



Introducing Azure Machine Learning

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Others Talk,
We Listen.

2 Introduction

- Mark Hudson

- >20 years mixing technology with data
- >10 years with CapTech
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- CapTech

- Headquarters – Richmond, VA
- Offices – Reston, VA, Charlotte, NC, King of Prussia, PA, & Baltimore, MD, ...
- Local, national, and international clients
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3 Agenda

- Azure and Machine Learning
- Azure Machine Learning Terminology
- AML Components
- AML Algorithms
- Demo
- Questions



4 Azure and Machine Learning

- **Azure**
 - Microsoft's cloud-based Infrastructure as a Service
 - Virtual machines, storage, databases, web/mobile apps & data analytics
 - Flexible scaling and pricing to meet your needs
- **Machine Learning**
 - “Field of study that gives computers the ability to learn without being explicitly programmed” – Arthur Samuel, 1959
 - Computerized recognition of patterns in data
- **Azure Machine Learning**
 - Circa 2014
 - Constantly, quickly evolving


















5 Azure Machine Learning Terminology

- **Studio**
 - Cloud-based user interface for creating and maintaining experiments
- **Gallery**
 - Publicly available templates, experiments, APIs, tutorials
- **Projects**
 - Organization of Datasets, Experiments, Trained Model, and Web Services
- **Experiment**
 - **Combination of data, transformations & models to produce an predictive outcome**
- **Web Services**
 - Primary means for outputting AML predictions
- **Notebooks**
 - Python 2/3, R, and other development environments
- **Datasets**
 - Uploaded or read into Studio and saved for use in Experiments
- **Trained Models**
 - Predictive models created from Experiments and saved for later use



6 Focused AML Components

- Data
 - Saved Datasets
 - Data Input Reader – Web, Azure SQL, Azure Hive
- Data Transformation
 - Manipulation, Sample & Split
- Machine Learning
 - Initialize Model, Train, Score, Evaluate
- Python Language Module
- R Language Module
- Statistical Functions
- Text Analytics

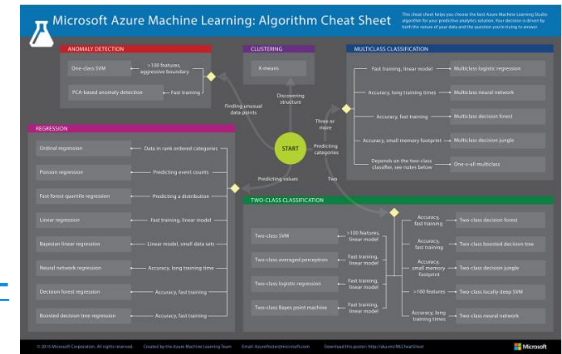
- ▶  Saved Datasets
- ▶  Trained Models
- ▶  Transforms
- ▶  Data Format Conversions
- ▶  Data Input and Output
- ▶  Data Transformation
- ▶  Feature Selection
- ▶  Machine Learning
- ▶  OpenCV Library Modules
- ▶  Python Language Modules
- ▶  R Language Modules
- ▶  Statistical Functions
- ▶  Text Analytics
- ▶  Web Service
- ▶  Deprecated

7 AML's Available Algorithms

- Anomaly Detection
 - 2 models detecting abnormal activities
- Classification
 - 14 models resulting in 2-class (Y/N) or multi-class (A/B/C ...) classes
- Clustering
 - 1 model organizing data into groups with similar characteristics
- Regression
 - 8 models resulting in actual predicted values

- Machine Learning
 - ▶ Evaluate
 - ▶ Initialize Model
 - ▶ Anomaly Detection
 - ▶ Classification
 - ▶ Clustering
 - ▶ Regression
 - ▶ Score
 - ▶ Train

<https://azure.microsoft.com/en-us/documentation/articles/machine-learning-algorithm-cheat-sheet/>



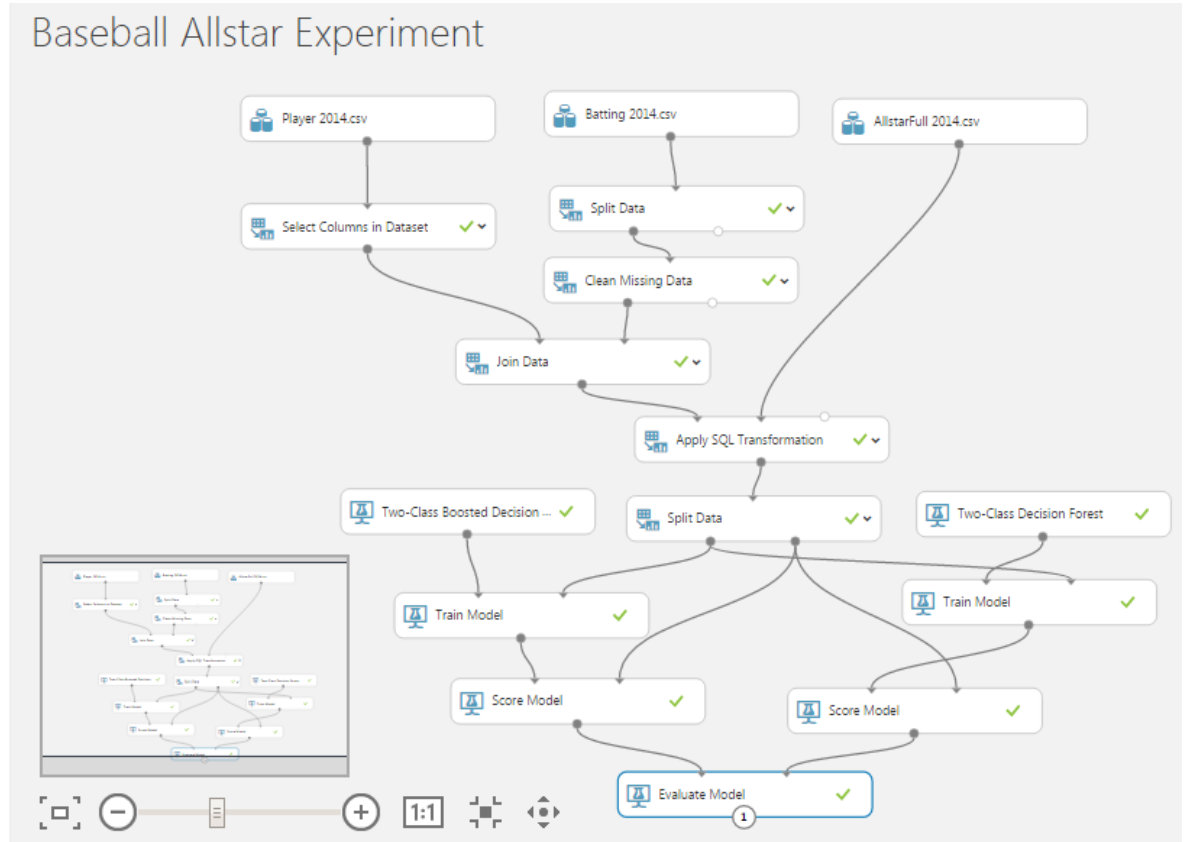
8 Demo

- Azure Machine Learning Studio
 - <https://studio.azureml.net/Home/>
- Lahman's Baseball Database
 - <http://www.seanlahman.com/baseball-archive/statistics/>



9 Demo – Steps & Results

- Batting data – exclude years, exclude AL pitchers, include only certain batting statistics
- Player data – include only certain player attributes
- Inner join Player and Batting data
- Left join Player/Batting data to Allstar data to set AllstarFlag; this is your result set for machine learning
- Split remaining result set into Training and Testing data sets
- Add any 2-class machine learning model, train the model using your Training data set, score the model with your Testing data set, evaluate the model using the score results, run and visualize the Evaluate Model results
- Add any number of 2-class machine learning models, train them using the same Training data set above, score them using the same Testing data set, evaluate results of any 2 scored models at a time
- Save a copy of your final experiment, click your best model, click Set Up Web Service to convert your trained model for predictions



10 A Second Opinion

“Why don't more people talk about how awesome this is?”

A true story about Azure Machine Learning -

<http://www.capttechconsulting.com/blogs/trying-out-azure-ml>

- Vicki Boykis

11 Azure Machine Learning Material

Hands-On with Azure Machine Learning

https://mva.microsoft.com/en-US/training-courses/handson-with-azure-machine-learning-16638?l=2oXJxvJrC_506218965

Microsoft's Channel 9

<https://channel9.msdn.com/Search?term=azure%20machine%20learning#ch9Search>

Split Data Options & Examples

<https://msdn.microsoft.com/en-us/library/azure/dn905969.aspx>

12 General Machine Learning Material

Machine Learning is Fun!

<https://medium.com/@ageitgey/machine-learning-is-fun-80ea3ec3c471#.t8hxzkxmo>

13 Questions

