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Course 20774A:

Perform Cloud Data Science with Azure Machine Learning

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⊖ About this course

Audience(s):   Data Professional

Technology: SQL Server

Level: 300

This Revision: A

Length: 5 days

Language(s):   English

First published: 16 June 2017

⊖ Overview

About this course

The main purpose of the course is to give students the ability to ~~~~~~~~~~
Azure Machine Learning, and to provide an introduction to the ~~~~~~~~~~~~~~~~~
tools such as HDInsight and R Services.

Audience profile

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.

At course completion

After completing 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 and 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

⊖ Course details

Course Outline

Module 1: Introduction to Machine Learning

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

Lessons

- What is machine learning?

- Introduction to machine learning algorithms

- Introduction to machine learning languages

Lab : Introduction to machine Learning

- Sign up for Azure machine learning studio account

- View a simple experiment from gallery

- Evaluate an experiment

After completing this module, students will be able to:

- Describe machine learning

- Describe machine learning algorithms

- Describe machine learning languages

Module 2: Introduction to Azure Machine Learning

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

Lessons

- Azure machine learning overview

- Introduction to Azure machine learning studio

- 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

After completing this module, students will be able to:

- Describe Azure machine learning.

- Use the Azure machine learning studio.

- Describe the Azure machine learning platforms and environments.

Module 3: 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.

Lessons

- Categorizing your data

- Importing data to Azure machine learning

- Exploring and transforming data in Azure machine learning

Lab : Managing Datasets

- Prepare Azure SQL database

- Import data

- Visualize data

- Summarize data

After completing this module, students will be able to:

- Understand the types of data they have.

- Upload data from a number of different sources.

- Explore the data that has been uploaded.

Module 4: Preparing Data for use with Azure Machine Learning

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

Lessons

- Data pre-processing

- Handling incomplete datasets

Lab : Preparing data for use with Azure machine learning

- Explore some data using Power BI

- Clean the data

After completing this module, students will be able to:

- Pre-process data to clean and normalize it.

- Handle incomplete datasets.

Module 5: 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.

Lessons

- Using feature engineering

- Using feature selection

Lab : Using feature engineering and selection

- Prepare datasets

- Use Join to Merge data

After completing this module, students will be able to:

- Use feature engineering to manipulate data.

- Use feature selection.

Module 6: Building Azure Machine Learning Models

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

Lessons

- Azure machine learning workflows

- Scoring and evaluating models

- Using regression algorithms

- 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

After completing this module, students will be able to:

- Describe machine learning workflows.

- Explain scoring and evaluating models.

- Describe regression algorithms.

- Use a neural-network.

Module 7: Using Classification and Clustering with Azure machine learning models

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

Lessons

- Using classification algorithms

- Clustering techniques

- 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

- Add PCA for anomaly detection.

- Evaluate the models

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After completing this module, students will be able to:

- Use classification algorithms.

- Describe clustering techniques.

- Select appropriate algorithms.

Module 8: 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.

Lessons

- 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

After completing this module, students will be able to:

- Explain the key features and benefits of R.

- Explain the key features and benefits of Python.

- Use Jupyter notebooks.

- Support R and Python.

Module 9: 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.

Lessons

- Using hyper-parameters

- Using multiple algorithms and models

- Scoring and evaluating Models

Lab : Initializing and optimizing machine learning models

- Using hyper-parameters

After completing this module, students will be able to:

- Use hyper-parameters.

- Use multiple algorithms and models to create ensembles.

- Score and evaluate ensembles.

Module 10: 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.

Lessons

- Deploying and publishing models

- Consuming Experiments

Lab : Using Azure machine learning models

- Deploy machine learning models

- Consume a published model

After completing this module, students will be able to:

- Deploy and publish models.

- Export data to a variety of targets.

Module 11: 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.

Lessons

- 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

After completing this module, students will be able to:

- Describe cognitive services.

- Process text through an application.

- Process images through an application.

- Create a recommendation application.

Module 12: Using Machine Learning with HDInsight

This module describes how use HDInsight with Azure machine

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Lessons

- 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

After completing this module, students will be able to:

- Describe the features and benefits of HDInsight.

- Describe the different HDInsight cluster types.

- Use HDInsight with machine learning models.

Module 13: 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.

Lessons

- 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

After completing this module, students will be able to:

- Implement interactive queries.

- Perform exploratory data analysis.

⊖ Prerequisites

In addition to their professional experience, students who attend this course should have:

- Programming experience using R, and familiarity with common R packages

- Knowledge of common statistical methods and data a

- Basic knowledge of the Microsoft Windows operating system and its core functionality.

- Working knowledge of relational databases.

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