

Azure Machine Learning

Knowledge Transfer Session
February 2017

BUSINESS
CONSULTANTS

DEEP
TECHNOLOGISTS





AI, ML, and DL:

Artificial Intelligence, Machine Learning, and Deep Learning

◆ Artificial Intelligence:

AI refers to making a machine “smart” by getting it to act without being explicitly programmed to act. Essentially, it is human intelligence/behavior exhibited by a machine.

◆ Machine Learning:

Machine Learning is a current application of AI based around the idea that we should really just be able to give machines access to data and let them learn for themselves.

◆ Deep Learning:

The subset of machine learning composed of algorithms that permit software to train itself to perform tasks, like speech and image recognition.

What is Machine Learning?

- ◆ Using known data to develop a model that predicts unknown data
 - ◆ Known Data: Big enough archive, previous observations, past data model:
Known data + ML algorithms
 - ◆ Unknown Data: missing, unseen, non-existent, future data





What language?

Which ads to show, and in what order?

Misspelled?

Which links are most likely to get clicked?

What is the probability of a click on each ad?

What is the intent?

Are any of these pages malicious?

Machine learning enables nearly every value proposition of web search.

8,140,000 RESULTS Any time ▾

Ads related to getting a mortgage in seattle

[15-Year Mortgage Rates | QuickenLoans.com](#)

[www.QuickenLoans.com/Rates](#)

Lock Your Rate. 3.500% (3.92% APR) With America's #1 Online Lender.

[Lendi](#)

[Lendi](#)

APR fr

[TILA](#)

[seattle](#)

Meet o

[Pre C](#)

[www.wellsfargo.com/mortgage](#)

Estimate how much you can afford

Including results for *getting a mortgage in seattle*.

Do you want results only for *getting a mortgage in seattle*?

[Seattle Mortgage Rates - Find the Best Home Loan | Zillow](#)

[www.zillow.com/mortgage-rates/wa/seattle](#)

See up to the minute Seattle mortgage rates and find Seattle Washington's best, lowest possible quote with Zillow Mortgage Marketplace.

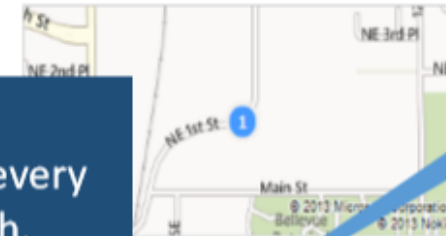
[Seattle's Best Mortgage](#)

[www.seattlesbm.com](#)

Get the best mortgage loan for you at Seattle's Best Mortgage. (CL#117721) When you decide to buy a home or refinance a mortgage, it's a big step.

1 11911 Ne 1st St Ste B306, Bellevue · (425) 228-7000 · [Directions](#) · Bing Local

Seattle's Best Mortgage Inc



St Ste B306 - Bellevue
0 - Directions

Website: [seattlesbm.com](#)

[Report a problem](#)

RELATED SEARCHES

[Getting a First Mortgage](#)

[Getting a Mortgage Self-Employed](#)

[Getting a Mortgage Loan Approved](#)

[Getting a Mortgage On Land](#)

[Getting a Mortgage in 2013](#)

[How to Get a Mortgage License](#)

[How to Get a Mortgage After Bankruptcy](#)

[Mortgage Calculator](#)

Ads related to getting a mortgage in seattle

What pages should we index?

What ad pricing will optimize revenue?



Text Analytics: User reviews

Positive

Text Analytics - Preview by [Azure Machine Learning](#) [Demo](#) [Sample Code](#) [Docs](#)

Try out the Azure ML [Text Analytics service](#) - for free.

To use the service in production, you can get access to its API by [signing up](#) for it (click on "Sign Up" on the right pane on that page). For questions/comments, please use the "Feedback" button in the top right.

I love this presentation. I found it very useful.

Analyze

Sentiment:

98 %

Key phrases highlighted below:

I love this **presentation**. I found it very useful.

Negative

Text Analytics - Preview by [Azure Machine Learning](#) [Demo](#) [Sample Code](#) [Docs](#)

Try out the Azure ML [Text Analytics service](#) - for free.

To use the service in production, you can get access to its API by [signing up](#) for it (click on "Sign Up" on the right pane on that page). For questions/comments, please use the "Feedback" button in the top right.

I hate this presentation. I found it very useless.

Analyze

Sentiment:

7 %

Key phrases highlighted below:

I hate this **presentation**. I found it very useless.

Types of Learning

Supervised Learning

- Machine learns from labeled (known) data
- Each input has an output



Unsupervised Learning

- Discern any kind of structure present in data set
- No “labeled” information to assist



Semisupervised Learning

- Learn from both labeled/unlabeled data
- Useful when getting labeled data is expensive



Reinforcement Learning

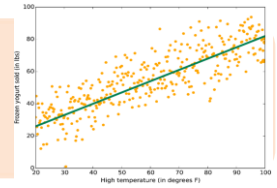
- Action results in “reward”
- Inputs have positive or negative outcomes



Common ML Algorithms

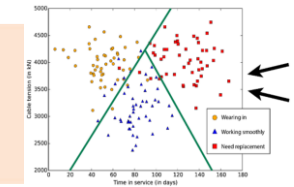
Regression

- Supervised Learning
- Predicting a numerical value



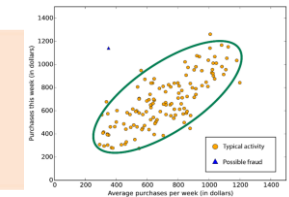
Classification

- Supervised Learning
- Answering a “yes or no” question



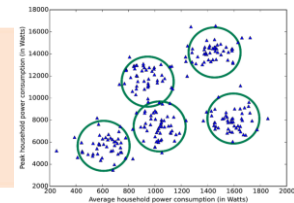
Anomaly Detection

- Supervised Learning
- Finding something atypical, or unusual

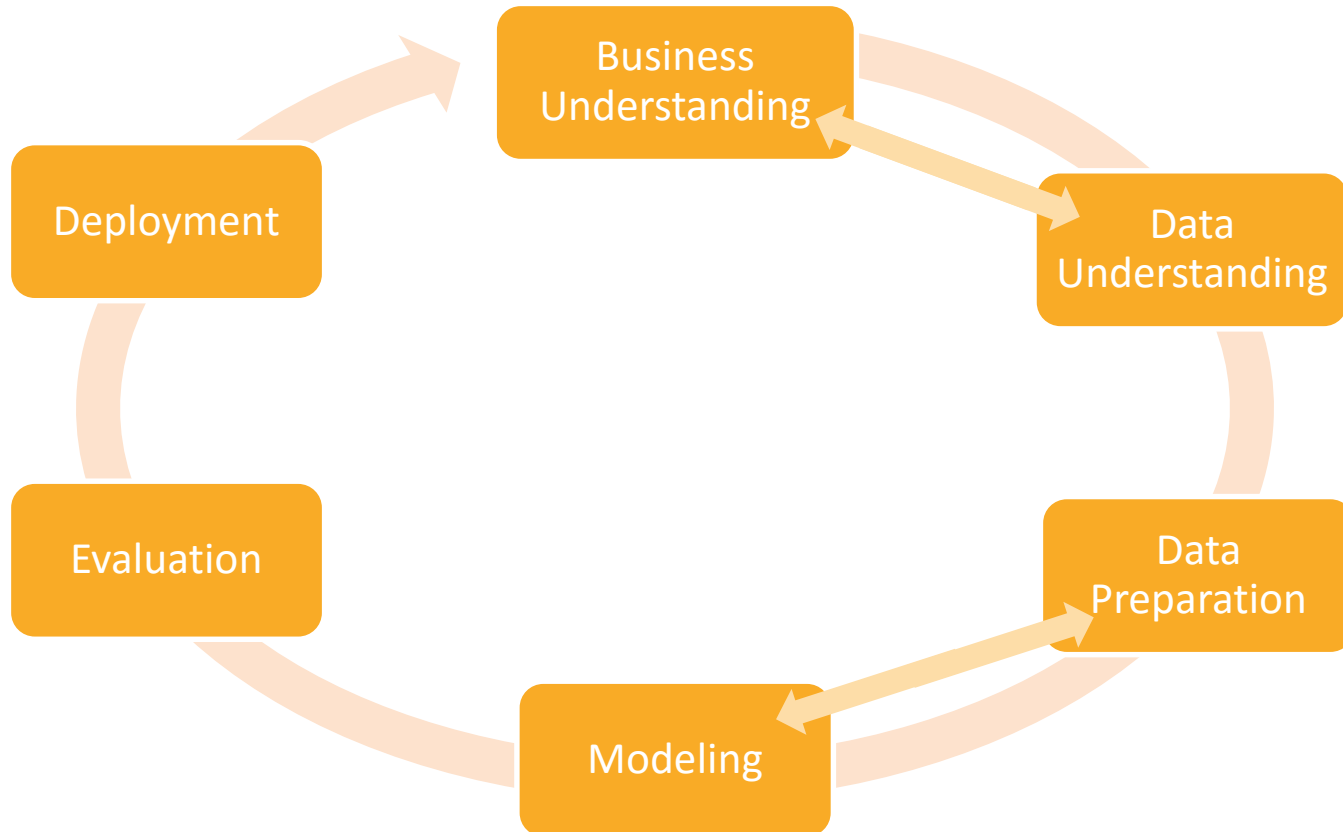


Clustering

- Unsupervised Learning
- Grouping similar data to find a pattern

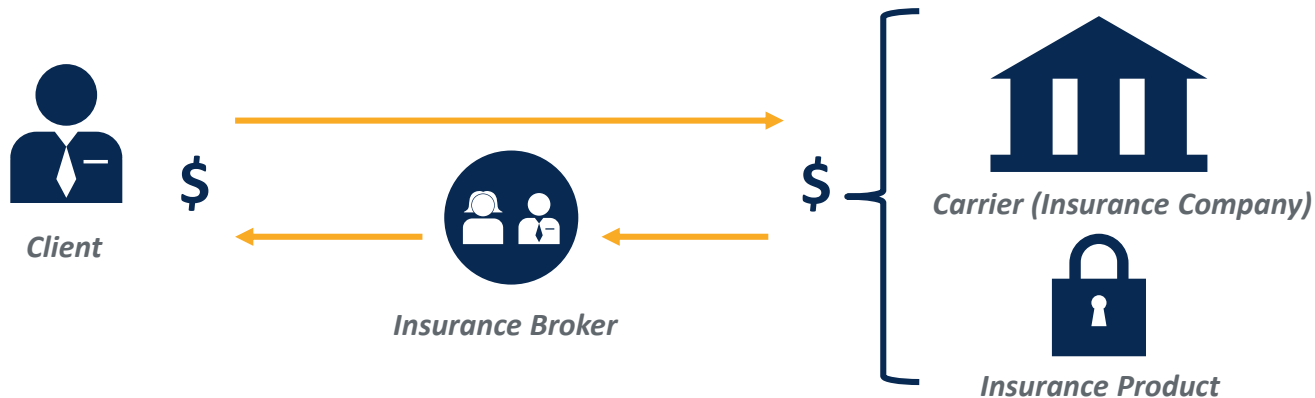


ML Project Life Cycle – CRISP-DM Model



WMP ML Project Example:

- ◆ Insurance Brokerage needs ML Model to predict insurance upsells
- ◆ Upsell: an additional insurance product sold to an existing client
- ◆ The Big Question: What additional products will a client buy, and how likely is the client to buy them?
- ◆ Why ML? Millions of products exist!



ML as a Service Platforms

- ◆ Microsoft Azure ML
- ◆ Amazon Machine Learning
- ◆ BigML
- ◆ DataRobot
- ◆ FICO
- ◆ Google Cloud ML
- ◆ IBM Watson
- ◆ PurePredictive
- ◆ Yottamine

Microsoft Azure Machine Learning

- ◆ Web based UI
- ◆ Shared ML workspace for easy collaboration/sharing
- ◆ Drag & drop for visual design/development
- ◆ Wide range of ML Algorithms available
- ◆ Extend with OSS R and/or Python scripts
- ◆ Share and document with IPython and/or Jupyter
- ◆ Deploy, publish, and scale rapidly using APIs

Microsoft Azure Machine Learning

Fully managed

No software to install, no hardware to manage, all you need is an Azure subscription.

Integrated

Drag, drop and connect interface. Data sources with just a drop down; run across any data.

Flexible

Built-in collection of best of breed algorithms with no coding required. Drop in custom R or use popular CRAN packages.

Deploy in minutes

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

Lab Time!



Next steps: What now?

- ◆ More labs available here:
 - ◆ <https://github.com/melzoghbi/DataCamp>
 - ◆ Material owner's blog: <http://www.mostafaelzoghbi.com/>
- ◆ Free material from Microsoft available on Virtual Academy
- ◆ Check out the sources on next slide

SOURCES

- ❖ <http://www.mostafaelzoghbi.com/>
- ❖ <https://github.com/melzoghbi/DataCamp>
- ❖ <https://www.the-modeling-agency.com/crisp-dm.pdf>
- ❖ <http://www.forbes.com/sites/bernardmarr/2016/12/06/what-is-the-difference-between-artificial-intelligence-and-machine-learning/#637b2f01687c>
- ❖ <https://blogs.nvidia.com/blog/2016/07/29/whats-difference-artificial-intelligence-machine-learning-deep-learning-ai/>
- ❖ <http://www.wired.co.uk/article/machine-learning-ai-explained>
- ❖ <http://fortune.com/ai-artificial-intelligence-deep-machine-learning/>
- ❖ http://www.sas.com/en_us/insights/analytics/machine-learning.html
- ❖ http://www.public.asu.edu/~huanliu/dmml_presentation/zhao.pdf
- ❖ <https://www.elen.ucl.ac.be/Proceedings/esann/esannpdf/es2009-3.pdf>
- ❖ <http://www.butleranalytics.com/10-machine-learning-as-a-service-platforms/>
- ❖ <http://dataconomy.com/2015/01/whats-the-difference-between-supervised-and-unsupervised-learning/>
- ❖ <http://www.datasciencecentral.com/profiles/blogs/the-data-science-project-lifecycle>