

# Machine Learning applied to Planetary Sciences

PTYS 595B/495B

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<https://leonpalafox.github.io/MLClass/>



Biden: What if we tell them that ICA stands for I Can Achieve  
Obama: Joe, they're in the middle of a quiz.  
Biden: Just think about it.

# Quiz Answers

- Hold-Out takes less time to compute and is easier to implement. K-Fold uses all of our data and there is no waste.
- There aren't any training datasets that are valid.
- ICA will probably be the best tool, since K-Means is a clustering algorithm and PA doesn't really care about the sources of the data.
- K-Means finds clusters for the current dataset, while PCA reduces the number of features by finding the components of maximum variation.
- As we increase the number of features, basic concepts like metrics and distances become less representative of the data.
- The Shuttle was planned to do up to 50 missions per year, as pitched to the Nixon Administration, it ended with an average of 4

# PSA

- There is supposed to be a teacher evaluation going around.
  - Got like 30 mails reminding me of that.
  - They are a nice feature, they don't really work
    - Good idea
    - Zero action on the feedback
    - They don't measure learning, but likeability.

# In the news

## Amazon Go is a grocery store with no checkout lines

It's a vision of what the future of physical retail can be.



Devindra Hardawar , @devindra  
12.05.16 in Business

79  
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It looks like those rumors of Amazon convenience stores were true. The online shopping giant unveiled Amazon Go today, its spin on brick and mortar retail. It uses computer vision, a whole bunch of sensors and deep learning to let you walk into a store, sign in with an Amazon Go app, fill up your bags and leave without stopping for a checkout line. Amazon is calling it a "Just Walk Out Shopping" experience, a self-descriptive name if there ever was one. The company is starting out with a large store in Seattle, but it's clearly meant to serve as a model for other locations and retail stores.

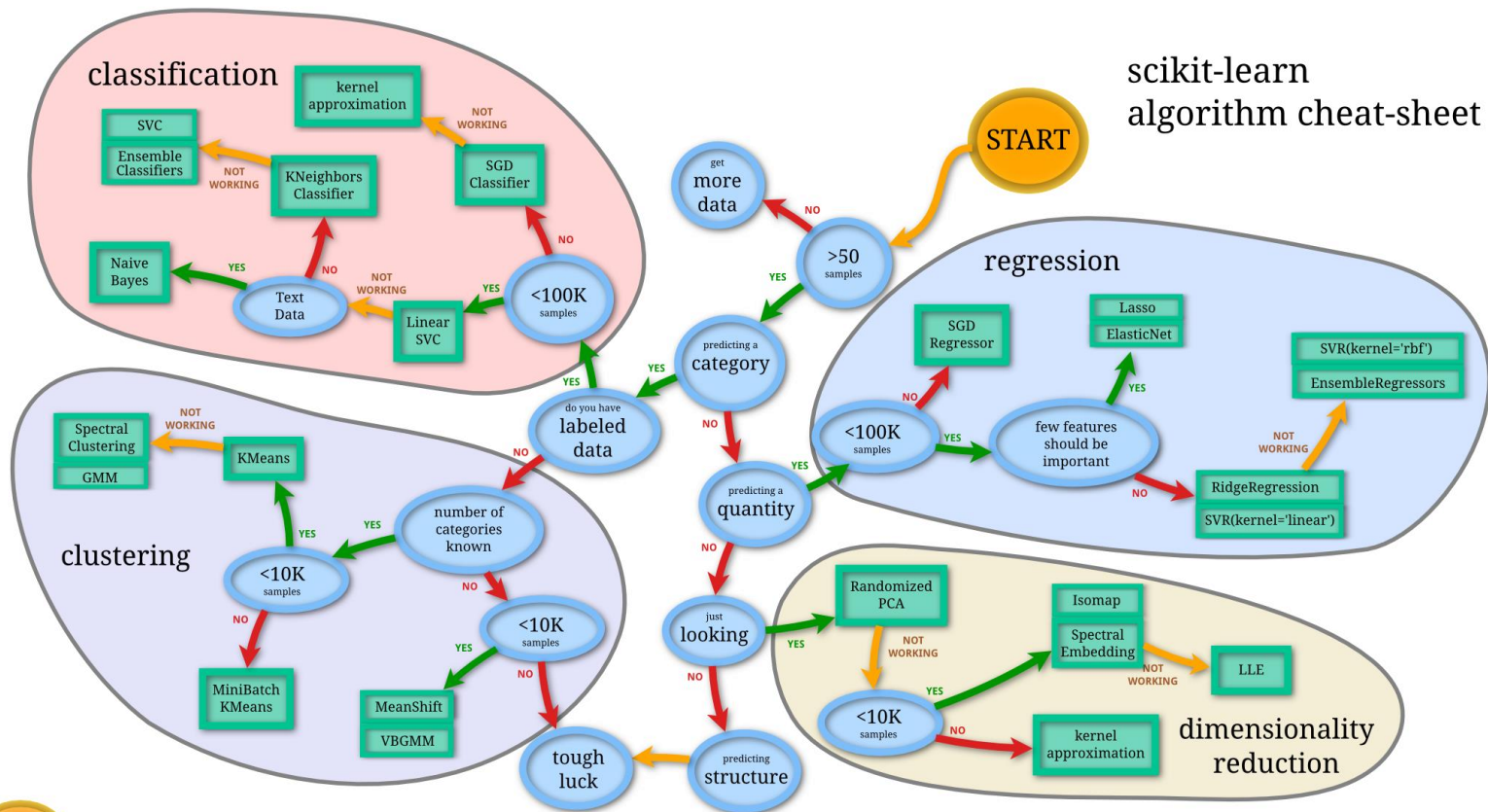
<https://www.engadget.com/2016/12/05/amazon-go-grocery-store/>

# How would you do it?

- Input:
- Technique:
- Validation:

# Machine Learning Cheat Sheet

scikit-learn  
algorithm cheat-sheet



[http://scikit-learn.org/stable/tutorial/machine\\_learning\\_map/](http://scikit-learn.org/stable/tutorial/machine_learning_map/)

# Future of Machine Learning

- Machine Learning as an industry is becoming exciting.
- More computational power and Deep Learning are starting to shape many companies.
- Apple just started publishing their AI work (A first from Apple research labs)
- Most people agree that ML is the new industrial revolution.



# Consequences and Expectations

- Even more specialization for jobs.
  - More unemployment
- Areas that do not take it seriously, may sin of being obsolete.
  - Scientific Publishing
- Field Experts with ML Knowledge will become a commodity.

# Objectives of this class

- Familiarize people with Machine Learning and show them how can it be used in real-world scenarios.
- Show how different datasets and problems have unique problems.
- Show that Machine Learning is far from Plug-and-Play, it still needs knowledge about the algorithms and the data.
- Get people excited about Machine Learning.