

Microsoft Azure

Azure Machine Learning

Microsoft Research

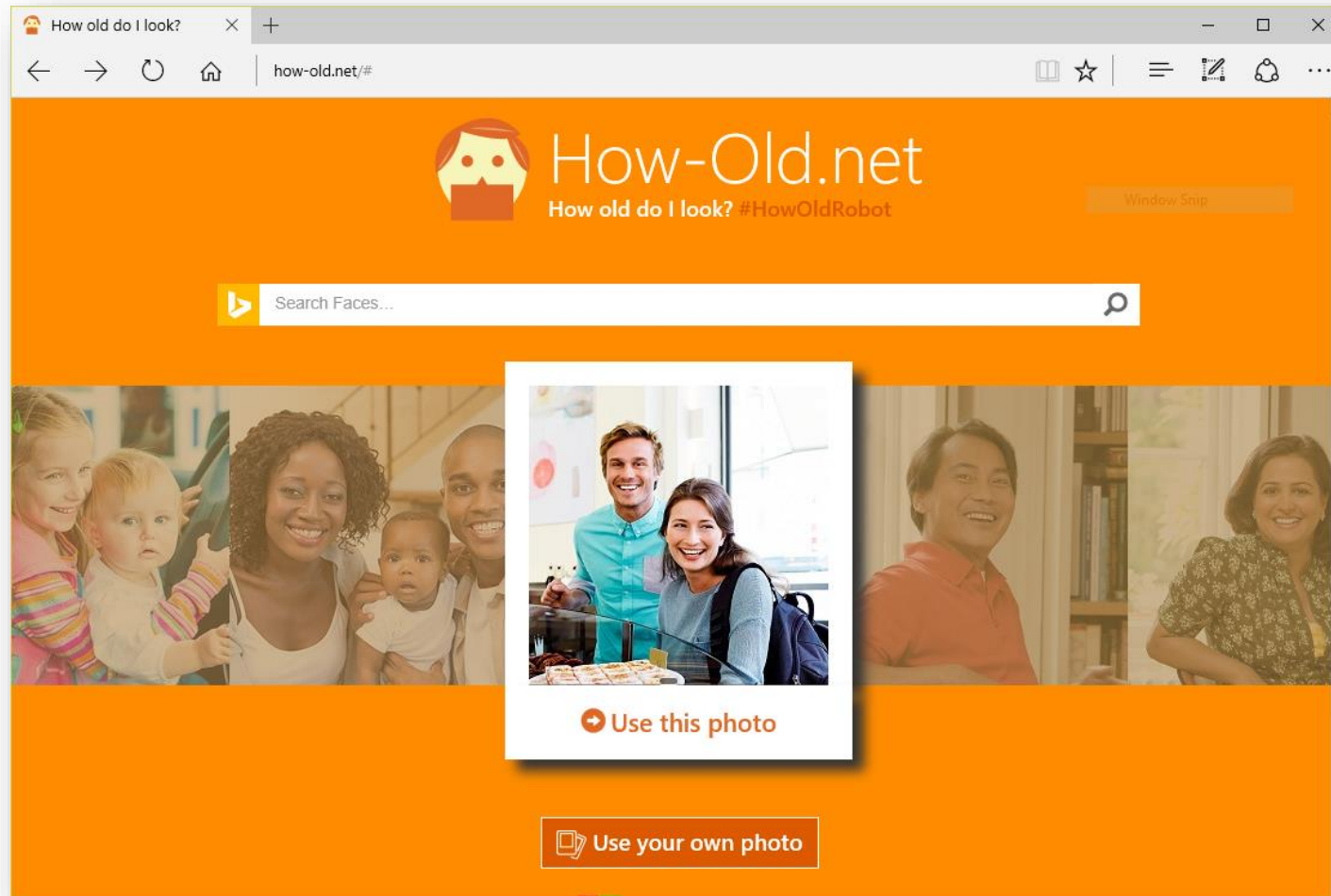
A decorative graphic consisting of several overlapping rounded rectangles in various shades of blue, located in the bottom right area of the slide.

What is Machine Learning?

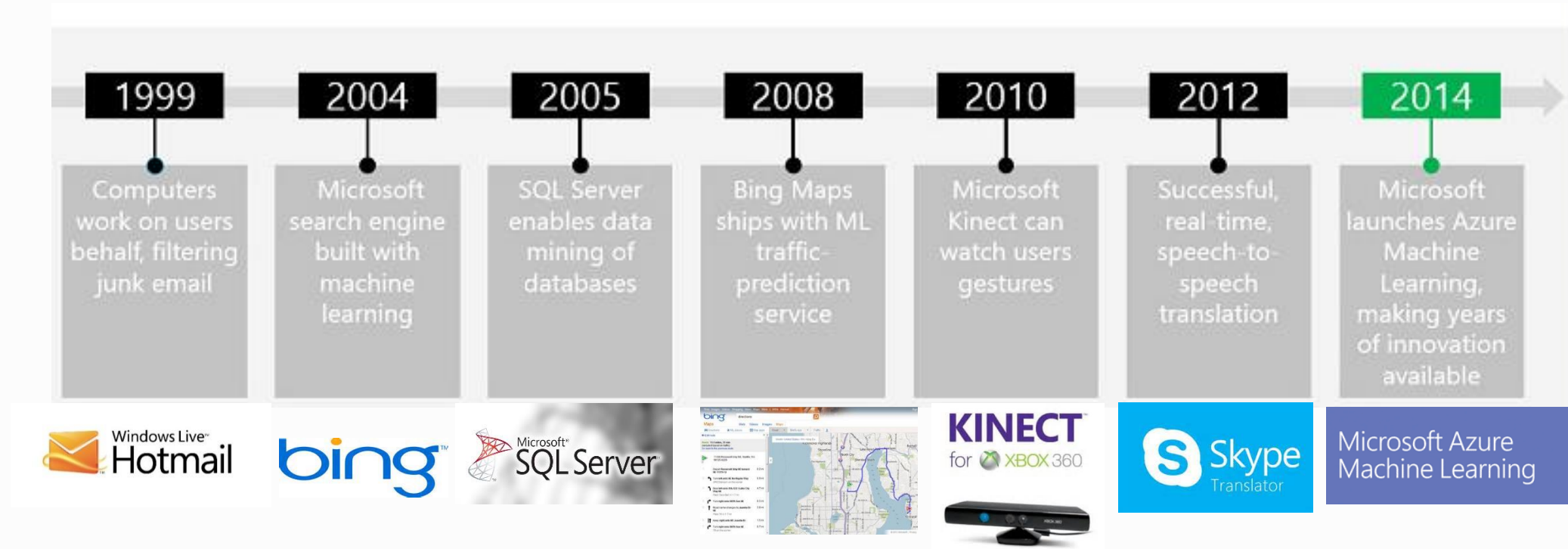
- Computer "learns" from data in order to perform predictive analytics
 - Credit-card fraud detection
 - Online shopping recommendations
 - Self-driving cars and more
- Supervised learning
- Unsupervised learning



Machine Learning in Action



Microsoft Machine Learning History



Modified from <http://pulsweb.fr/predict-wine-quality-azureml>

Azure Machine Learning

- Fully managed cloud service for building and operationalizing ML models



Fully managed

No software to install, no hardware to manage, and one portal to view and update.

Integrated

Simple drag, drop, and connect interface for Data Science. No need for programming for common tasks.

Best in Class Algorithms + R

Built-in collection of best of breed algorithms. Support for R and popular CRAN packages.

Deploy in minutes

Operationalize models with a single click. Monetize in Machine Learning Marketplace.

“

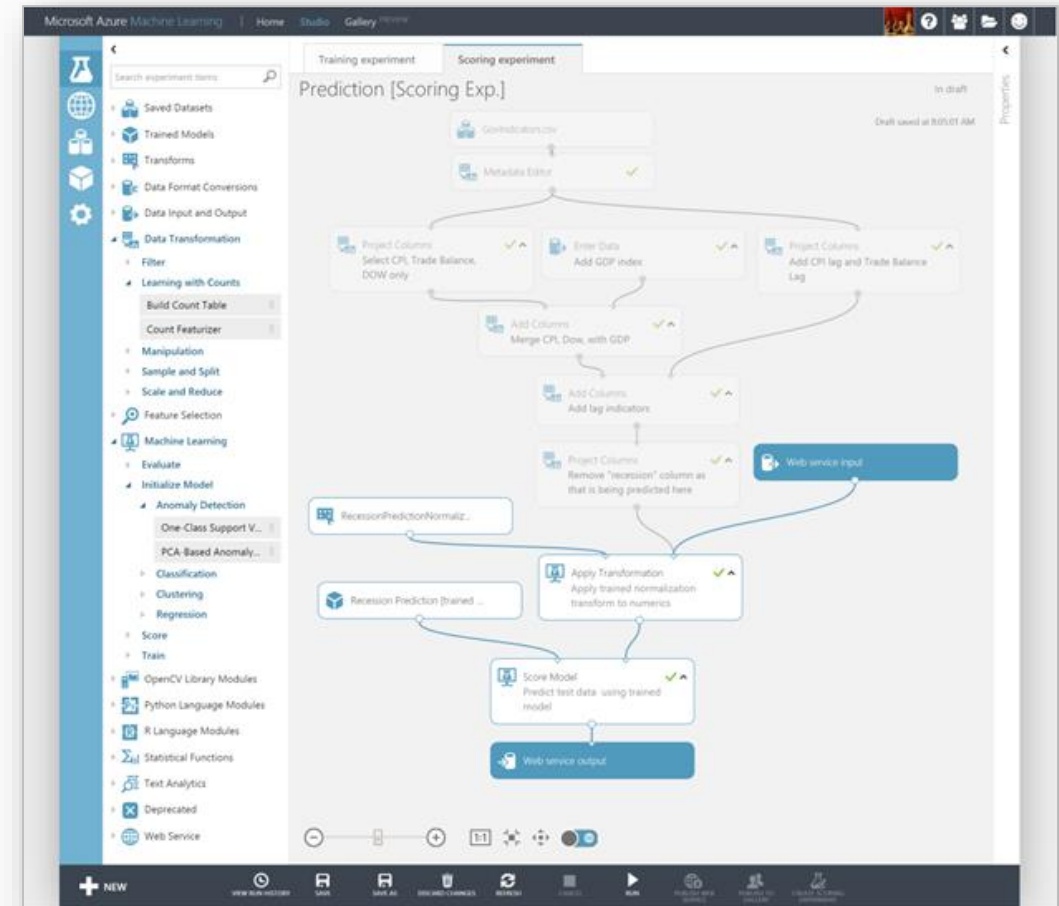
*I spent last semester
building a regression model
in Python, and I just did the
same thing in 10 minutes
with Azure ML*

”

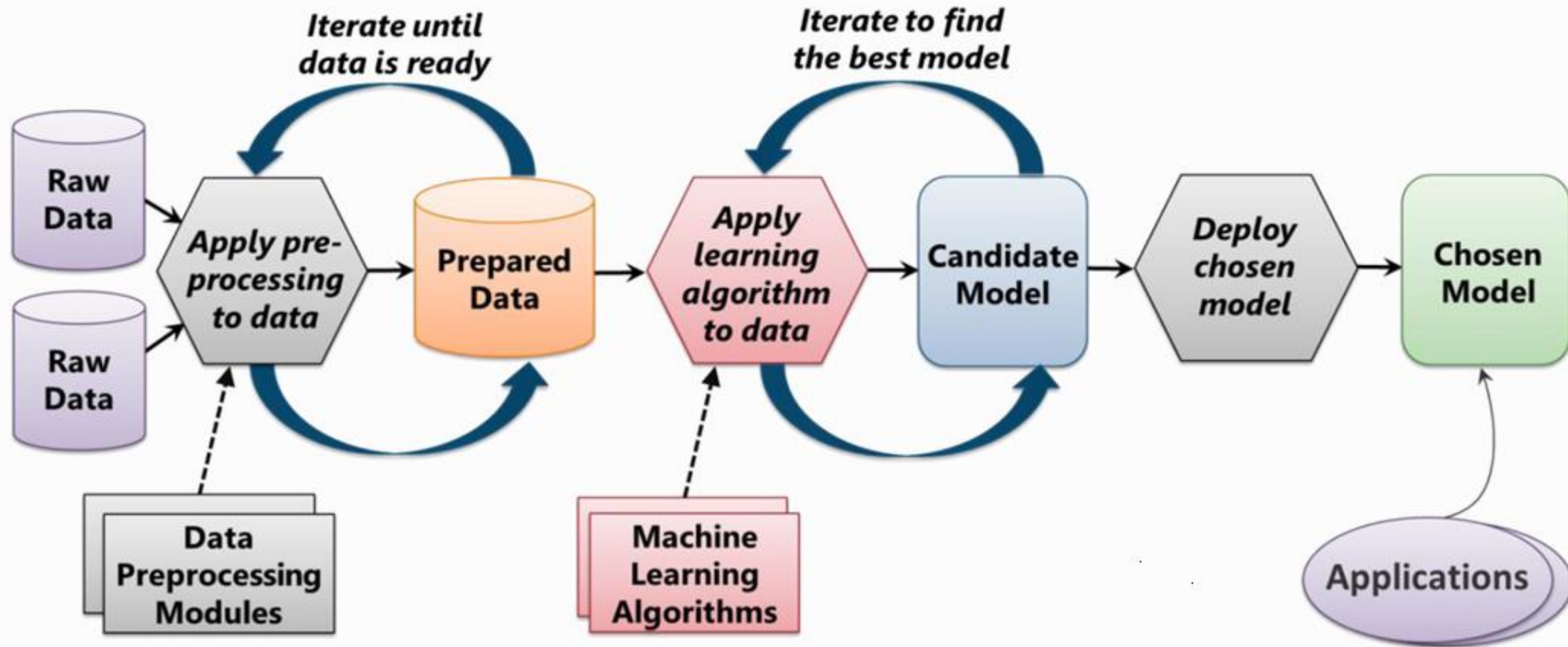
Azure Machine Learning Studio

- Visual editor for composing, testing, and deploying ML models
 - Hundreds of modules
 - 25 algorithms for classification, regression, and more
 - Supports text input, CSV, TSV, OData, RData, ZIP, and more
 - Supports R and Python
- Machine learning for the masses

Microsoft Azure




Machine Learning Process




From: Introduction to Microsoft Azure by David Chappell


Azure ML Algorithms

 Machine Learning


- ▶ Evaluate
- ▶ Initialize Model
 - ▶ Anomaly Detection
 - One-Class Support Vector Machine
 - PCA-Based Anomaly Detection
 - ▶ Classification
 - ▶ Clustering
 - ▶ Regression

 Machine Learning

- ▶ Evaluate
- ▶ Initialize Model
 - ▶ Anomaly Detection
 - ▶ Classification
 - Multiclass Decision Forest
 - Multiclass Decision Jungle
 - Multiclass Logistic Regression
 - Multiclass Neural Network
 - One-vs-All Multiclass
 - Two-Class Averaged Perceptron
 - Two-Class Bayes Point Machine
 - Two-Class Boosted Decision Tree
 - Two-Class Decision Forest
 - Two-Class Decision Jungle
 - Two-Class Locally-Deep Support...
 - Two-Class Logistic Regression
 - Two-Class Neural Network
 - Two-Class Support Vector Machine
 - ▶ Clustering
 - ▶ Regression

 Machine Learning

- ▶ Evaluate
- ▶ Initialize Model
 - ▶ Anomaly Detection
 - ▶ Classification
 - ▶ Clustering
 - K-Means Clustering
 - ▶ Regression

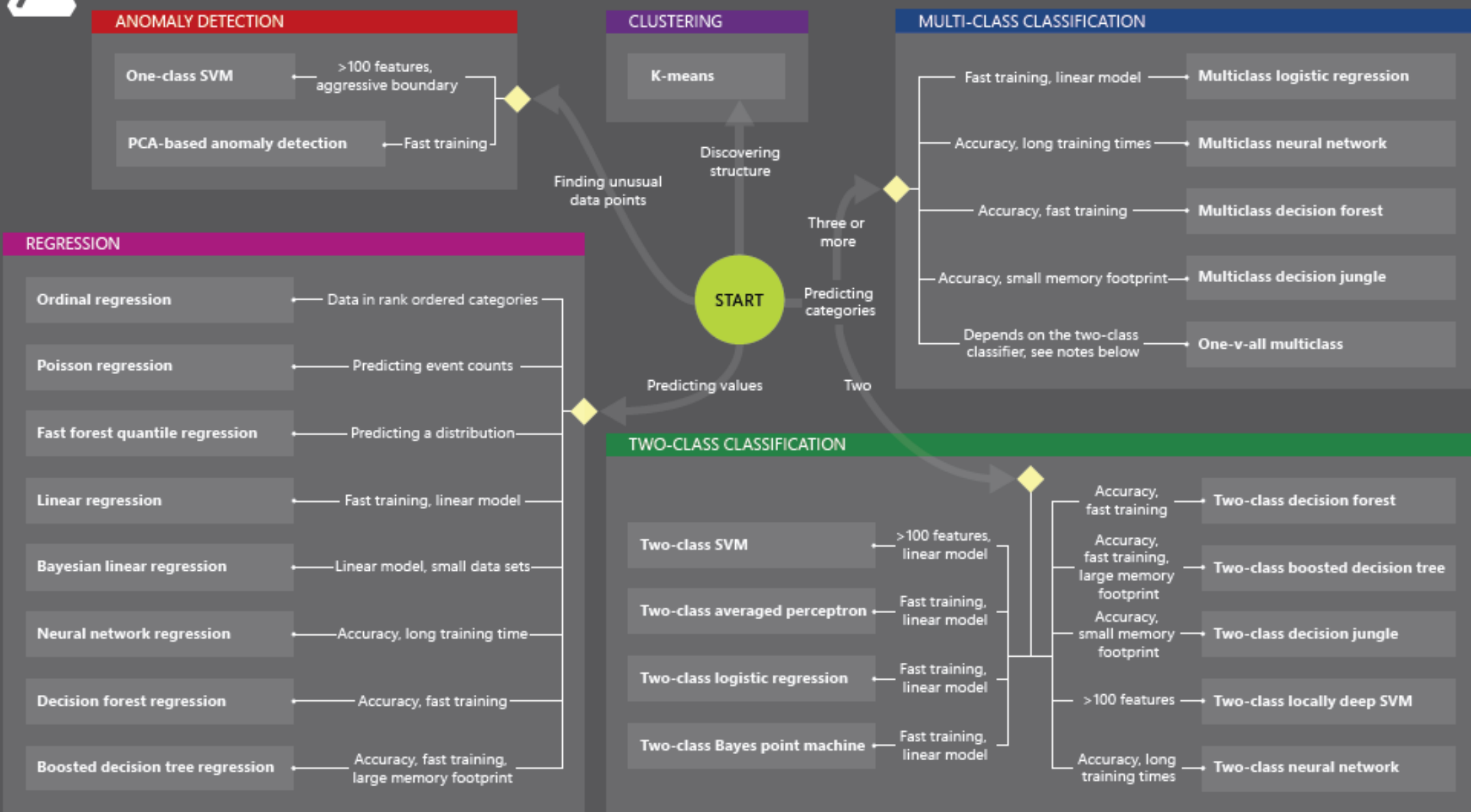
 Machine Learning

- ▶ Evaluate
- ▶ Initialize Model
 - ▶ Anomaly Detection
 - ▶ Classification
 - ▶ Clustering
 - ▶ Regression
 - Bayesian Linear Regression
 - Boosted Decision Tree Regression
 - Decision Forest Regression
 - Fast Forest Quantile Regression
 - Linear Regression
 - Neural Network Regression
 - Ordinal Regression
 - Poisson Regression



Microsoft Azure Machine Learning: Algorithm Cheat Sheet

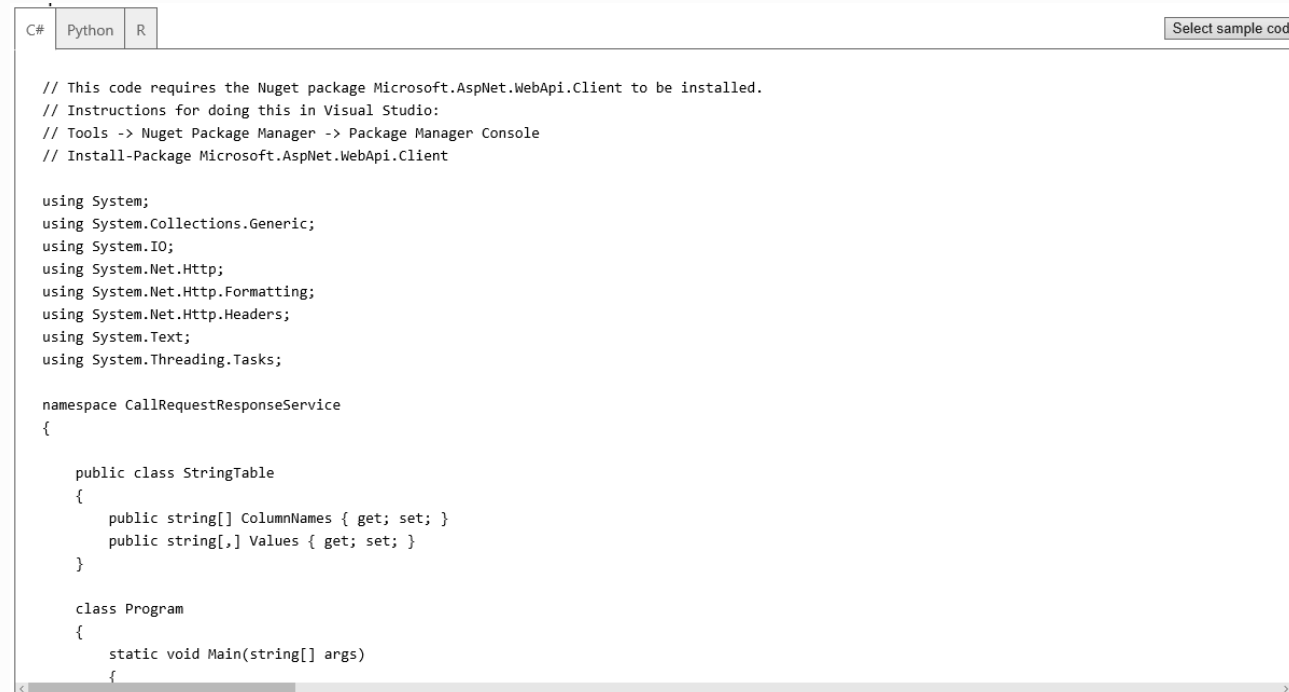
This cheat sheet helps you choose the best Azure Machine Learning Studio algorithm for your predictive analytics solution. Your decision is driven by both the nature of your data and the question you're trying to answer.



<http://aka.ms/MLCheatSheet>

Deploying as a Web Service

- A button click in ML Studio deploys a model as a Web service ("operationalizes" the model) and provides sample code for calling it in three languages



The screenshot shows a code editor window with tabs for C#, Python, and R. The C# tab is active, displaying sample code for calling a web service. The code includes comments about installing the NuGet package Microsoft.AspNet.WebApi.Client and a 'Select sample code' button in the top right corner.

```
// This code requires the Nuget package Microsoft.AspNet.WebApi.Client to be installed.  
// Instructions for doing this in Visual Studio:  
// Tools -> Nuget Package Manager -> Package Manager Console  
// Install-Package Microsoft.AspNet.WebApi.Client  
  
using System;  
using System.Collections.Generic;  
using System.IO;  
using System.Net.Http;  
using System.Net.Http.Formatting;  
using System.Net.Http.Headers;  
using System.Text;  
using System.Threading.Tasks;  
  
namespace CallRequestResponseService  
{  
  
    public class StringTable  
    {  
        public string[] ColumnNames { get; set; }  
        public string[,] Values { get; set; }  
    }  
  
    class Program  
    {  
        static void Main(string[] args)  
        {  
        }  
    }  
}
```

Free e-Book



<http://bit.ly/a4r-mlbook>

Hands-On Lab



Using Azure Machine Learning

[Azure Machine Learning HOL.html](#)



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