

MOC 20774 A: Perform Cloud Data Science with Azure Machine Learning

Course Summary

Description

The main purpose of the course is to give students the ability to analyze and present data by using Azure Machine Learning, and to provide an introduction to the use of machine learning with big data tools such as HDInsight and R Services.

Objectives

After taking this course, students will be able to:

- Explain machine learning, and how algorithms and languages are used
- Describe the purpose of Azure Machine Learning, and list the main features of Azure Machine Learning Studio
- Upload and explore various types of data to Azure Machine Learning
- Explore and use techniques to prepare datasets ready for use with Azure Machine Learning
- Explore and use feature engineering and selection techniques on datasets that are to be used with Azure Machine Learning
- Explore and use regression algorithms and neural networks with Azure Machine Learning
- Explore and use classification and clustering algorithms with Azure Machine Learning
- Use R and Python with Azure Machine Learning, and choose when to use a particular language
- Explore and use hyperparameters, multiple algorithms, and models, and be able to score and evaluate models
- Explore how to provide end-users with Azure Machine Learning services, and how to share data generated from Azure Machine Learning models
- Explore and use the Cognitive Services APIs for text and image processing, to create a recommendation application, and describe the use of neural networks with Azure Machine Learning
- Explore and use HDInsight with Azure Machine Learning
- Explore and use R and R Server with Azure Machine Learning, and explain how to deploy and configure SQL Server to support R services

Topics

- Introduction to Machine Learning
- Introduction to Azure Machine Learning
- Managing Datasets
- Preparing Data for use with Azure Machine Learning
- Using Feature Engineering and Selection
- Building Azure Machine Learning Models
- Using Classification and Clustering with Azure machine learning models
- Using R and Python with Azure Machine Learning
- Initializing and Optimizing Machine Learning Models
- Using Azure Machine Learning Models
- Using Cognitive Services
- Using Machine Learning with HDInsight
- Using R Services with Machine Learning

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Course Summary (cont.)

Audience

The primary audience for this course is people who wish to analyze and present data by using Azure Machine Learning. The secondary audience is IT professionals, developers, and information workers who need to support solutions based on Azure machine learning.

Prerequisites

In addition to their professional experience, students who attend this course should have programming experience using R, and familiarity with common R packages. Students should have knowledge of common statistical methods and data analysis best practices. Basic knowledge of the Microsoft Windows operating system and its core functionality and working knowledge of relational databases is also required.

Duration

Five days

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Course Outline

I. *Introduction to Machine Learning*

This module introduces machine learning and discussed how algorithms and languages are used.

- A. What is machine learning?
- B. Introduction to machine learning algorithms
- C. Introduction to machine learning languages

Lab: Introduction to Azure Machine Learning

- Sign up for Azure machine learning studio account
- View a simple experiment from gallery
- Evaluate an experiment

II. *Introduction to Azure Machine Learning*

Describe the purpose of Azure Machine Learning, and list the main features of Azure Machine Learning Studio.

- A. Azure machine learning overview
- B. Introduction to Azure machine learning studio
- C. Developing and hosting Azure machine learning applications

Lab: Introduction to Azure Machine Learning

- Explore the Azure machine learning studio workspace
- Clone and run a simple experiment
- Clone an experiment, make some simple changes, and run the experiment

III. *Managing Datasets*

At the end of this module the student will be able to upload and explore various types of data in Azure machine learning.

- A. Categorizing your data
- B. Importing data to Azure machine learning
- C. Exploring and transforming data in Azure machine learning

Lab: Managing Datasets

- Prepare Azure SQL database
- Import data
- Visualize data
- Summarize data

IV. *Preparing Data for use with Azure Machine Learning*

This module provides techniques to prepare datasets for use with Azure machine learning.

- A. Data pre-processing
- B. Handling incomplete datasets

Lab: Preparing Data for Use with Azure Machine Learning

- Explore some data using Power BI
- Clean the data

V. *Using Feature Engineering and Selection*

This module describes how to explore and use feature engineering and selection techniques on datasets that are to be used with Azure machine learning.

- A. Using feature engineering
- B. Using feature selection

Lab: Using Feature Engineering and Selection

- Prepare datasets
- Use Join to Merge data

VI. *Building Azure Machine Learning Models*

This module describes how to use regression algorithms and neural networks with Azure machine learning.

- A. Azure machine learning workflows
- B. Scoring and evaluating models
- C. Using regression algorithms
- D. Using neural networks

Lab: Building Azure Machine Learning Models

- Using Azure machine learning studio modules for regression
- Create and run a neural-network based application

VII. *Using Classification and Clustering with Azure Machine Learning Models*

This module describes how to use classification and clustering algorithms with Azure machine learning.

- A. Using classification algorithms
- B. Clustering techniques
- C. Selecting algorithms

Lab: Using Classification and Clustering with Azure Machine Learning Models

- Using Azure machine learning studio modules for classification.
- Add k-means section to an experiment

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Course Outline (cont.)

- Add PCA for anomaly detection.
- Evaluate the models

VIII. *Using R and Python with Azure Machine Learning*

This module describes how to use R and Python with azure machine learning and choose when to use a particular language.

- Using R
- Using Python
- Incorporating R and Python into Machine Learning experiments

Lab: Using R and Python with Azure Machine Learning

- Exploring data using R
- Analyzing data using Python

IX. *Initializing and Optimizing Machine Learning Models*

This module describes how to use hyper-parameters and multiple algorithms and models, and be able to score and evaluate models.

- Using hyper-parameters
- Using multiple algorithms and models
- Scoring and evaluating Models

Lab: Initializing and Optimizing Machine Learning Models

- Using hyper-parameters

X. *Using Azure Machine Learning Models*

This module explores how to provide end users with Azure machine learning services, and how to share data generated from Azure machine learning models.

- Deploying and publishing models
- Consuming Experiments

Lab: Using Azure Machine Learning Models

- Deploy machine learning models
- Consume a published model

XI. *Using Cognitive Services*

This module introduces the cognitive services APIs for text and image processing to create a recommendation application, and describes the use of neural networks with Azure machine learning.

- Cognitive services overview
- Processing language
- Processing images and video
- Recommending products

Lab: Using Cognitive Services

- Build a language application
- Build a face detection application
- Build a recommendation application

XII. *Using Machine Learning with HDInsight*

This module describes how use HDInsight with Azure machine learning.

- Introduction to HDInsight
- HDInsight cluster types
- HDInsight and machine learning models

Lab: Machine Learning with HDInsight

- Provision an HDInsight cluster
- Use the HDInsight cluster with MapReduce and Spark

XIII. *Using R Services with Machine Learning*

This module describes how to use R and R server with Azure machine learning, and explain how to deploy and configure SQL Server and support R services.

- R and R server overview
- Using R server with machine learning
- Using R with SQL Server

Lab: Using R services with Machine Learning

- Deploy DSVM
- Prepare a sample SQL Server database and configure SQL Server and R
- Use a remote R session
- Execute R scripts inside T-SQL statements