



DP-100T01 - Designing and Implementing a Data Science Solution on Azure

Course ID #: 1414-200-00-W

Hours: 28

Course Content

Course Description:

In this course, you will cover how to operate machine learning solutions at cloud scale using Azure Machine Learning. This course teaches you to leverage your existing knowledge of Python and machine learning to manage data ingestion and preparation, model training and deployment, and machine learning solution monitoring with Azure Machine Learning and MLflow.

Prerequisites:

Successful Azure Data Scientists start this role with a fundamental knowledge of cloud computing concepts, and experience in general data science and machine learning tools and techniques.

Specifically:

- Creating cloud resources in Microsoft Azure.
 - Using Python to explore and visualize data.
 - Training and validating machine learning models using common frameworks like Scikit-Learn, PyTorch, and TensorFlow.
 - Working with containers
- To gain these prerequisite skills, take the following free online training before attending the course:
- Explore Microsoft cloud concepts.
 - Create machine learning models.
 - Administer containers in Azure
- If you are completely new to data science and machine learning, please complete Microsoft Azure AI Fundamentals first.

Target Audience:

This course is designed for data scientists with existing knowledge of Python and machine learning frameworks like Scikit-Learn, PyTorch, and Tensorflow, who want to build and operate machine learning solutions in the cloud.



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Topics:

Lesson 1: Design a machine learning model training solution

- Design a data ingestion strategy for machine learning projects
 - Introduction
 - Identify your data source and format
 - Choose how to serve data to machine learning workflows
 - Design a data ingestion solution
 - Exercise: Design a data ingestion strategy
 - Knowledge check
 - Summary
- Design a machine learning model training solution
 - Introduction
 - Identify machine learning tasks
 - Choose a service to train a machine learning model
 - Decide between compute options
 - Exercise: Design a model training strategy
 - Knowledge check
 - Summary
- Design a model deployment solution
 - Introduction
 - Understand how model will be consumed
 - Decide on real-time or batch deployment
 - Exercise - Design a deployment solution
 - Summary
- Design a machine learning operations solution
 - Introduction
 - Explore an MLOps architecture
 - Design for monitoring
 - Design for retraining
 - Knowledge check
 - Summary

Lesson 2: Explore the Azure Machine Learning workspace

- Explore Azure Machine Learning workspace resources and assets
 - Introduction
 - Create an Azure Machine Learning workspace
 - Identify Azure Machine Learning resources
 - Identify Azure Machine Learning assets
 - Train models in the workspace
 - Exercise - Explore the workspace
 - Knowledge check
 - Summary
- Explore developer tools for workspace interaction
 - Introduction
 - Explore the studio
 - Explore the Python SDK
 - Explore the CLI
 - Exercise - Explore the developer tools
 - Knowledge check
 - Summary

Lesson 3: Work with data in Azure Machine Learning

- Make data available in Azure Machine Learning
 - Introduction
 - Understand URIs
 - Create a datastore
 - Create a data asset
 - Exercise - Make data available in Azure Machine Learning
 - Knowledge check
 - Summary



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Lesson 4: Work with compute in Azure Machine Learning

- Work with compute targets in Azure Machine Learning
 - Introduction
 - Choose the appropriate compute target
 - Create and use a compute instance
 - Create and use a compute cluster
 - Exercise - Work with compute resources
 - Knowledge check
 - Summary
- Work with environments in Azure Machine Learning
 - Introduction
 - Understand environments
 - Explore and use curated environments
 - Create and use custom environments
 - Exercise - Work with environments
 - Knowledge check
 - Summary

Lesson 5: Automate machine learning model selection with Azure Machine Learning

- Find the best classification model with Automated Machine Learning
 - Introduction
 - Preprocess data and configure featurization
 - Run an Automated Machine Learning experiment
 - Evaluate and compare models
 - Exercise - Find the best classification model with Automated Machine Learning
 - Knowledge check
 - Summary

Lesson 6: Use notebooks for experimentation in Azure Machine Learning

- Track model training in Jupyter notebooks with MLflow
 - Introduction
 - Configure MLflow for model tracking in notebooks
 - Train and track models in notebooks
 - Exercise - Track model training
 - Knowledge check
 - Summary

Lesson 7: Train models with scripts in Azure Machine Learning

- Run a training script as a command job in Azure Machine Learning
 - Introduction
 - Convert a notebook to a script
 - Run a script as a command job
 - Use parameters in a command job
 - Exercise - Run a training script as a command job
 - Knowledge check
 - Summary
- Track model training with MLflow in jobs
 - Introduction
 - Track metrics with MLflow
 - View metrics and evaluate models
 - Exercise - Use MLflow to track training jobs
 - Knowledge check
 - Summary
- Perform hyperparameter tuning with Azure Machine Learning
 - Introduction
 - Define a search space
 - Configure a sampling method
 - Configure early termination
 - Use a sweep job for hyperparameter tuning
 - Exercise - Run a sweep job
 - Knowledge check
 - Summary



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Lesson 8: Optimize model training with pipelines in Azure Machine Learning

- Run pipelines in Azure Machine Learning
 - Introduction
 - Create components
 - Create a pipeline
 - Run a pipeline job
 - Exercise - Run a pipeline job
 - Knowledge check
 - Summary

Lesson 9: Manage and review models in Azure Machine Learning

- Register an MLflow model in Azure Machine Learning
 - Introduction
 - Log models with MLflow
 - Understand the MLflow model format
 - Register an MLflow model
 - Exercise - Log and register models with MLflow
 - Knowledge check
 - Summary
- Create and explore the Responsible AI dashboard for a model in Azure Machine Learning
 - Introduction
 - Understand Responsible AI
 - Create the Responsible AI dashboard
 - Evaluate the Responsible AI dashboard
 - Exercise - Explore the Responsible AI dashboard
 - Knowledge check
 - Summary

Lesson 10: Deploy and consume models with Azure Machine Learning

- Deploy a model to a managed online endpoint
 - Introduction
 - Explore managed online endpoints
 - Deploy your MLflow model to a managed online endpoint
 - Deploy a model to a managed online endpoint
 - Test managed online endpoints
 - Exercise - Deploy an MLflow model to an online endpoint
 - Knowledge check
 - Summary
- Deploy a model to a batch endpoint
 - Introduction
 - Understand and create batch endpoints
 - Deploy your MLflow model to a batch endpoint7 min
 - Deploy a custom model to a batch endpoint9 min
 - Invoke and troubleshoot batch endpoints5 min
 - Exercise - Deploy an MLflow model to a batch endpoint10 min
 - Knowledge check3 min
 - Summary

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