 - Data transformation: normalization, standardization, encoding categorical variables

 - Feature selection and feature extraction

 - Handling imbalanced datasets

 - Introduction to Azure ML data wrangling and transformation tools

Project:

Clean and preprocess a realworld dataset using Azure ML, including feature scaling and encoding.

Module 3: Building and Training Machine Learning Models

- Overview of supervised vs unsupervised learning algorithms

 - Training classification models: Logistic Regression, Decision Trees, SVM

 - Training regression models: Linear Regression, Random Forest Regressor

 - Model evaluation metrics: Accuracy, Precision, Recall, F1Score, ROC Curve

 - Crossvalidation and hyperparameter tuning using Azure ML

- Implementing ensemble methods (e.g., Random Forest, Gradient Boosting)

Project:

Build and train a classification model on a dataset, and evaluate it using crossvalidation.

Module 4: Model Evaluation and Tuning

 - Understanding overfitting and underfitting

 - Techniques to prevent overfitting: Regularization, Dropout, Pruning

 - Hyperparameter optimization using Azure ML's Hyperdrive

 - Model comparison and selecting the best model

 - Advanced metrics: Confusion Matrix, AUCROC, PrecisionRecall Curve

Project:

Perform hyperparameter tuning on a regression model using Azure ML Hyperdrive, then compare model performance.

Module 5: Deployment of Machine Learning Models on Azure

- Introduction to Azure ML deployment options (ACI, AKS)

 - Deploying models as web services (REST API) using Azure Container Instances (ACI)

 - Deploying models for production with Azure Kubernetes Service (AKS)

 - Integrating models with other Azure services (Azure Functions, Logic Apps)

 - Securing and managing ML models in production

 - Versioning and retraining models on Azure ML

Project:

Deploy a trained model as a web service using Azure ML and test predictions via API calls.

Module 6: Monitoring and Managing Model Performance

- Importance of monitoring ML models in production

 - Using Azure Monitor for tracking model performance

 - Monitoring model drift and accuracy decay

 - Logging and auditing models in Azure ML

- Implementing automated retraining pipelines

- Best practices for maintaining machine learning models in production

Project:

Set up model monitoring on a deployed Azure ML model, track predictions, and implement a retraining pipeline.

Assessment:

Final Project: Complete endtoend project where students build, train, deploy, and monitor a machine learning model on Azure. This will include preprocessing, model building, evaluation, deployment, and performance monitoring.