ML.NET In Action

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Hello ☺

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Code & Slides

http://bit.ly/MLNETInActionNYC062019

Agenda

01 What is Machine Learning?

02 From Data to Machine Learning

03 What is ML.NET?

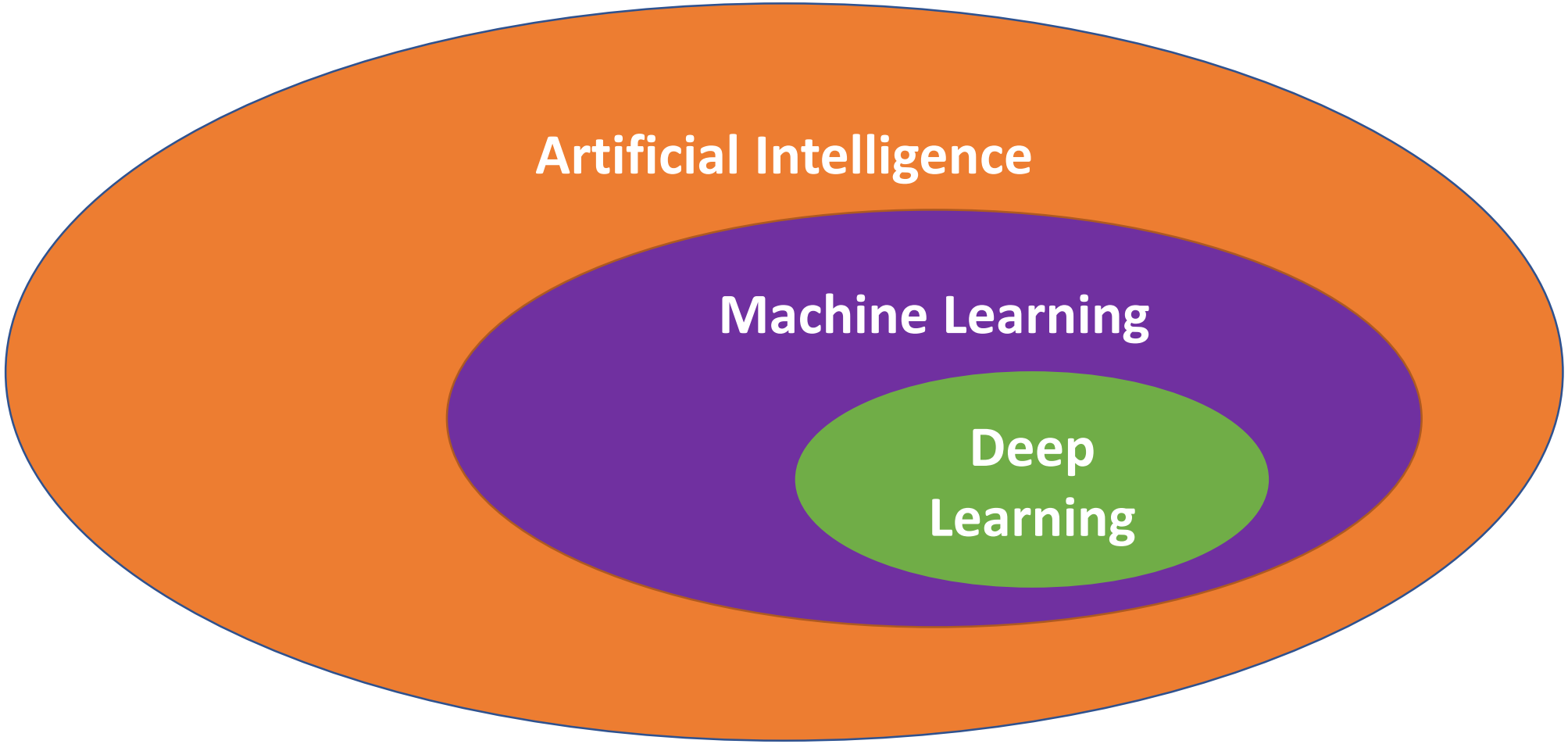
04 Building a Model

05 Deploying a Model

06 Beyond Machine Learning

What is Machine Learning?

AI vs ML vs DL



Machine Learning Tasks

Supervised Learning

Regression

What is the price of a home in NYC?

Classification

Is this a dog or cat?

Unsupervised Learning

Clustering

Customer segments in a database

Classification Example

Training Data

Species	Is Independent	Class
Canine	False	Dog
Feline	True	Cat
Feline	True	Cat
Canine	False	Dog
Canine	True	Dog

Features (input)

Label (output)

New Data

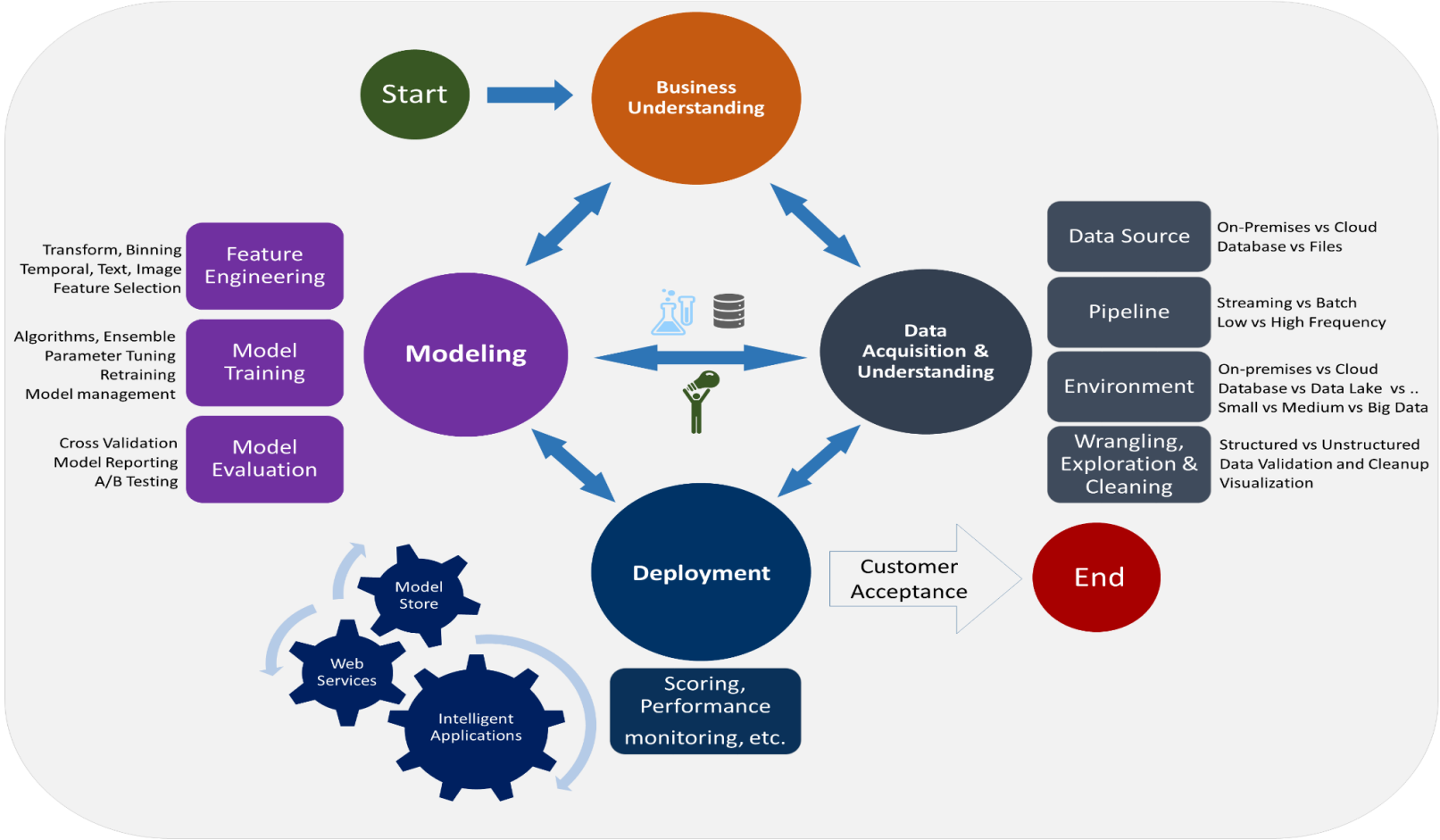
Species	Is Independent
Canine	False

Prediction

Class
Dog

From Data to Machine Learning

The Continuous Machine Learning Process



What is a model?

$f(x)$

True

False

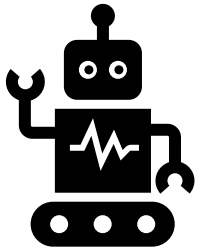
Input

Model

Output

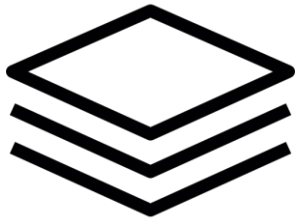
What is ML.NET?

ML.NET



Framework for Machine Learning

.NET Standard

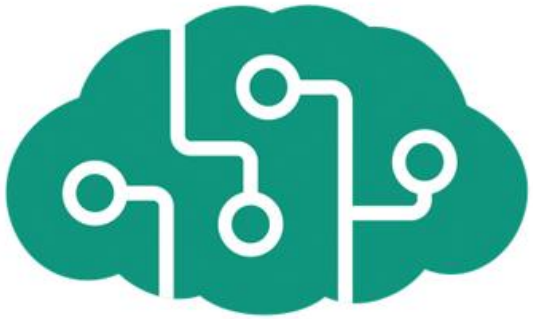


Proven & Extensible

Open Source

Cross Platform

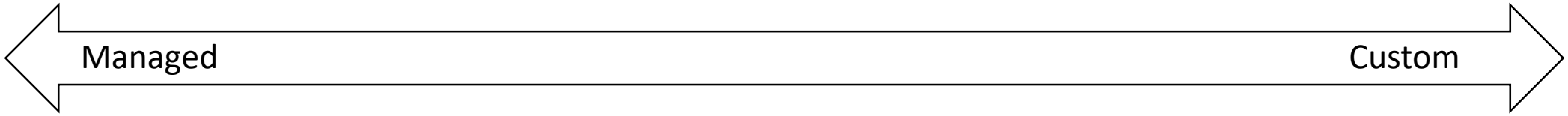
ML.NET In AI Ecosystem



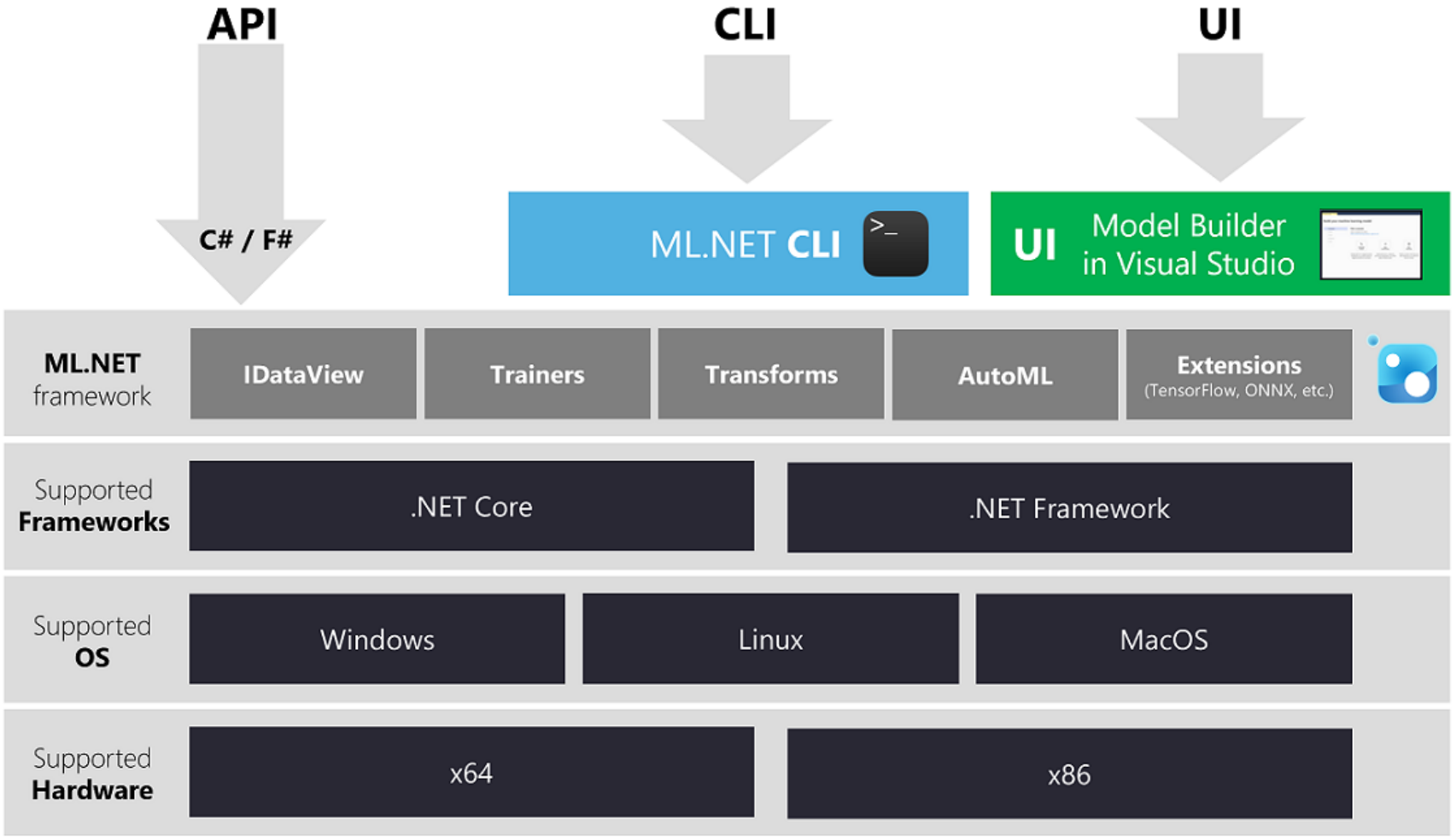
Cognitive Services

AzureML

ML.NET



ML.NET Architecture



ML.NET - Framework

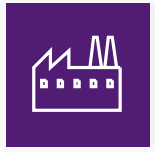
Transforms	Trainers	Misc	Extensions
• Missing Values • Feature Selection • Normalization	• SVM • K-Means • Boosted Trees	• Data Loaders • Evaluators	• TensorFlow • ONNX

A few things you can do with ML.NET ...

Sentiment Analysis

Forecasting

Issue Classification



Predictive maintenance

Image classification

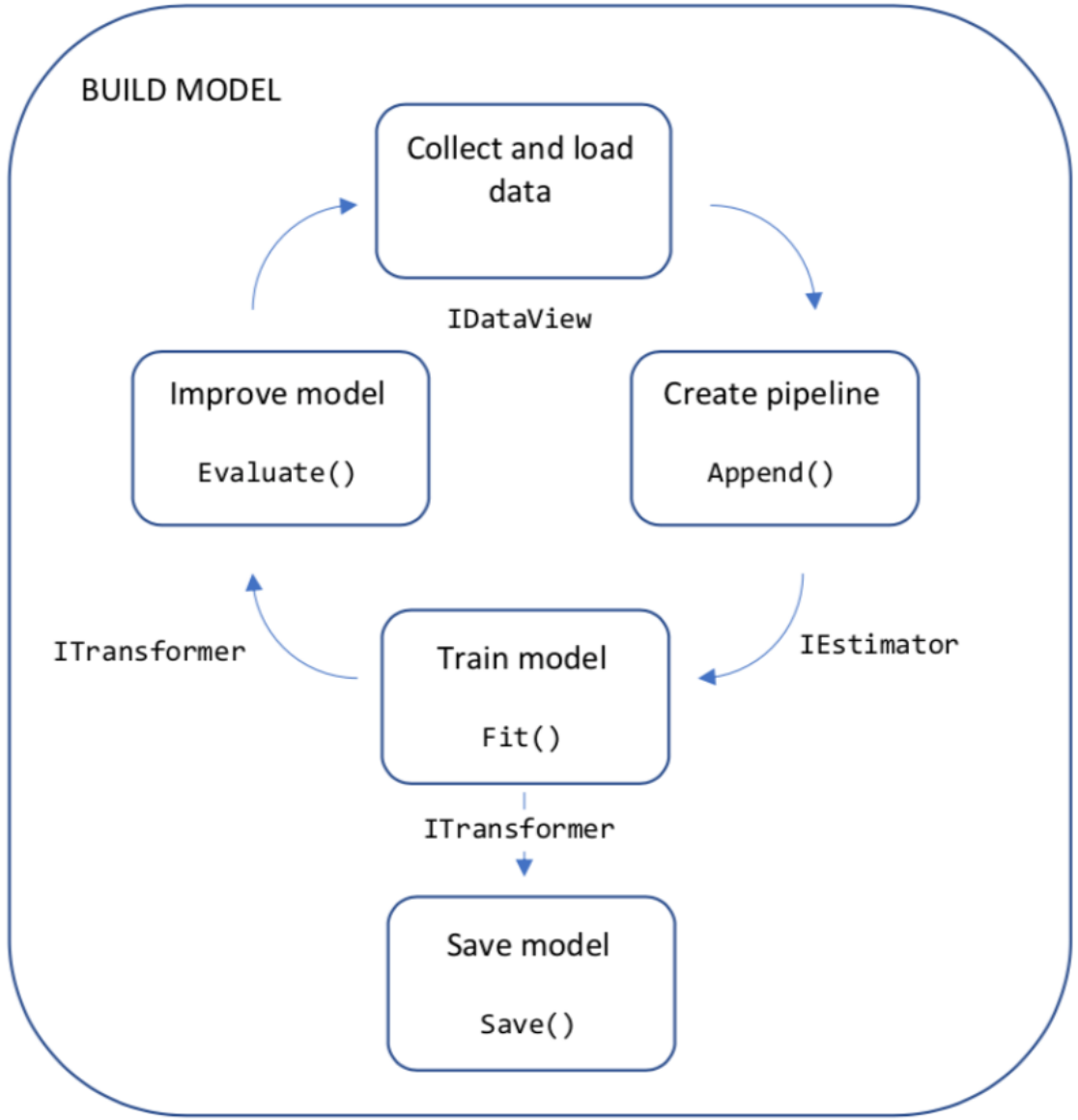
Recommendations

Spam detection

Customer segmentation

And more! Samples @ https://github.com/dotnet/machinelearning-samples

Building a Machine Learning Model

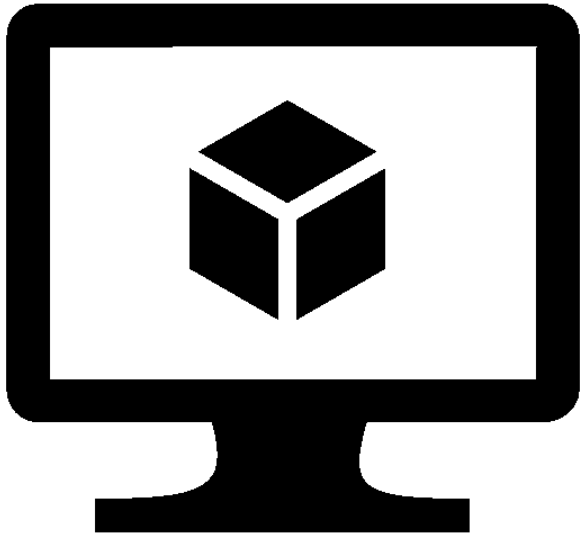

BUILD MODEL
Collect and load data
IDataView
Create pipeline
Append()
IEstimator
Train model
Fit()
ITransformer
ITransformer
Save model
Save()
Improve model
Evaluate()

Demo: Train Classification Model (API)

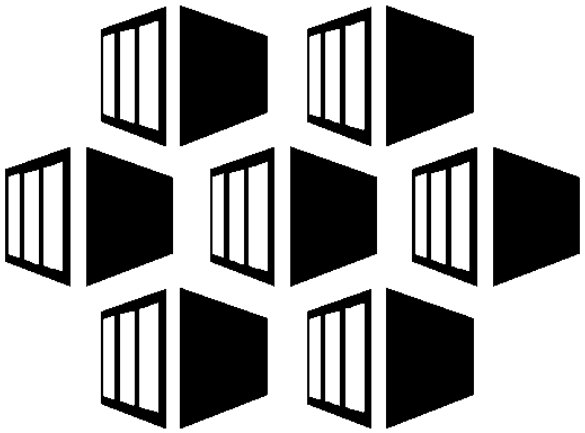
Demo: Train Classification Model (AutoML)

Consuming a Machine Learning Model

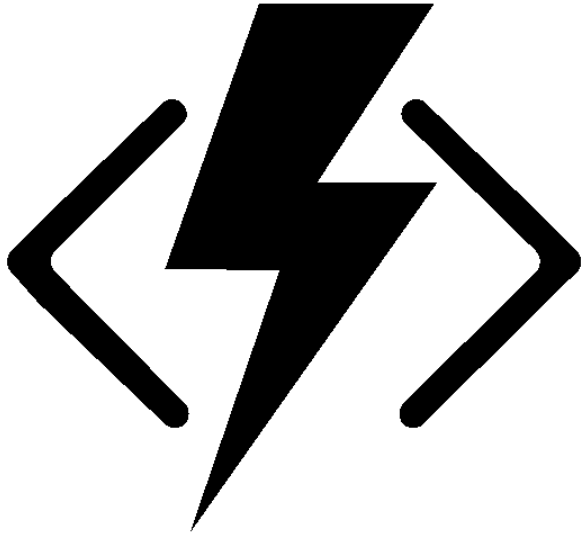
Deploying to the Web



Virtual Machines



Containers



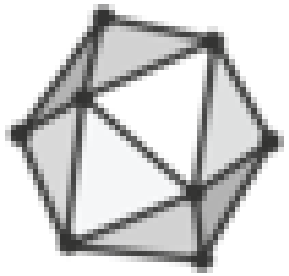
Serverless

Demo: Deploying Model to the Web

Deep Learning Beyond Machine Learning

Deep Learning in ML.NET

TensorFlow

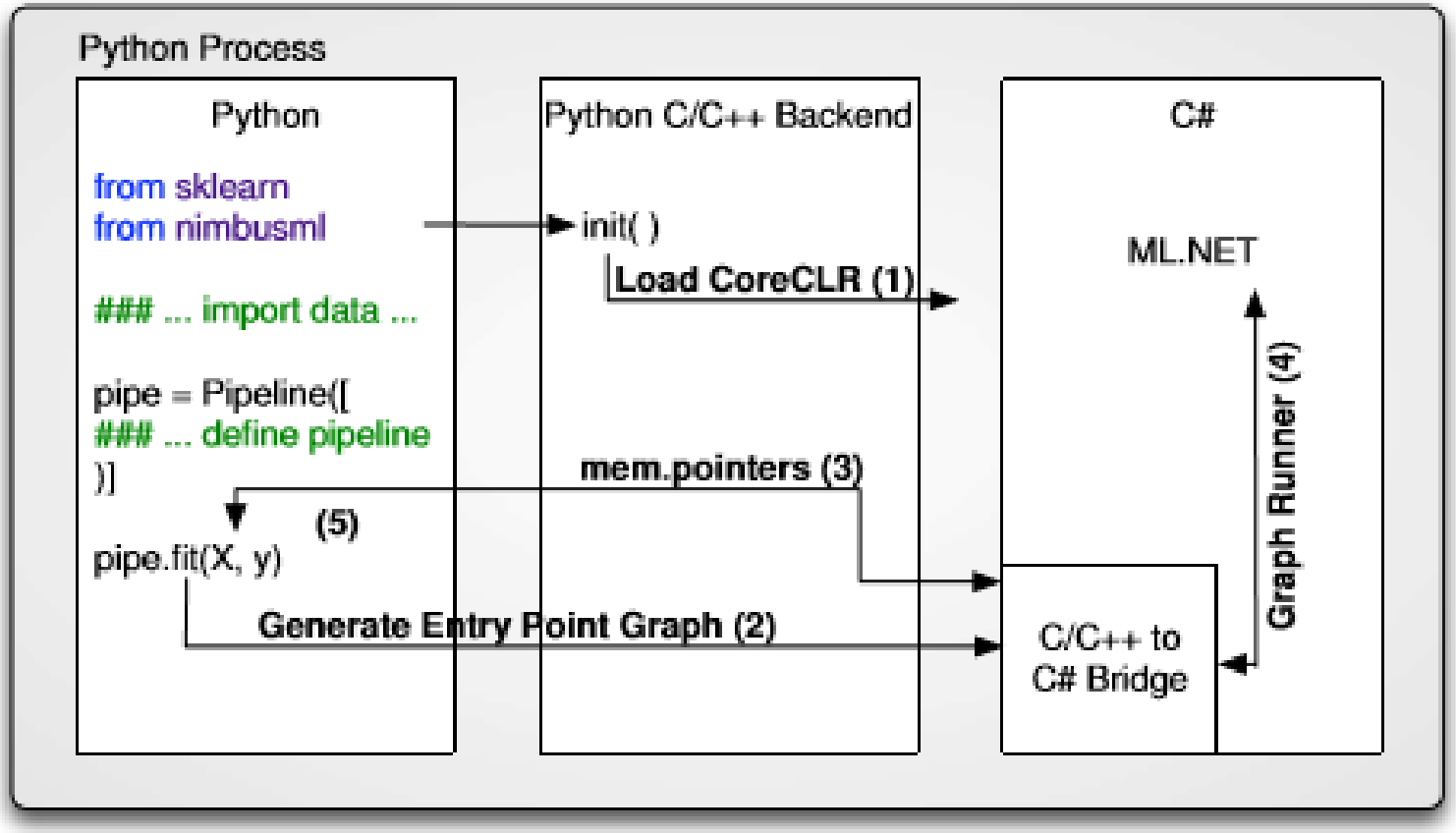


ONNX

Demo: Image Classification with TensorFlow Model

Demo: Object Detection with ONNX Model

ML.NET + Python = NimbusML



Takeaways

- ML.NET is a proven, open-source, cross-platform machine learning framework for building custom models in the .NET ecosystem.
- ML.NET is still in its early stages but is quickly maturing with strong support from open source community and Microsoft.
- Model persistence provides great flexibility in model deployment phase.
- Azure reduces friction and management overhead associated with deployment of ML.NET models to the web.
- Take your existing models and use in .NET

Questions?

Resources

- https://docs.microsoft.com/en-us/dotnet/machine-learning/resources/glossary
- https://docs.microsoft.com/en-us/dotnet/machine-learning/tutorials/
- https://docs.microsoft.com/en-us/dotnet/machine-learning/how-to-guides/
- https://github.com/dotnet/machinelearning-samples
- https://arxiv.org/pdf/1905.05715.pdf