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Introducing Azure Machine Learning

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Others Talk,
We Listen.

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3 Agenda

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

Azure
Machine Learning

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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

Microsoft Azure

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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

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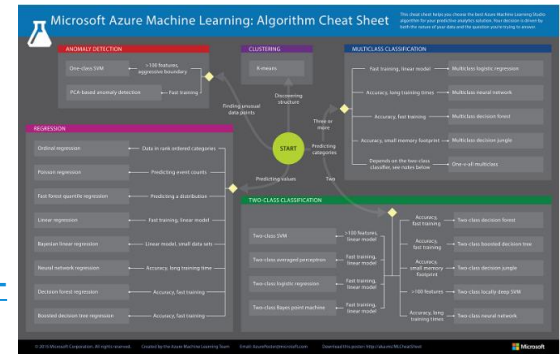
Saved Datasets
Trained Models
Transforms
Data Format Conversions
Data Input and Output
Data Transformation
Feature Selection
Machine Learning
OpenCV Library Modules
Python Language Modules
R Language Modules
Statistical Functions
Text Analytics
Web Service
Deprecated

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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

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

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

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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

Baseball Allstar Experiment

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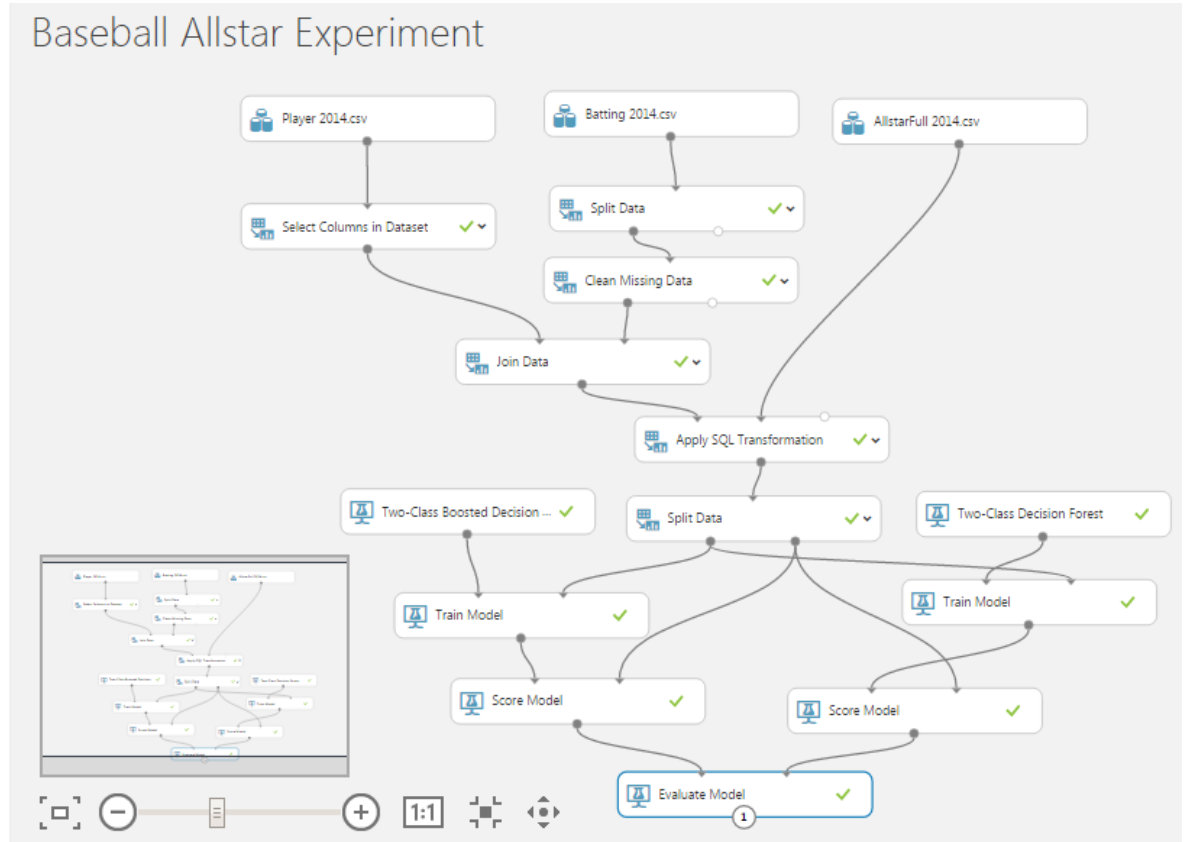
"Why don't more people talk about how awesome this is?"
A true story about Azure Machine Learning -
http://www.captechconsulting.com/blogs/trying-out-azure-ml
- Vicki Boykis

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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

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Machine Learning is Fun!
https://medium.com/@ageitgey/machine-learning-is-fun-80ea3ec3c471#.t8hxzkxmo

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