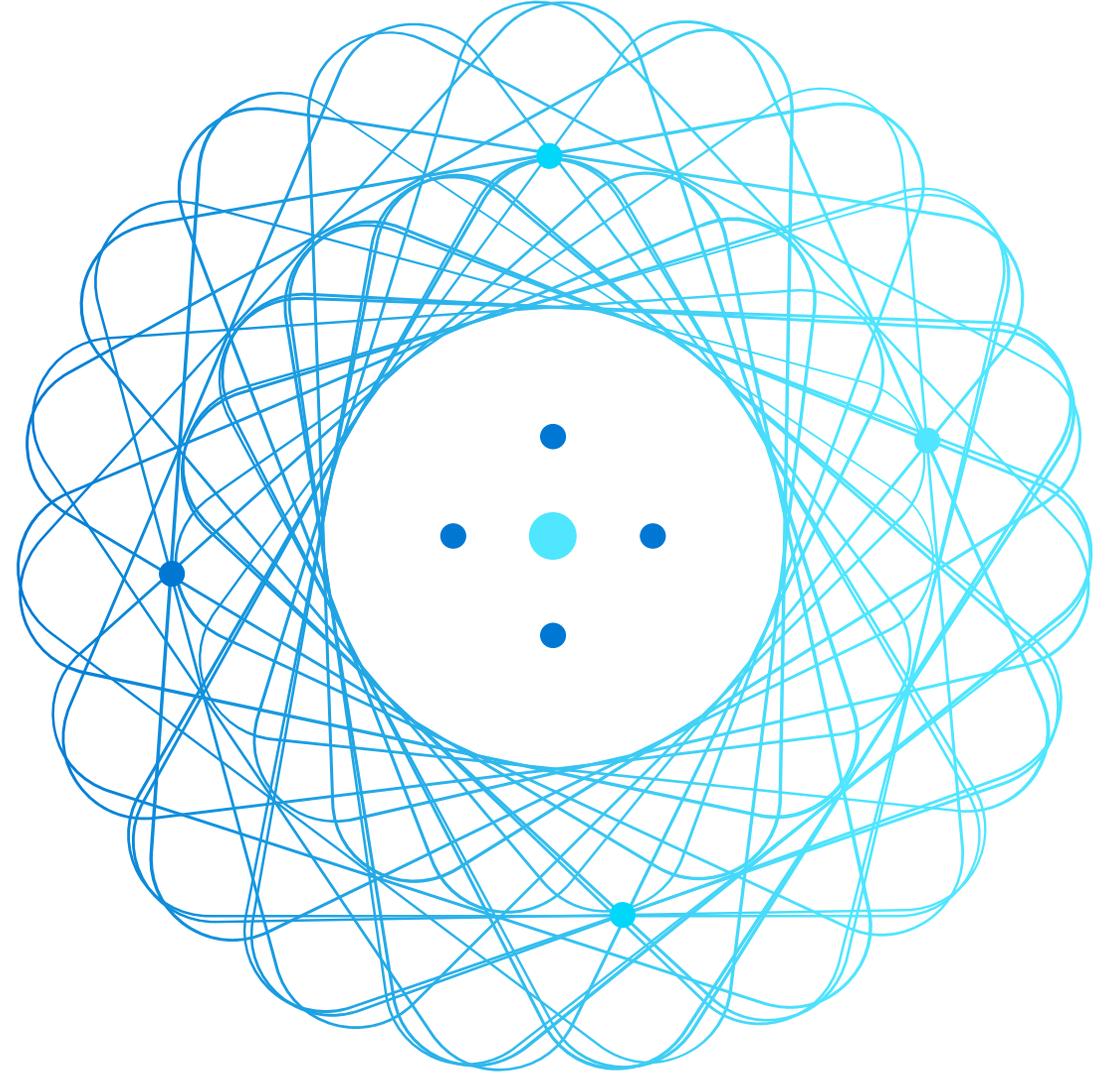


Explore Fundamentals of Machine Learning



Agenda



Introduction to Machine Learning



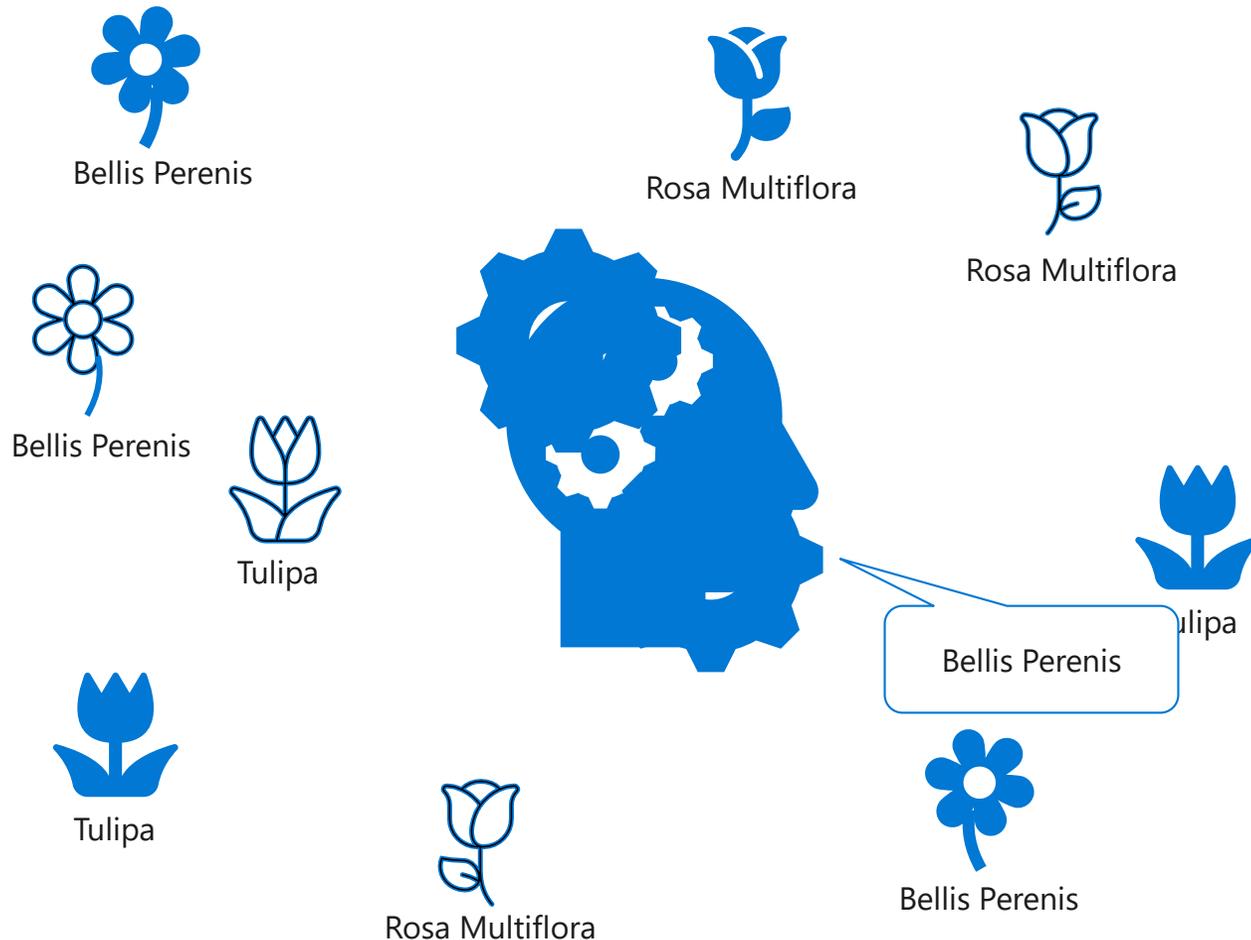
Azure Machine Learning

Introduction to Machine Learning



What is Machine Learning?

Creating predictive models by finding relationships in data



1. A botanist collects some samples of flowers
2. Each sample has a set of *features* (characteristics) and a *label* (the species)
3. An algorithm is used to find the relationship between the features and the label
4. The result is a *model* that encapsulates those relationships
5. The model can predict the label of a new sample based on its features

Types of Machine Learning

Machine Learning

Supervised Machine Learning

Training data includes known labels

Unsupervised Machine Learning

Training data is unlabeled

Regression

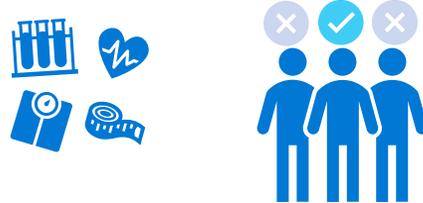
Label is a numeric value



Predict the number of bike rentals based on day, season, and weather

Classification

Label is a categorization (or *class*)



Predict whether a patient is at-risk for diabetes based on clinical measurements

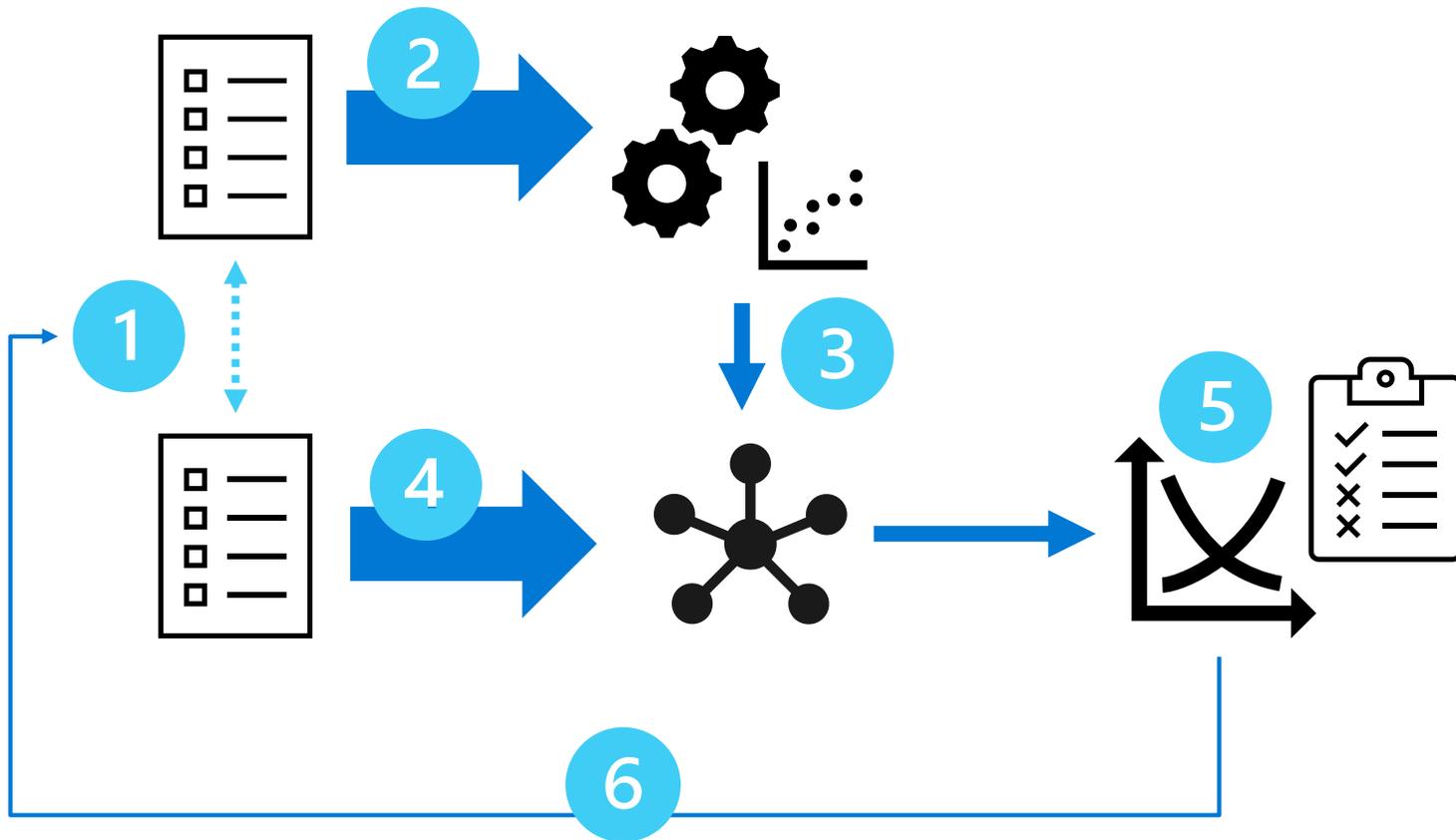
Clustering

Similar items are grouped together



Vehicles with similar emissions and fuel efficiency characteristics are separated into clusters

Model Training and Validation



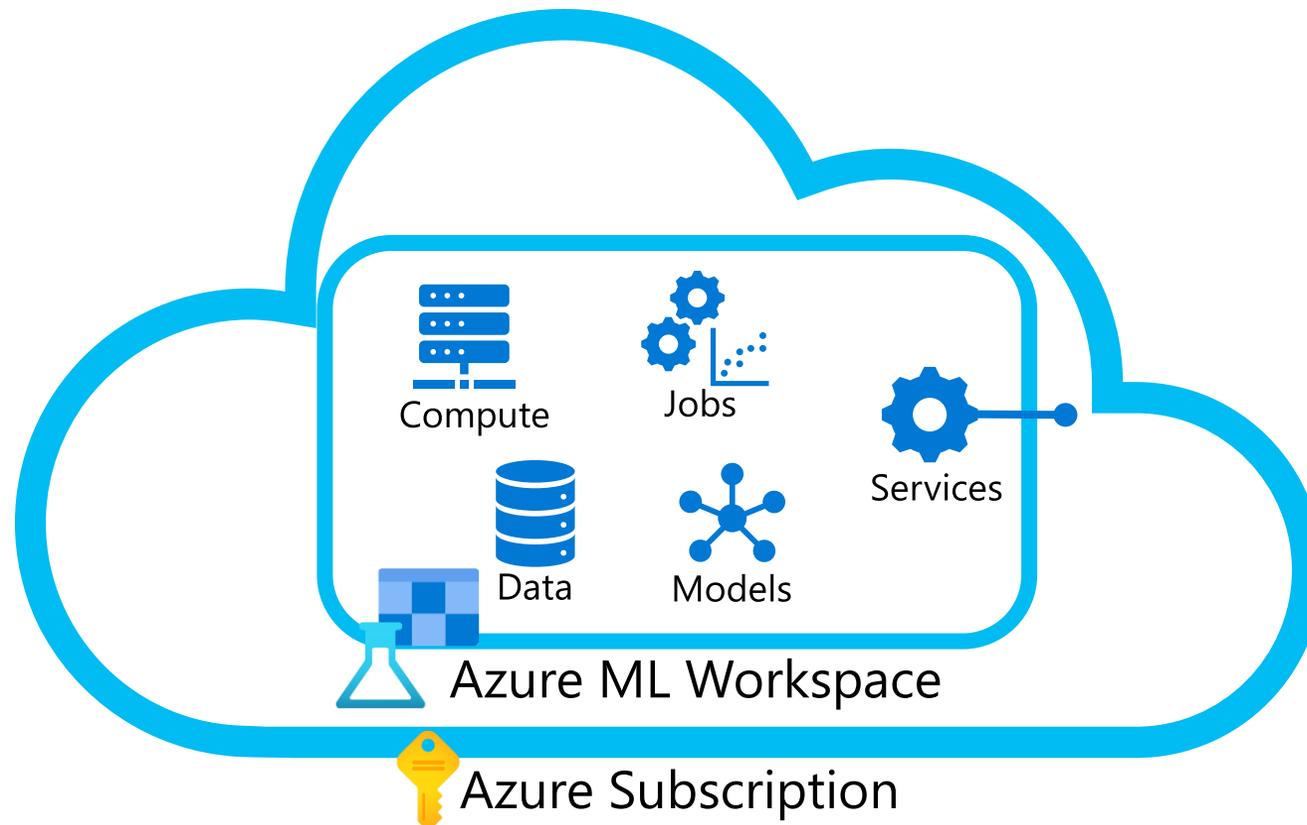
1. Split the data into a *training* set and a *validation* set
2. Apply an algorithm to *fit* the training data to a model
3. The trained model encapsulates the relationships in the data
4. Use the model to generate predictions from the validation data
5. Use evaluation metrics to compare predicted vs actual labels (supervised) or measure cluster separation (unsupervised)
6. Repeat...

Azure Machine Learning



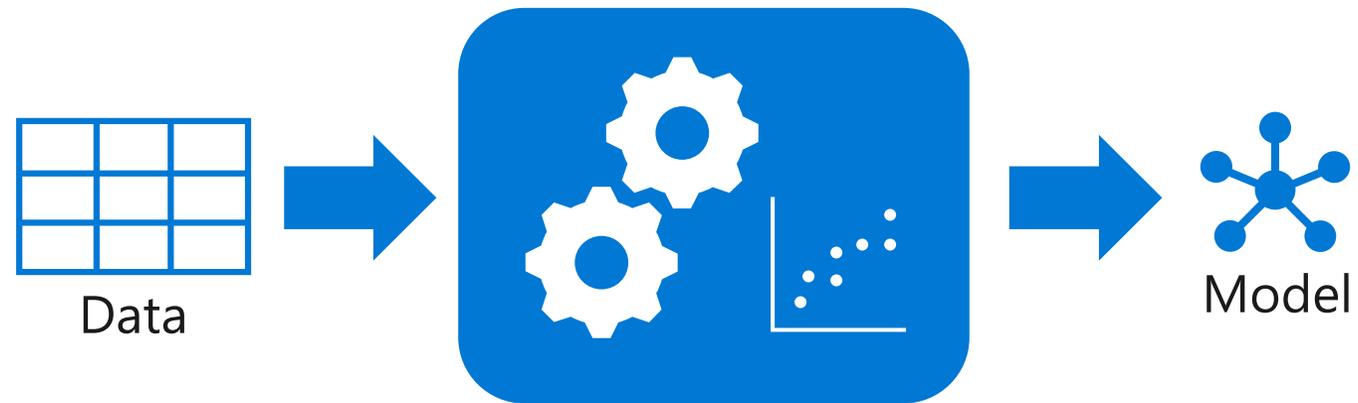
What is Azure Machine Learning?

A cloud-based platform for machine learning



Automated Machine Learning

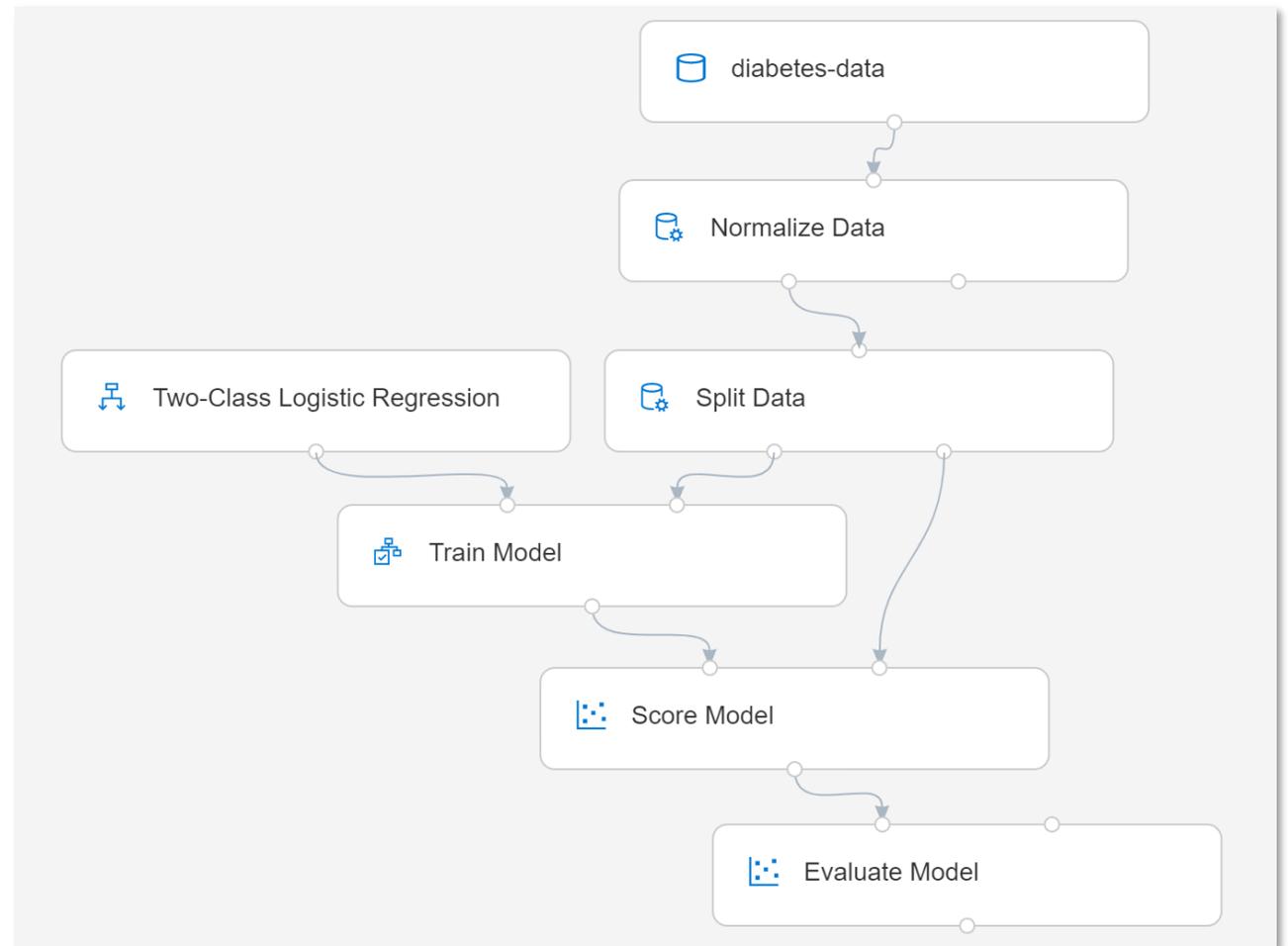
Supply the data and desired *supervised* model type, and let Azure Machine Learning find the best model



Azure Machine Learning Designer

Visual tool for creating a machine learning *pipeline*

1. Use a *training pipeline* to train and evaluate a model
2. Create an *inference pipeline* to predict labels from new data
3. Deploy the inference pipeline as a *service* for apps to use



Lab: Explore Automated Machine Learning in Azure ML

In this lab, you will explore the Azure Machine Learning service's Automated Machine Learning capability to train a machine learning model.

1. **Start the virtual machine for this lab**
or go to the exercise page at <https://aka.ms/ai900-automl-lab>
2. **Follow the instructions to complete the exercise**
Use the Azure subscription provided for this lab



Review

 You would like to train a model without labels that groups similar features together. What is this an example of?

- Classification
 - Regression
 - Clustering
-

 An automobile dealership wants to use historic car sales data to train a machine learning model. The model should predict the price of a pre-owned car based on its make, model, engine size, and mileage. What kind of machine learning model should the dealership use automated machine learning to create?

- Classification
 - Regression
 - Time series forecasting
-

 A bank wants to use historic loan repayment records to categorize loan applications as low-risk or high-risk based on characteristics like the loan amount, the income of the borrower, and the loan period. What kind of machine learning model should the bank use?

- Classification
- Regression
- Clustering

Summary

Introduction to Machine Learning

- What is Machine Learning?
- Types of Machine Learning
- Model Training and Validation

Azure Machine Learning

- What is Azure Machine Learning?
- Automated Machine Learning
- Azure Machine Learning Designer



References

Explore visual tools for machine learning

<https://aka.ms/intro-visual-ml>



