

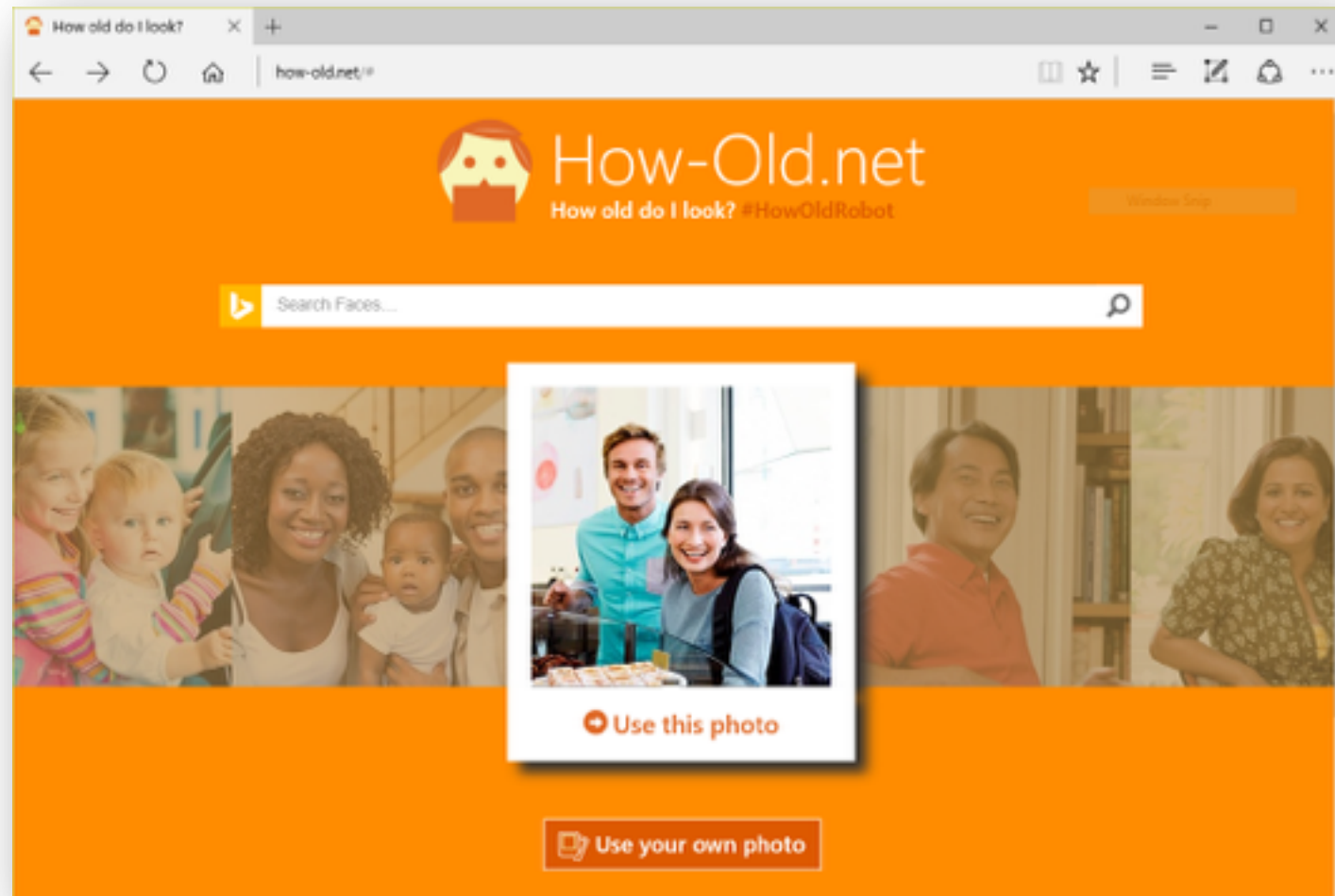
# Azure Machine Learning

# What is Machine Learning?

- Branch of computer science in which a computer "learns" from data in order to perform predictive analytics
  - Credit-card fraud detection
  - Online shopping recommendations
  - Self-driving cars and more
- Supervised learning
  - Regression and classification
- Unsupervised learning
  - Clustering

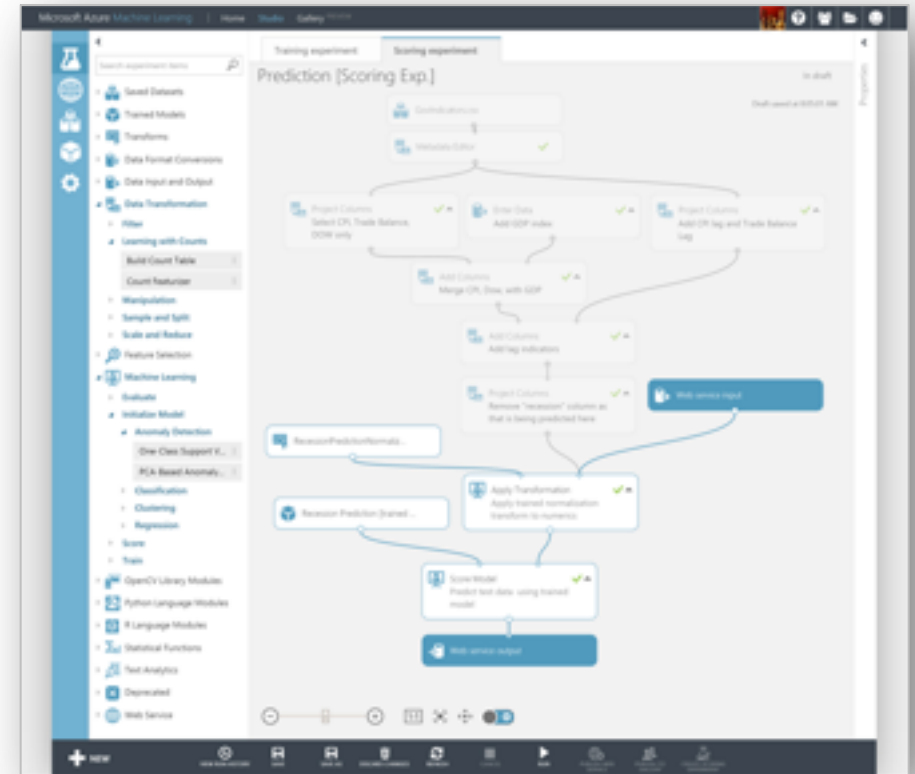


# Machine Learning in Action



# Azure Machine Learning

- Cloud service for building rich Machine Learning models
- ML Studio for composing models
  - Includes hundreds of modules
  - Includes common algorithms for classification, regression, and more
  - Supports numerous input formats
  - Supports R and Python
- Machine Learning for the masses

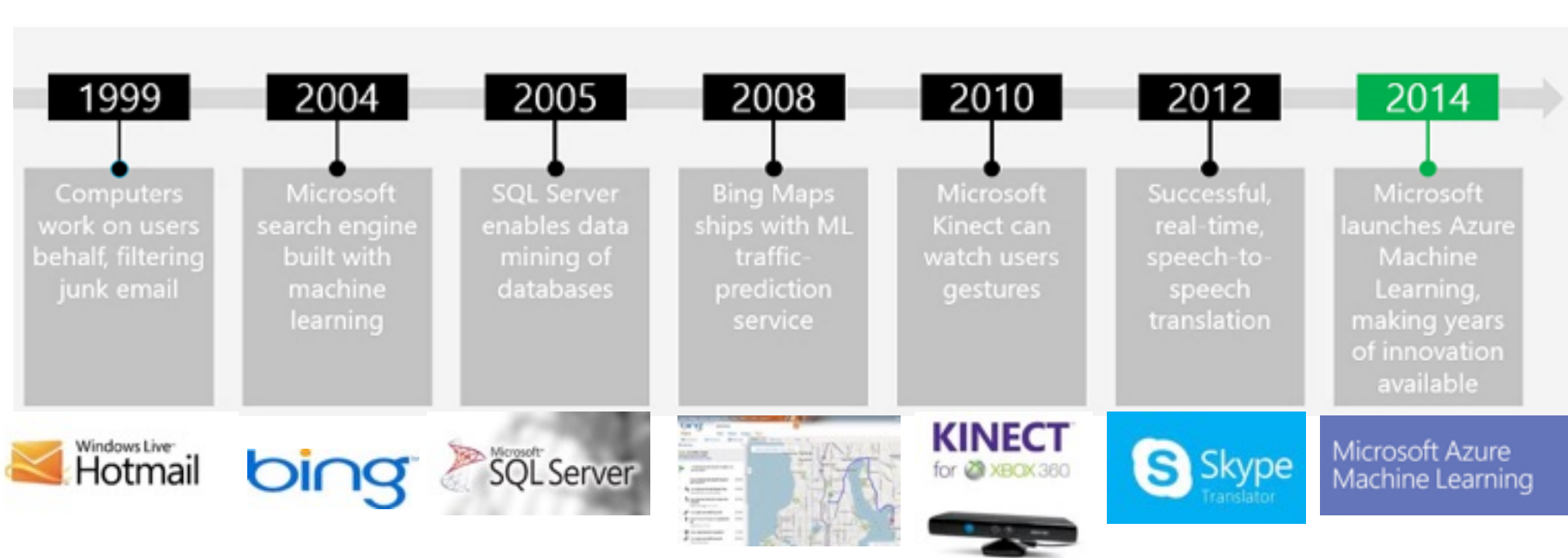


“

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

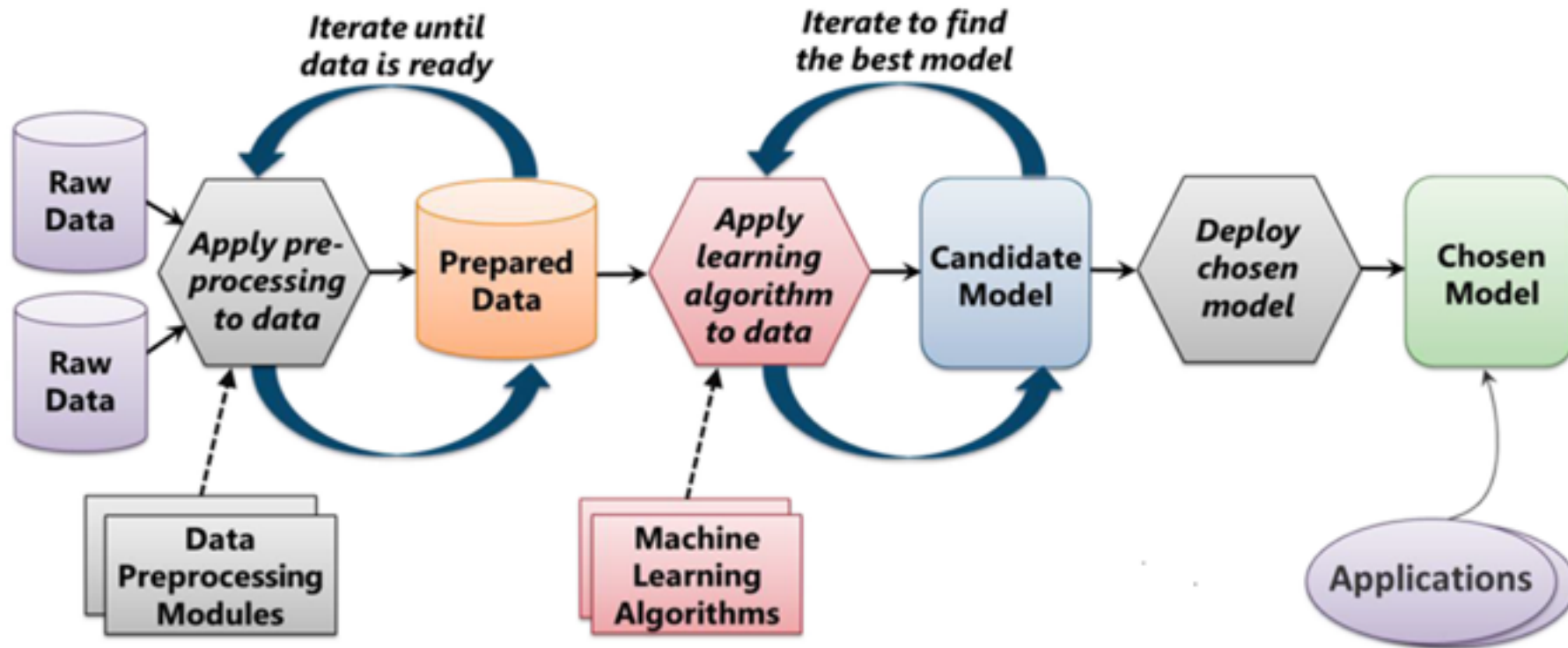
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# Microsoft and Machine Learning



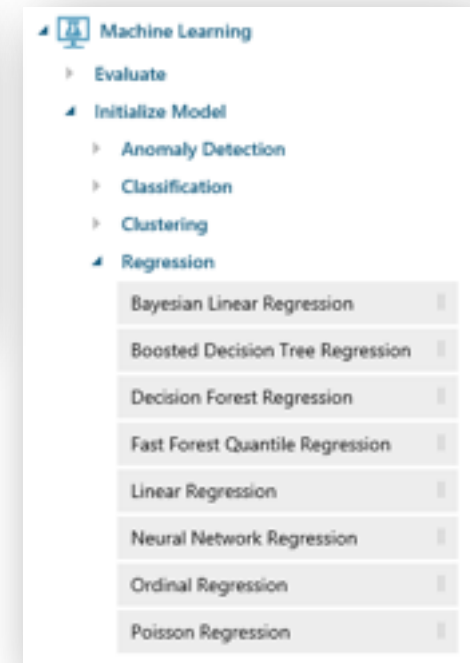
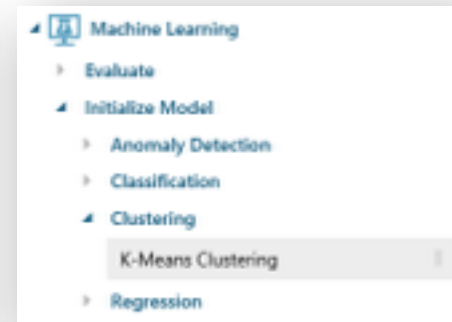
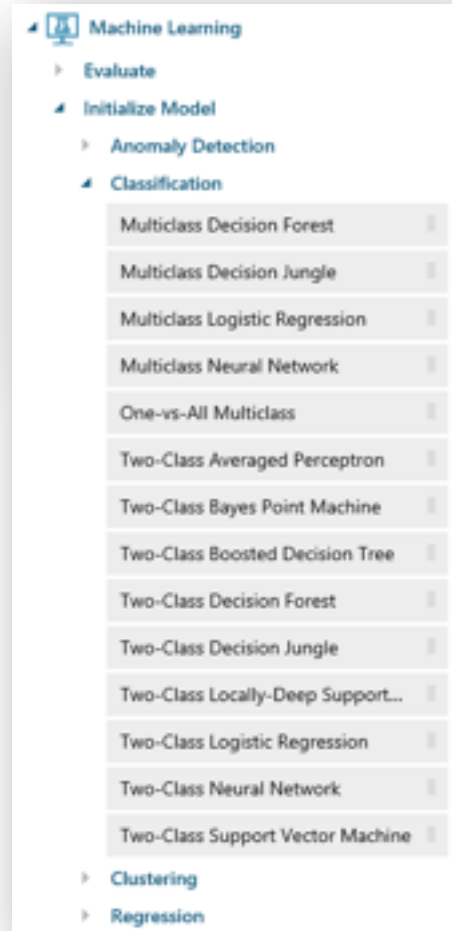
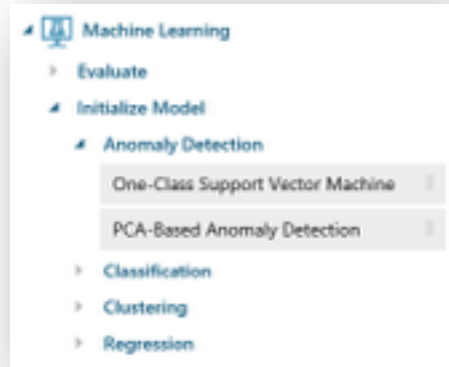
Modified from <http://pulsweb.fr/predict-wine-quality-azureml>

# The Machine Learning Process



From "Introduction to Microsoft Azure" by David Chappell

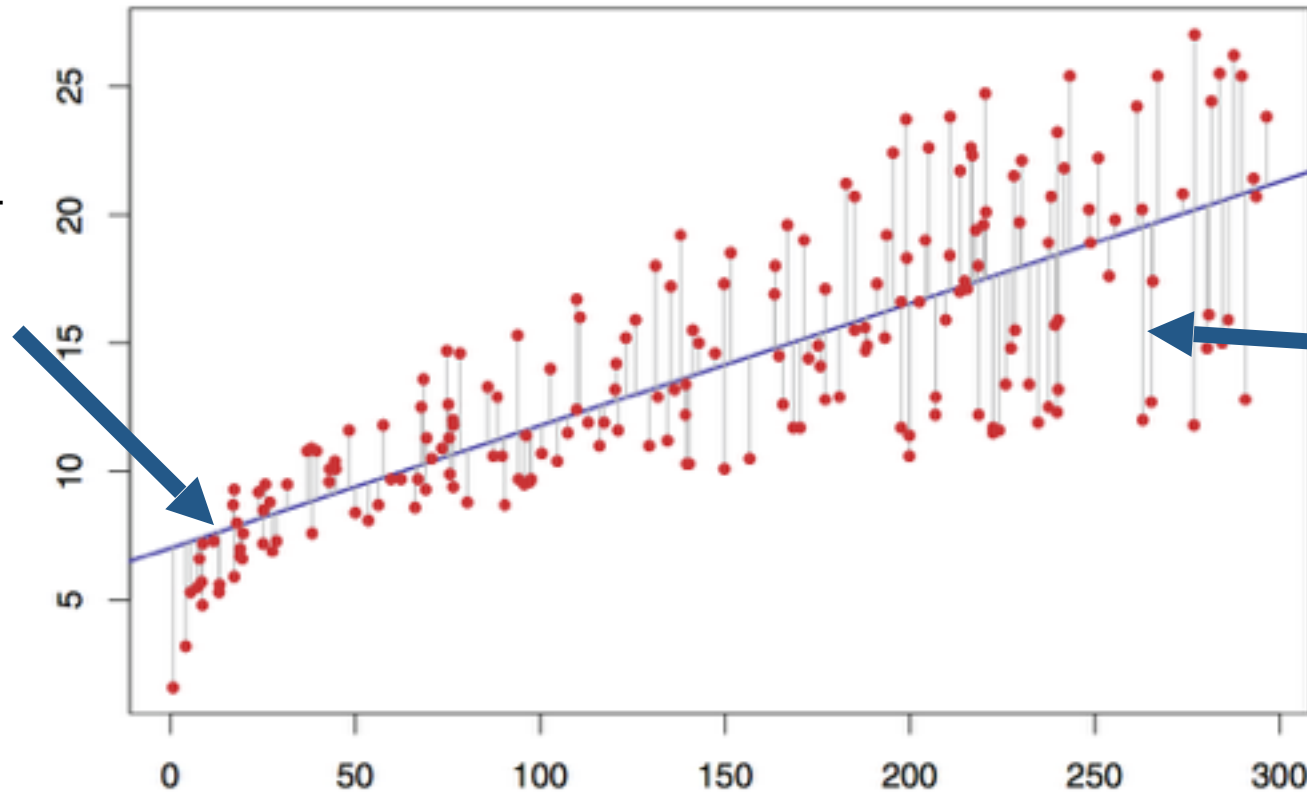
# Azure Machine Learning Algorithms





# Simple (Univariate) Linear Regression

Regression line represented by an equation of the form  $Y = b_0 + b_1X$  where  $Y$  is the dependent variable

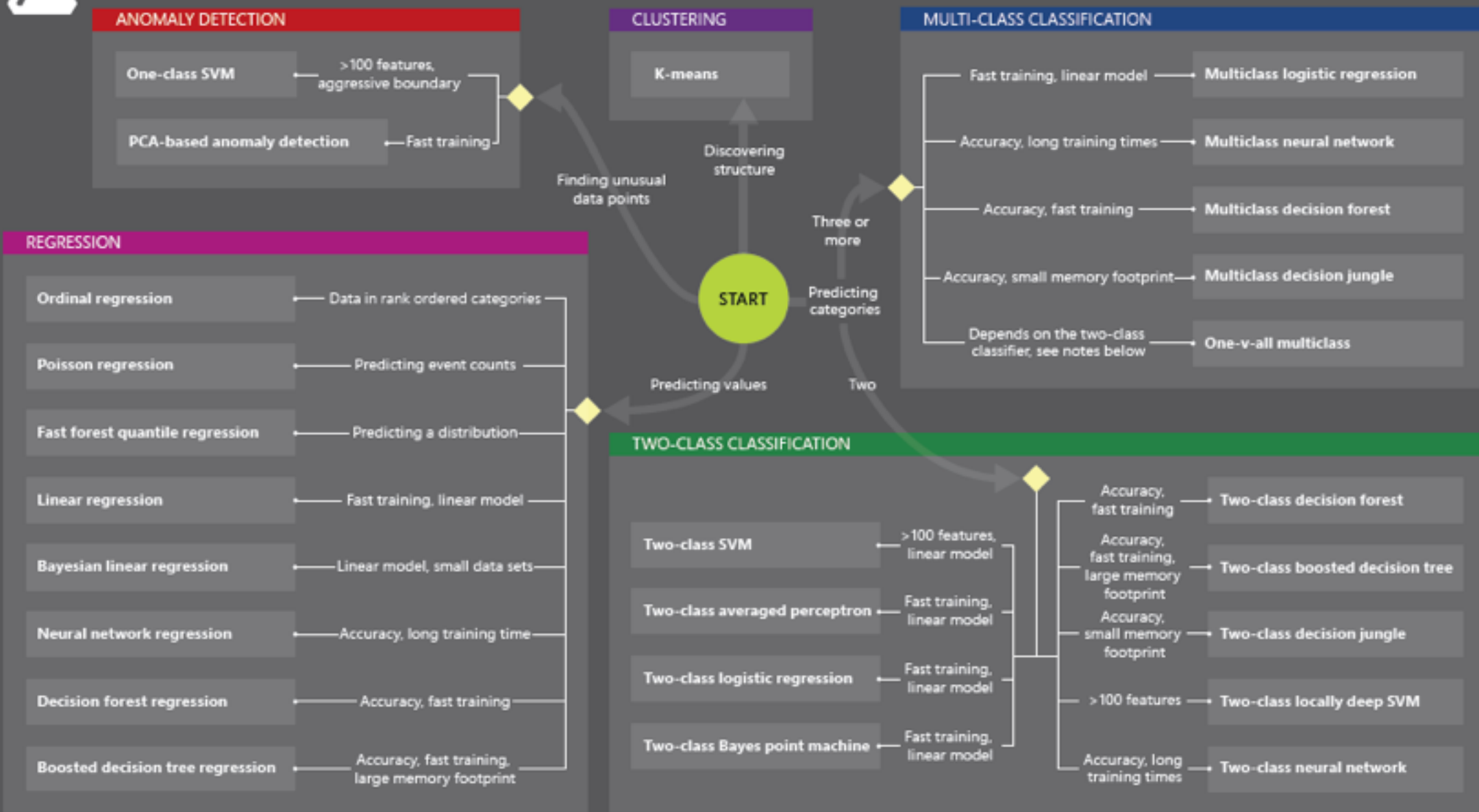


Error between actual and computed output minimized using least-squares or gradient-descent method



# 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 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 Microsoft.AspNet.WebApi.Client NuGet package and using various System and System.Net namespaces. It defines a StringTable class and a Program class with a Main method.

```
C# Python R Select sample code  
  
// 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)  
        {  

```