

Build Machine Learning Models with Azure Machine Learning Designer

SETTING UP A PIPELINE BY USING AZURE MACHINE LEARNING DESIGNER



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Overview

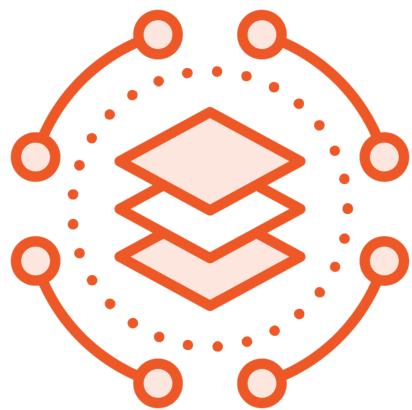


Understanding Azure ML Pipelines

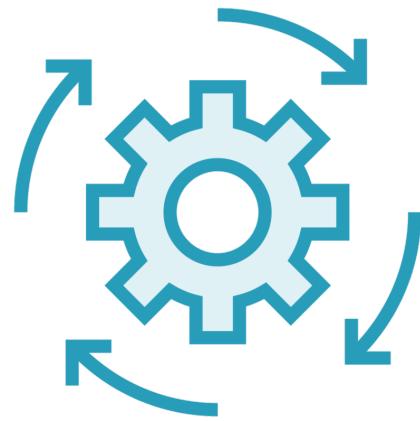
Understanding Azure ML Designer



Azure Machine Learning Pipeline



Build



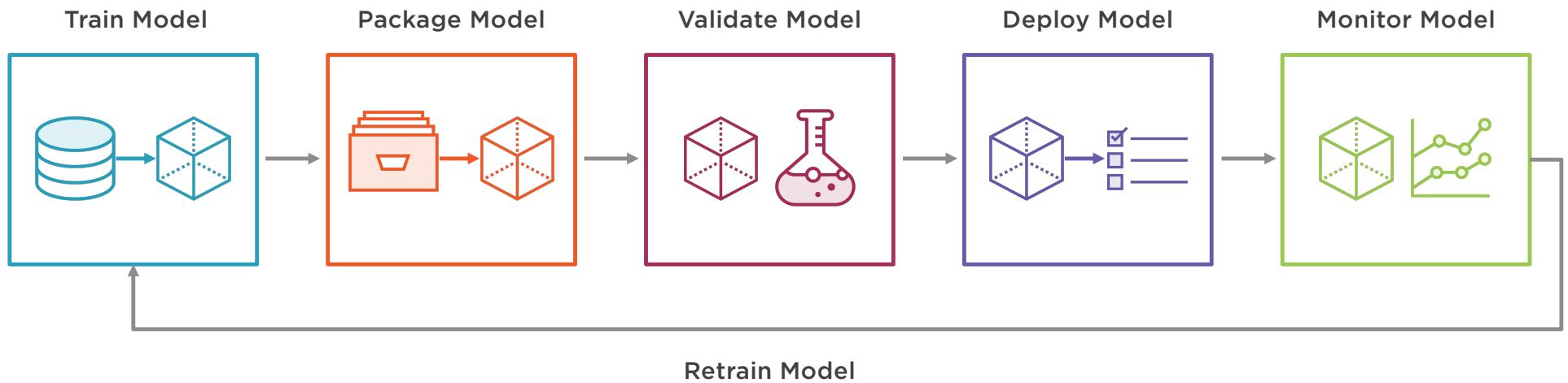
Optimize



Manage



Pipeline Expectation



Azure Pipeline Technologies

Azure DevOps Pipelines

Code & App Orchestration for App Developer / DevOps Engineers

Azure Data Factory Pipelines

Data Orchestration for Data Engineers

Azure Machine Learning Pipelines

Model Orchestration for Data Scientist



Understanding Azure ML Designer



Azure Machine Learning

A cloud-based environment used to train, deploy, automate, manage, and track ML Models. It can be accessed from the Azure ML Studio - ml.azure.com



What is the Azure Machine Learning Designer?



drag-n-drop option to build
your experiments and then
deploy pipelines



Components of Azure ML Designer

Pipeline

Dataset

Module

Compute

Deploy

Publish



Creating an Azure ML Designer

Pipeline

Includes the dataset and analytical modules

Dataset

Several data samples used to experiment with

Module

An algorithm to perform on the data

Compute

Resources used to run the pipeline

Deploy

Used to perform real-time inferencing through an endpoint

Publish

Similar to real-time endpoint with addition benefit of external submissions with REST calls



Understanding Azure ML Compute



Compute in Azure ML



Deploys environments preconfigured for ML

There are 4 Types in Azure ML Studio

- Compute Instance
- Compute Cluster
- Inference / Kubernetes Clusters
- Attached Compute



Compare Azure ML Compute

Testing

Azure Compute Instances

Production

Azure Compute Cluster

Azure Kubernetes / Inference Cluster



Compute in Azure ML



**Within each type you have the option to select
Processor Type**

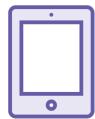
- CPU
- GPU
- FPGA



Benefits of Compute in Azure ML



Single or Multi Node Cluster



Ability to Scale clusters of virtual machines for on-demand processing of experiment code



Ability to deploy targets for predictive services that use your trained models



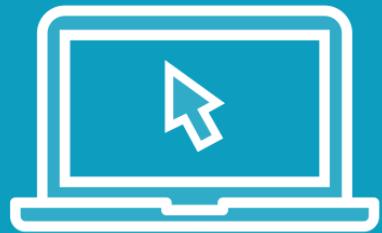
Specify Virtual Machine Priority



Leverage a range of high processors from CPU & GPU



Demo



[Deploy Azure ML Designer Environment](#)
[Explore the Azure ML Designer](#)
[Create Compute in Azure ML Studio](#)



Summary



Understood Azure ML Pipelines

Explored Azure ML Studio

Explored Azure ML Designer

Created Compute Resource in Azure ML Studio



Ingest Data in a Designer Pipeline



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Overview



Ingestion Options in Azure Machine Learning Studio

Understanding the Dataset Types

Connectivity to Data in Azure ML Studio



Working with Data in Azure ML Studio



Register the Dataset

How to Connect

- Locally (Desktop)
- Web Files e.g. GitHub
- Azure Datastores e.g. Azure SQL Database



Azure Data Stores

Connect to Built-in Data Stores

- Azure Blob Storage
- Azure File Share
- Open Datasets

Connect to Azure Data Stores

- Azure Blob Storage
- Azure Data Lake Storage
- Azure SQL Database
- Azure PostgreSQL Database



Connectivity to Azure Data Stores



Authentication to Azure Data Stores in Azure ML

Storage Type	Authentication
Azure Blob Storage	Account Key or SAS Token
Azure File Share	Account Key or SAS Token
Azure Data Lake Storage	Service Principal
Azure SQL Database	SQL Authentication or Service Principal
Azure PostgreSQL Database	SQL Authentication



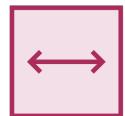
Retrieving Data from Azure Storage in Azure ML



Make sure the users has Storage Blob Data Reader



For Account SAS tokens defaults to no permissions



For Read Access have a minimum of list and read permissions for containers and objects



For Write Permission write and add permissions should be granted as well



Types of Dataset



Types of Dataset in Azure ML Studio

Tabular

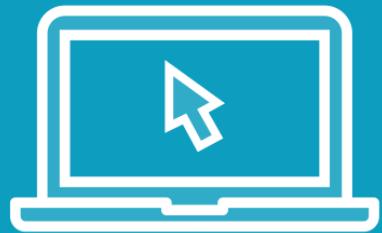
Represents data that is displayed data as a Table

File

References files in a datastore or public URL



Demo



Register a Dataset in Azure ML Studio

- Create a Data Store
- Selecting Data from the Data Store

Explore Open Datasets



Summary



- Reviewed Ingestion Options in Azure Machine Learning Designer
- Understood the Dataset Types
- Registered Dataset in Azure ML Studio



Using the Designer Modules to Define a Pipeline Data Flow



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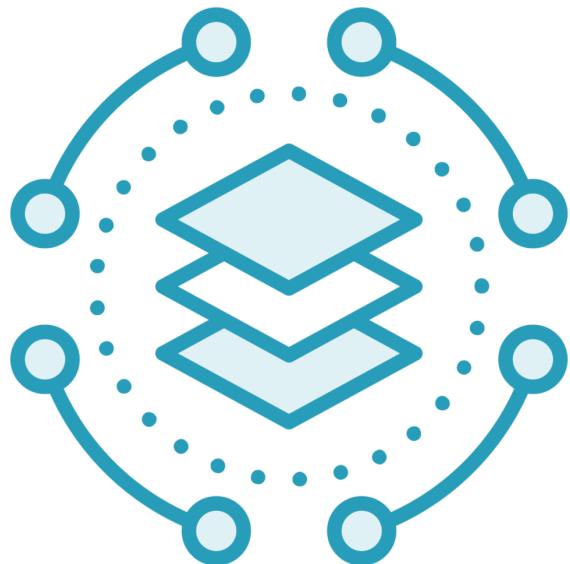


**Defining Azure Machine Learning
Designer Module**

Understand when to use a Module



What Are the Designer Modules?



Modules gives the ability to perform actions on dataset

It can be dragged and dropped onto the Designer Platform

Top Modules

- Select Column in Dataset
- Clean Missing Data
- Split Data
- Train Model
- Execute Custom Code e.g. Python



Scenario

Find out how much a car will cost?



Azure ML Studio - Designer Modules

Dataset

Where is my Data coming from ?
CSV File, Open Dataset, SQL

Clean Missing Data

Remove Empty Spots
Specify what to do with missing Data

Split Data

Specify Percentage Split e.g. 70/30
One for Training, One for Testing

Select Columns in Dataset

What Columns will help my Model
can also be seen as removing
unwanted columns



Normalize Data

View some of your data on a scale of 0-1
Visualize statistics within the data

Train Data

Add Algorithm
e.g. Regression



Azure ML Studio - Designer Modules

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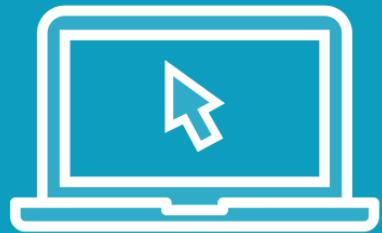
Visualize statistics within the data

Train Data

Add Algorithm
e.g. Regression



Demo



Using Modules on Datasets

- Review common Modules
- Running a Designer Pipeline to view Results
- Execute Custom Code



Summary



Defined Azure ML Designer Modules

Understood when to use Modules

Demonstrated using Modules in Azure ML Studio



Applying Machine Learning Algorithms



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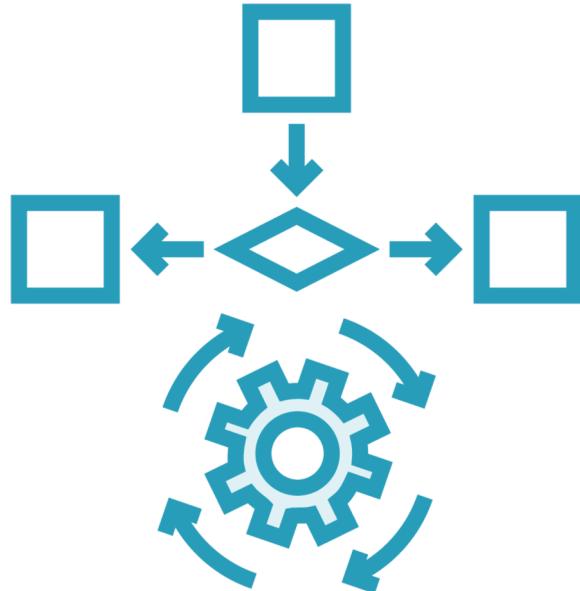


Define ML Algorithms

Implementing ML Algorithms in Azure ML Designer



Machine Learning Algorithms



Using code to help understand complex data set

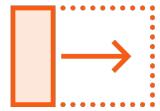
Examples are Regression or Classification

Typically fall into these categories

- Supervised Learning
- Unsupervised Learning
- Reinforcement Learning



What Can You Do with ML Algorithms



Predict Values



Select/Choose between two options



Group/Classify Items together



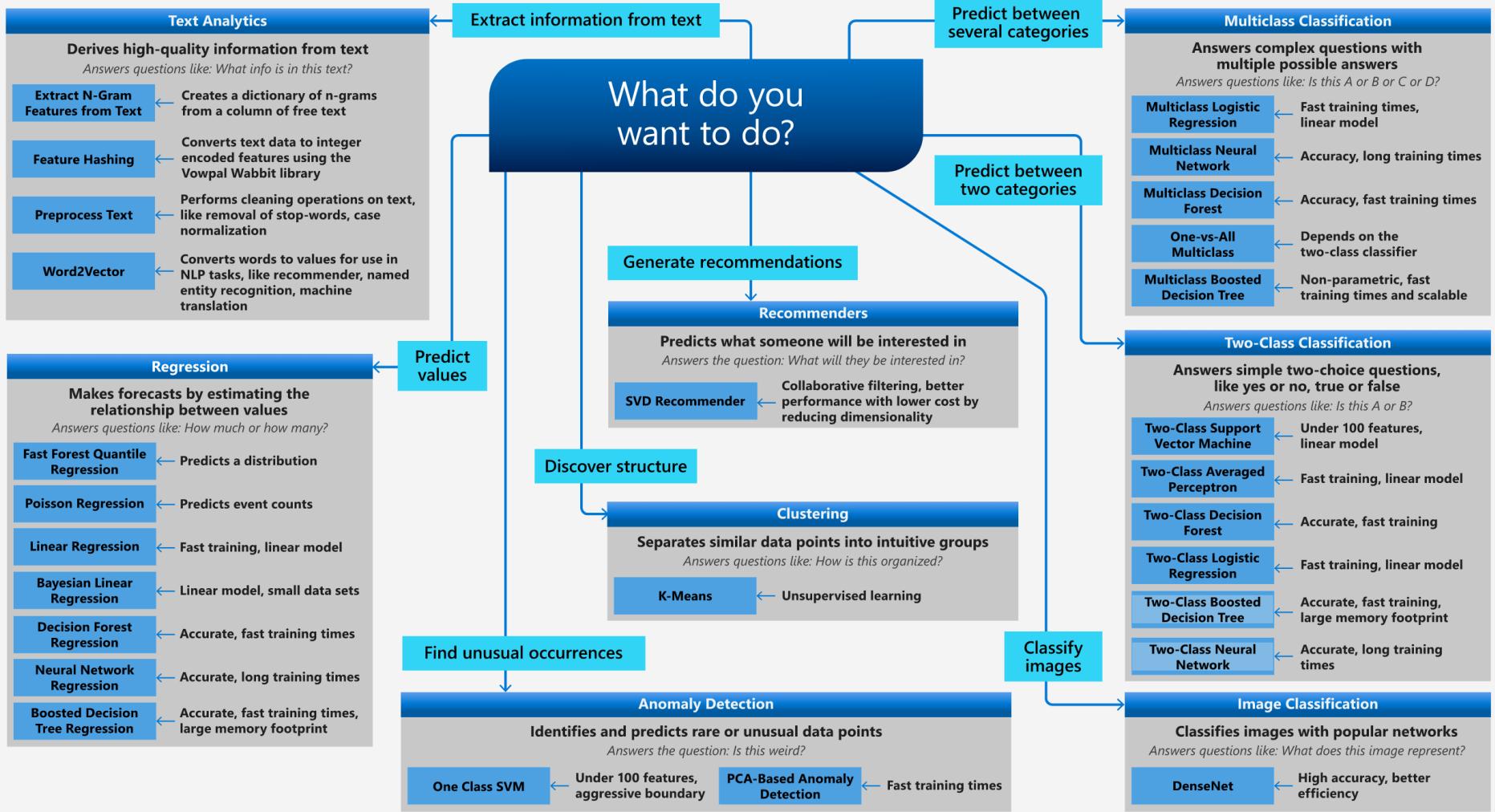
Azure Machine Learning Cheat Sheet





Microsoft Azure Machine Learning Algorithm Cheat Sheet

This cheat sheet helps you choose the best machine learning algorithm for your predictive analytics solution. Your decision is driven by both the nature of your data and the goal you want to achieve with your data.



Questions to Ask

**What do you want to do with
the Data**

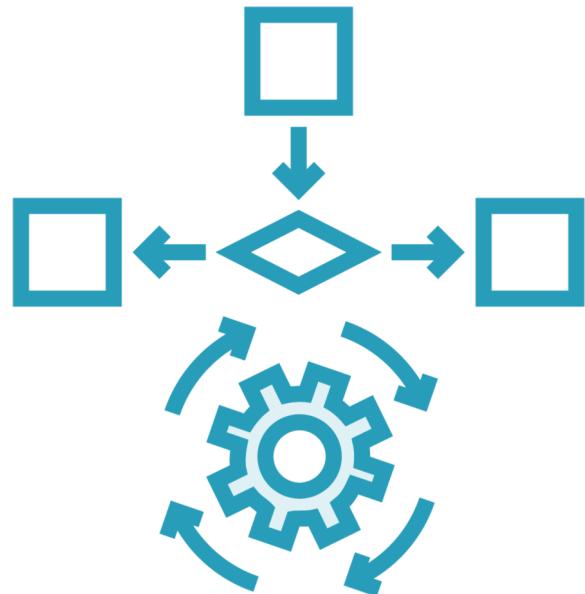
**Review the Algorithm Cheat
Sheet**

**Which Algorithm can Answer
the Question**

**What Additional
Requirements are need**



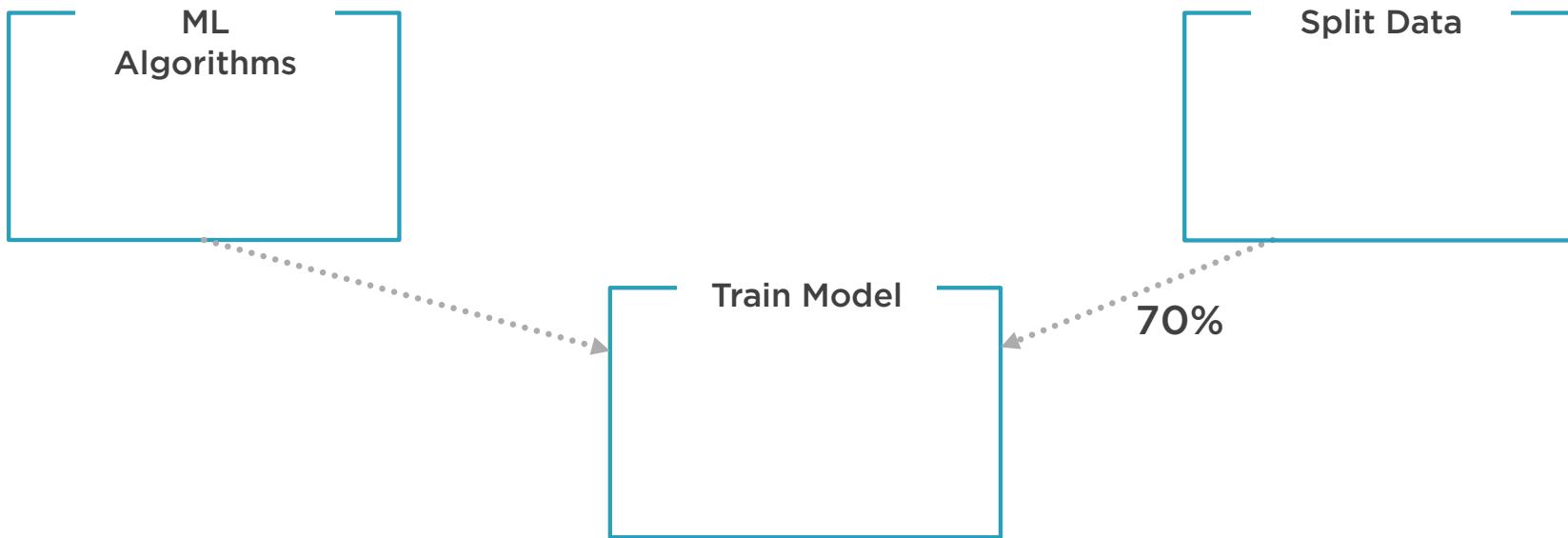
Connecting Algorithms in Azure ML Designer



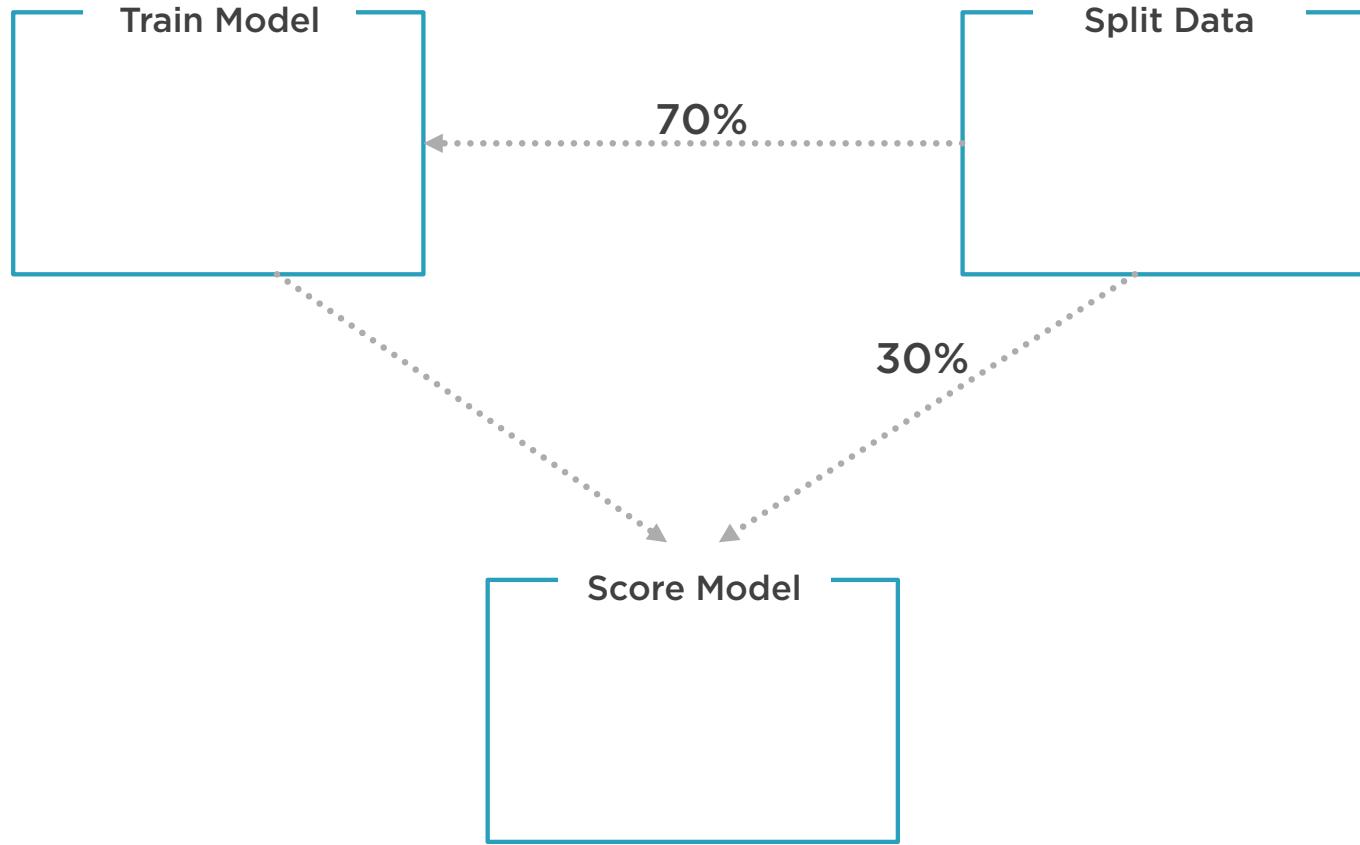
Train the Model
Score the Model
Evaluate the Model



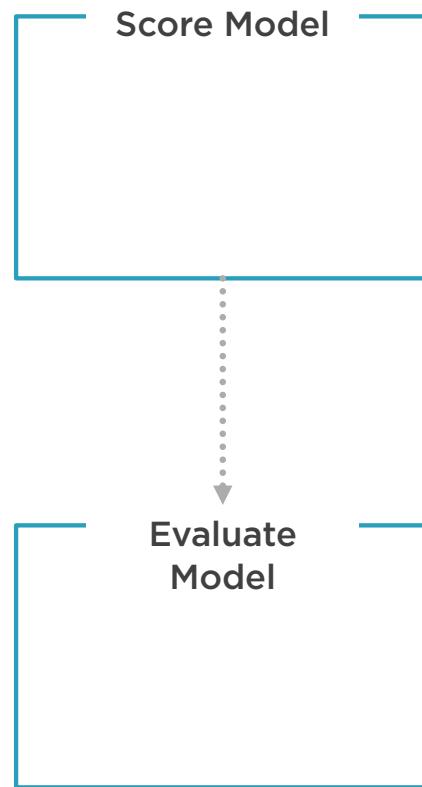
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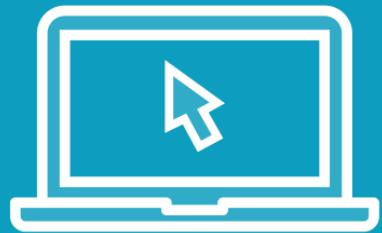
Score the Model



Evaluate the Model



Demo



Selecting an ML Algorithm in Azure ML Designer

**Connect Algorithm Module to be Trained,
Scored and Evaluated**



Summary



Defined ML Algorithms

Implemented ML Algorithm in Azure ML Studio



Publish and Deploy Machine Learning Models in Azure Machine Learning Designer



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Overview



Publish Azure ML Models

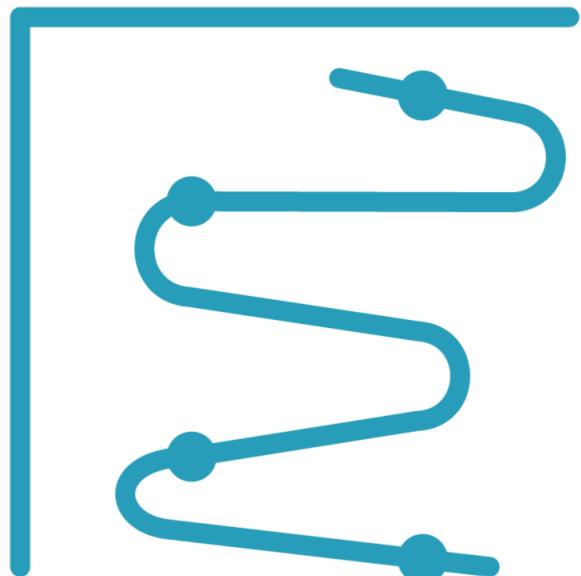
Deploy a Predictive Service

Create a Real Time Pipeline

Create a Batch Pipeline



Release your ML Pipeline



Pipeline must have been submitted

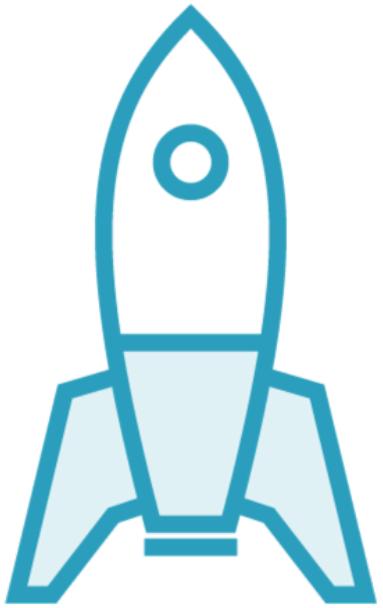
Deploy a Real-time Inference Pipeline

- Requires Azure Kubernetes Cluster

Publish a Batch Inference Pipeline

- Requires Compute Cluster





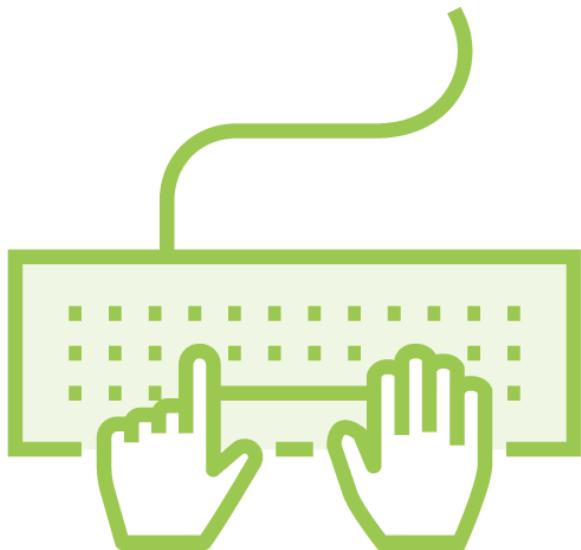
Deploy a Real-time Inference Pipeline

Ability to connect from External App to Scored Model

Predict Results

REST API Key used to call through endpoint





- Publish Batch Inference Pipeline**
- Runs from External Application with REST calls**
- Cannot send or receive data in real-time with endpoint**
- Flexible Pipelines**
 - Publish multiple pipeline to a single pipeline endpoint
 - Specify which pipeline version to run



Demo



Deploy & Publish an Inference Pipeline



Summary



Published Azure ML Modules

Created Real Time and Batch Pipelines

Deployed a Predictive Service

