

Machine Learning

Hello, world!

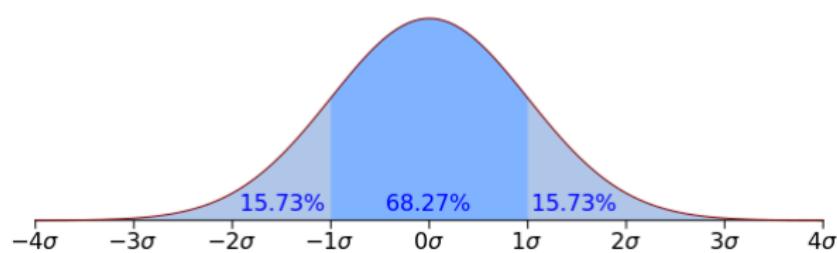
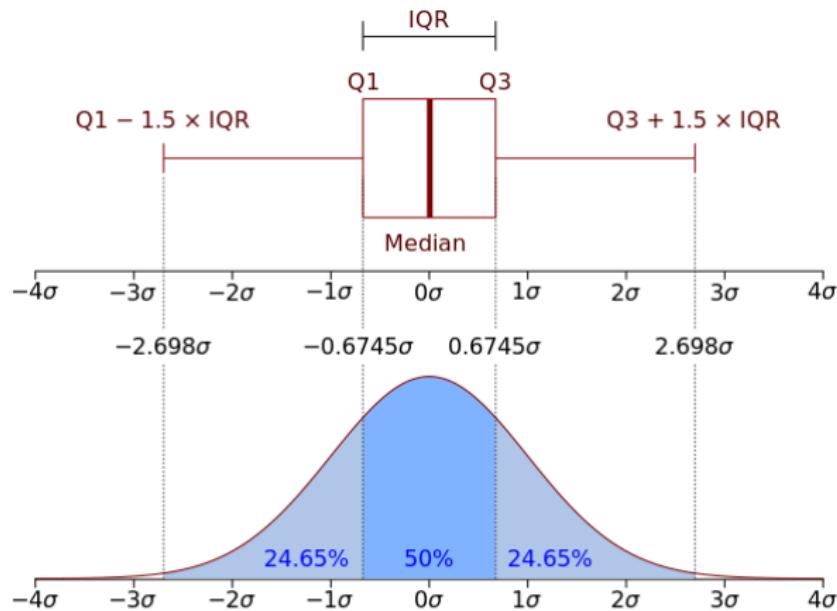
Jeff Abrahamson

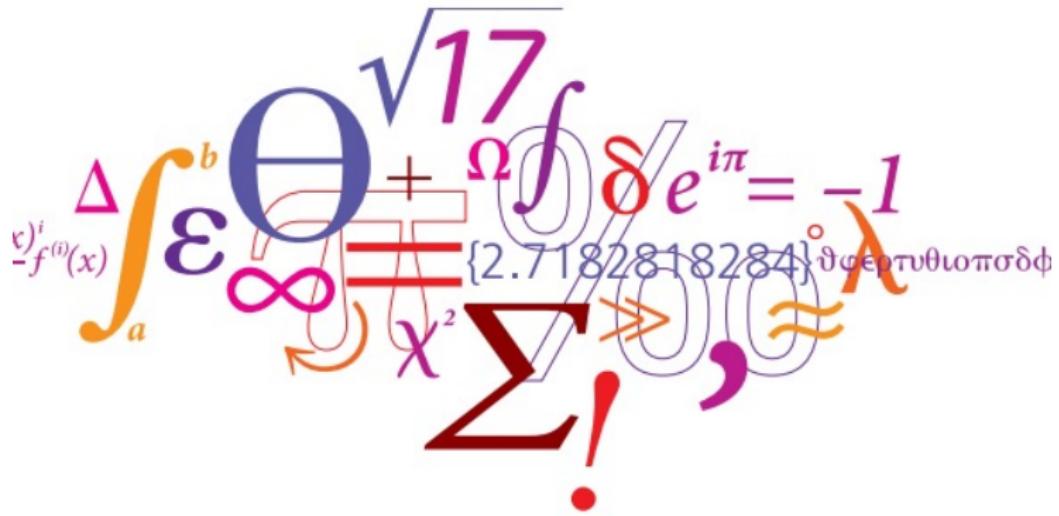
2 March 2016

Machine Learning

Data Science

Statistics



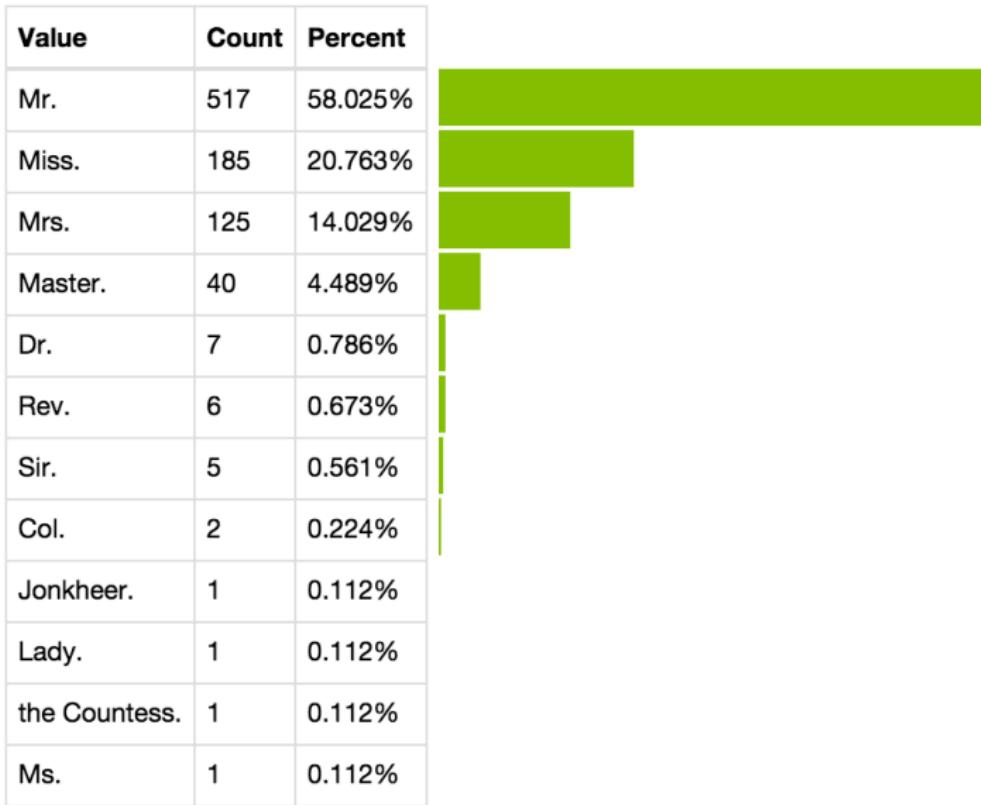


Maths

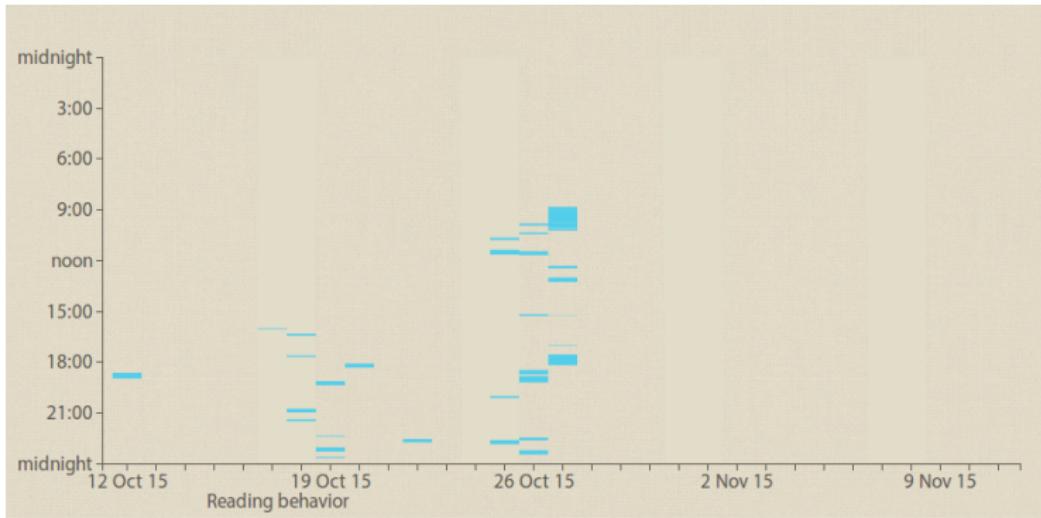
Vector Space

Features

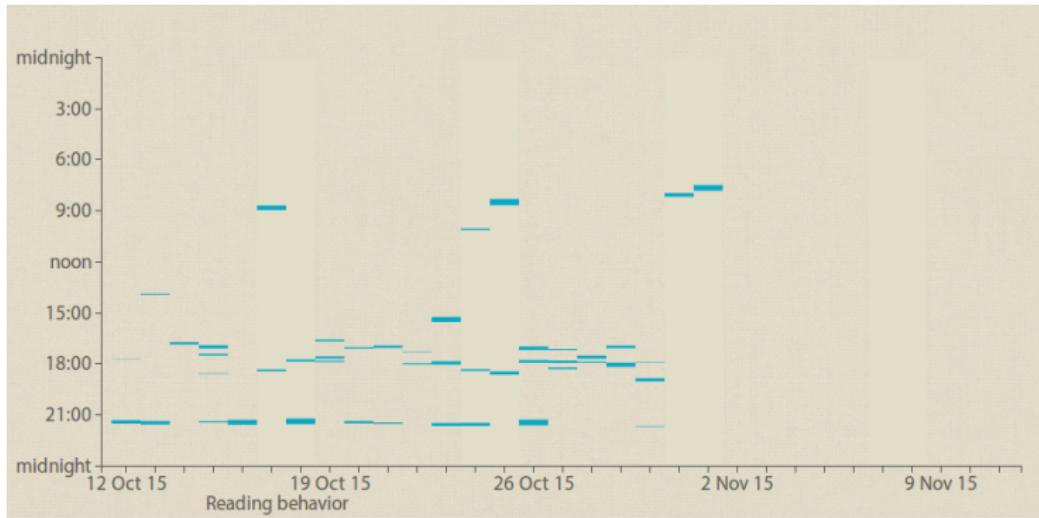
Feature engineering



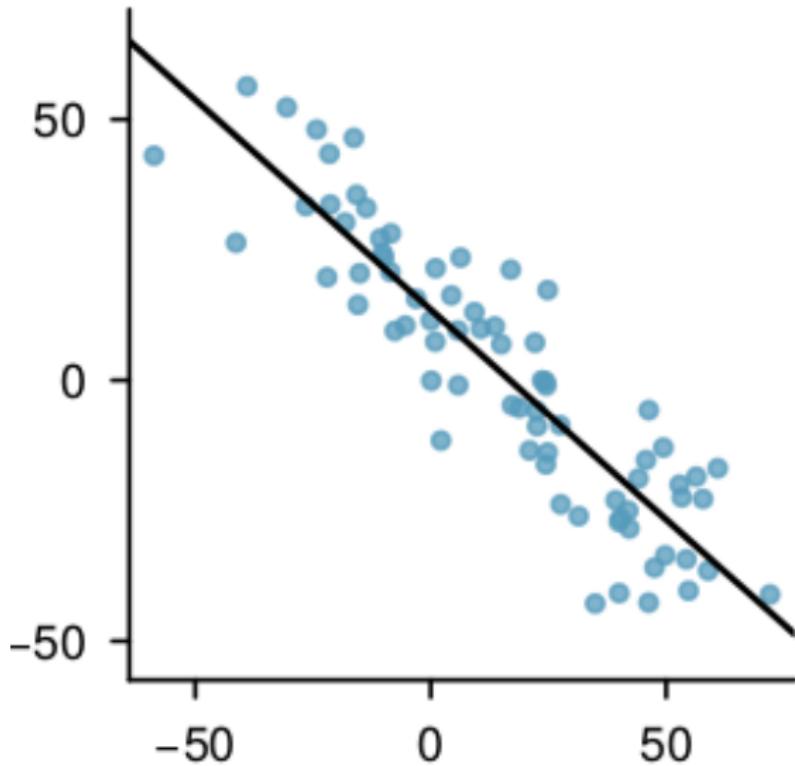
Kaggle

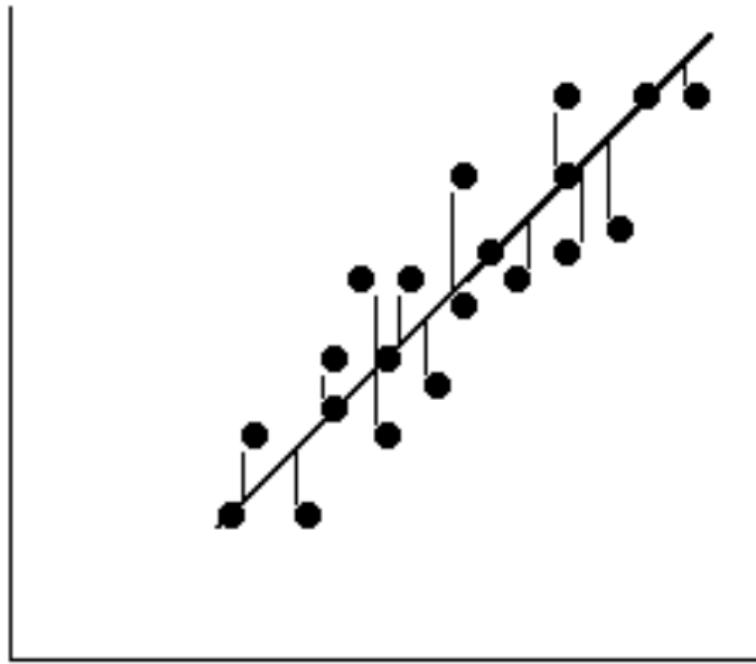


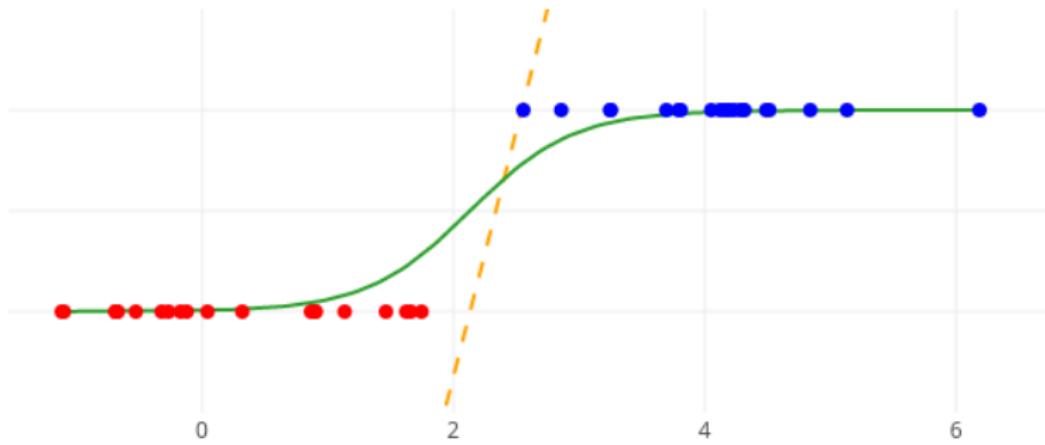
Jellybooks

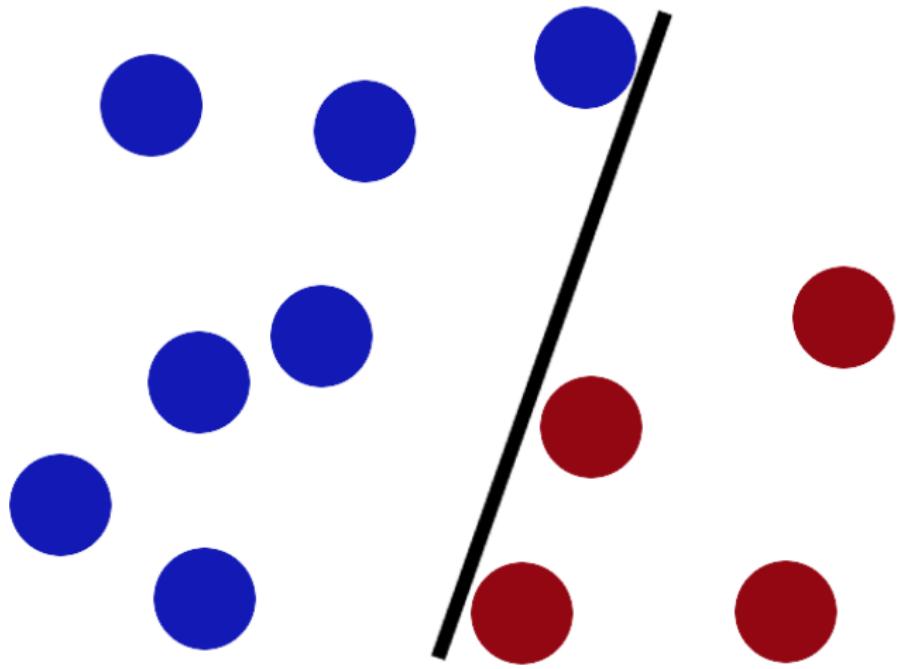


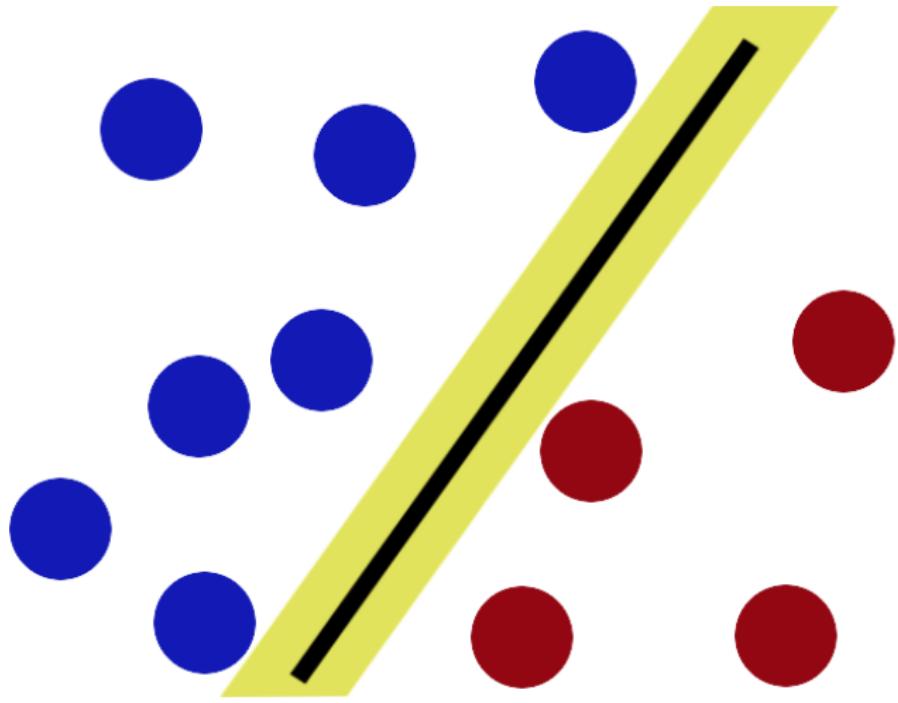
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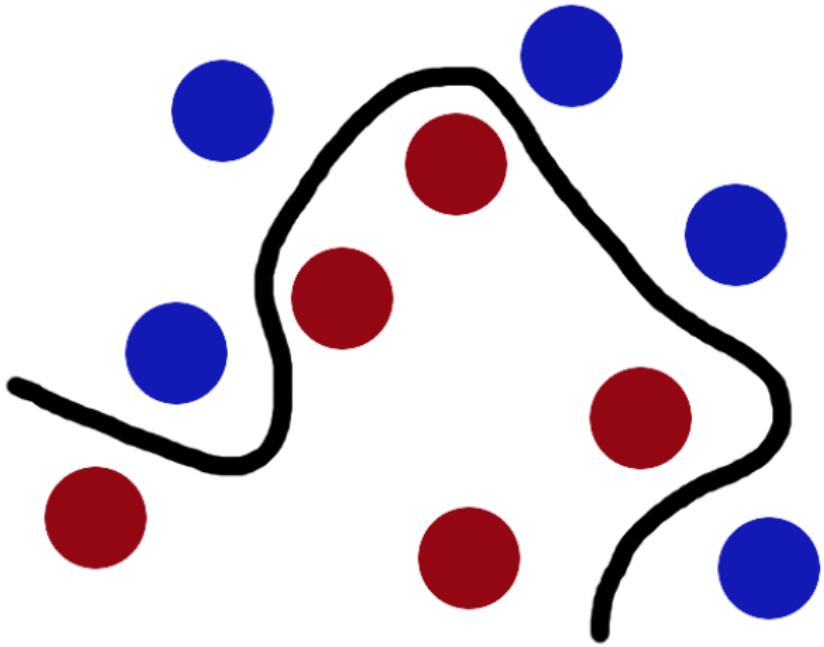


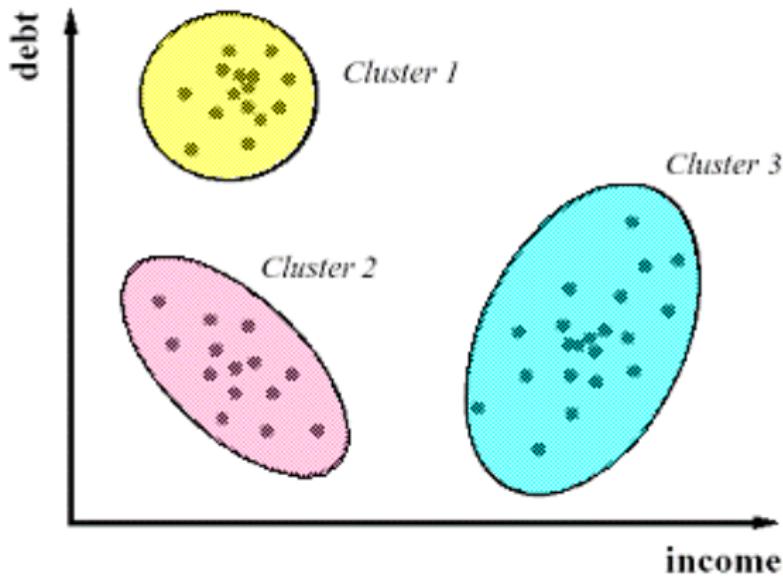


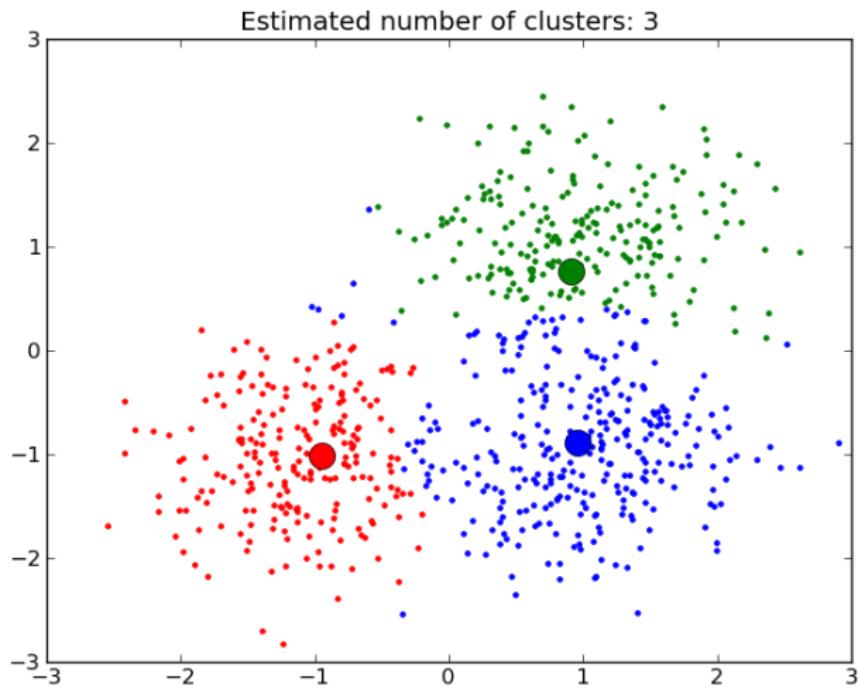


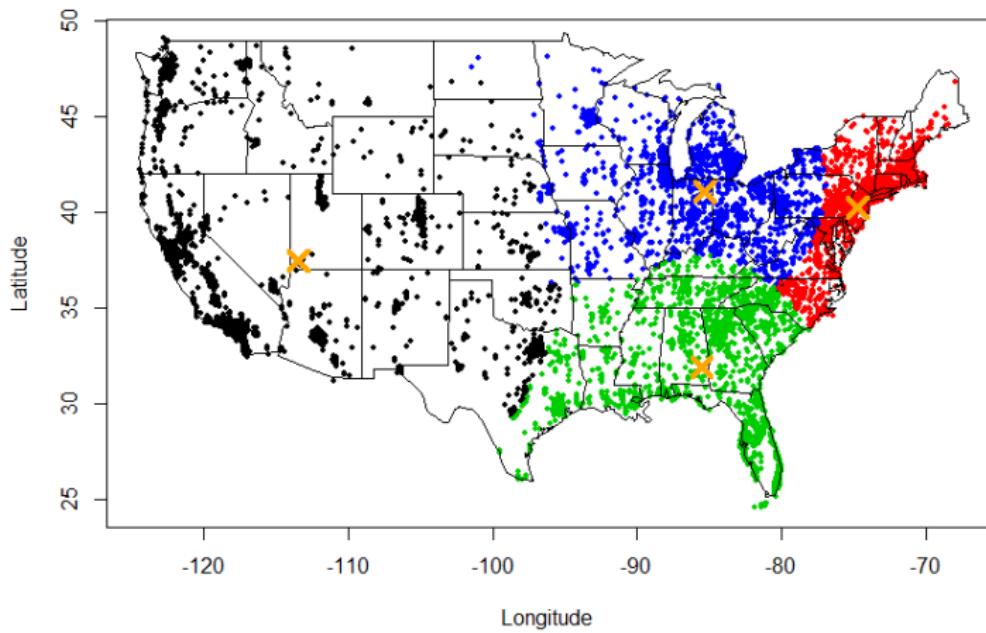




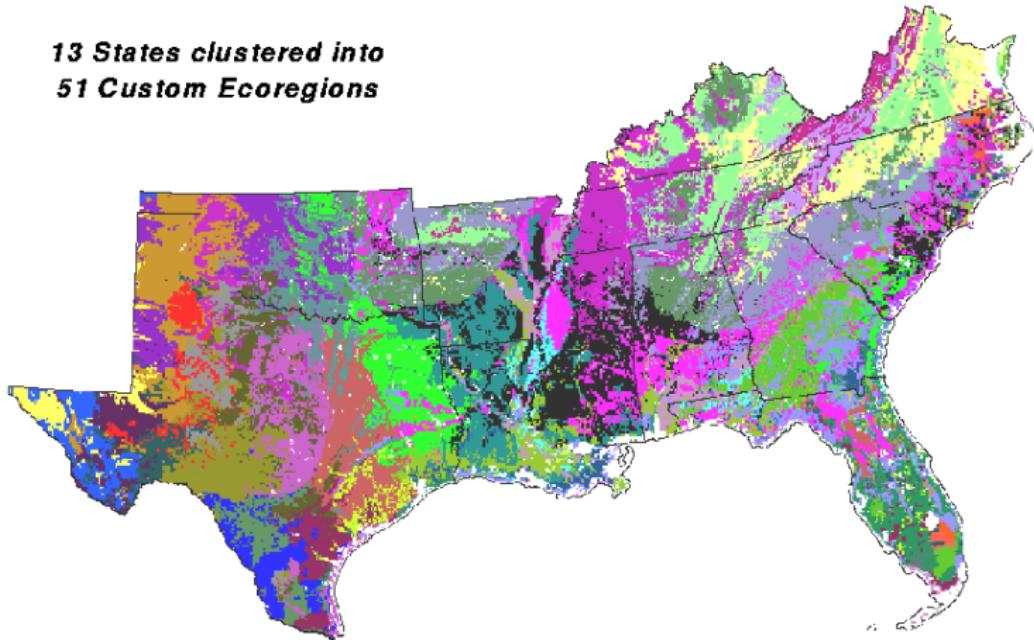








***13 States clustered into
51 Custom Ecoregions***





Eddie Bell @ Lyst



Eddie Bell @ Lyst



Eddie Bell @ Lyst



Eddie Bell @ Lyst



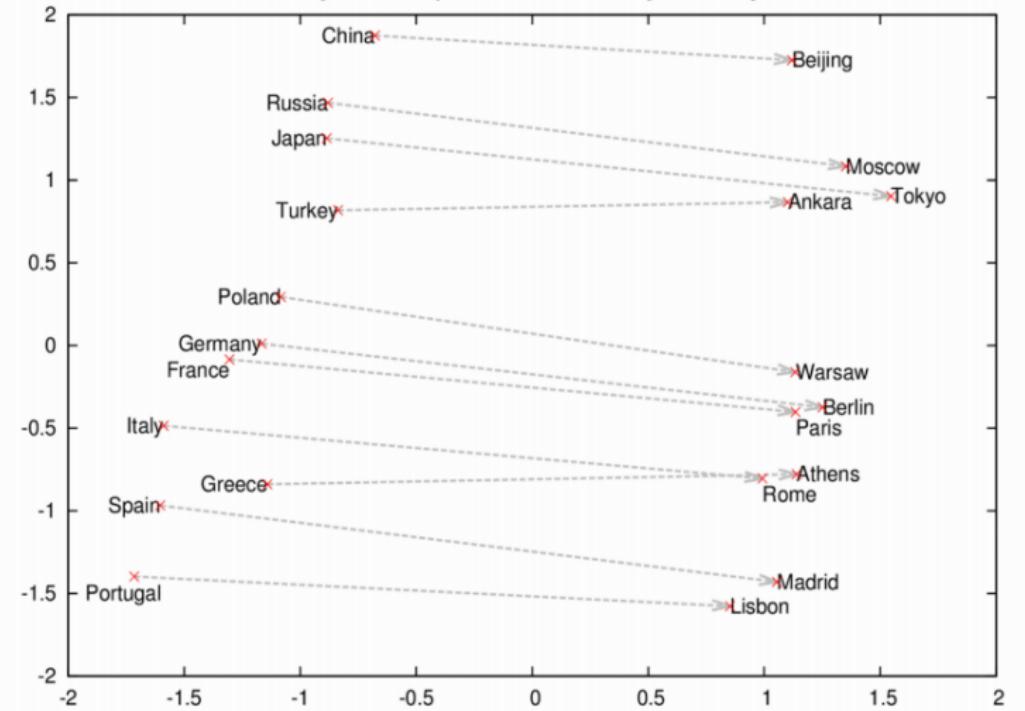
-1	0	+1
-2	0	+2
-1	0	+1



-1	-2	-1
0	0	0
+1	+2	+1



Country and Capital Vectors Projected by PCA



Term	Similarity	
	"shift"	0.933104
	"gown"	0.887743
	"skirt"	0.881672
	"bandage"	0.880162
	"midi"	0.869786

Similar to 'dress'

Eddie Bell @ Lyst



a group of young girls standing next
to each other on the beach



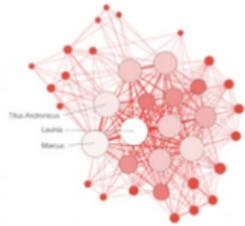
A clock tower with a clock on top of it

Google?



A bunch of bananas hanging from a tree

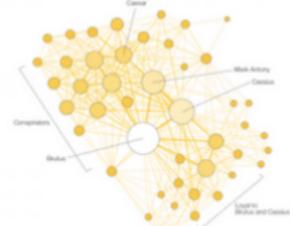
Google?



TITUS ANDRONICUS
Number of **36** | 50% Network density



ROMEO AND JULIET
Number of **41** | 37% Network density



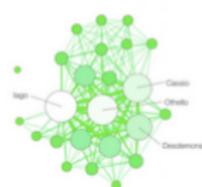
JULIUS CAESAR
Number of **46** | 34% Network density



HAMLET
Number of **37** | 39% Network density

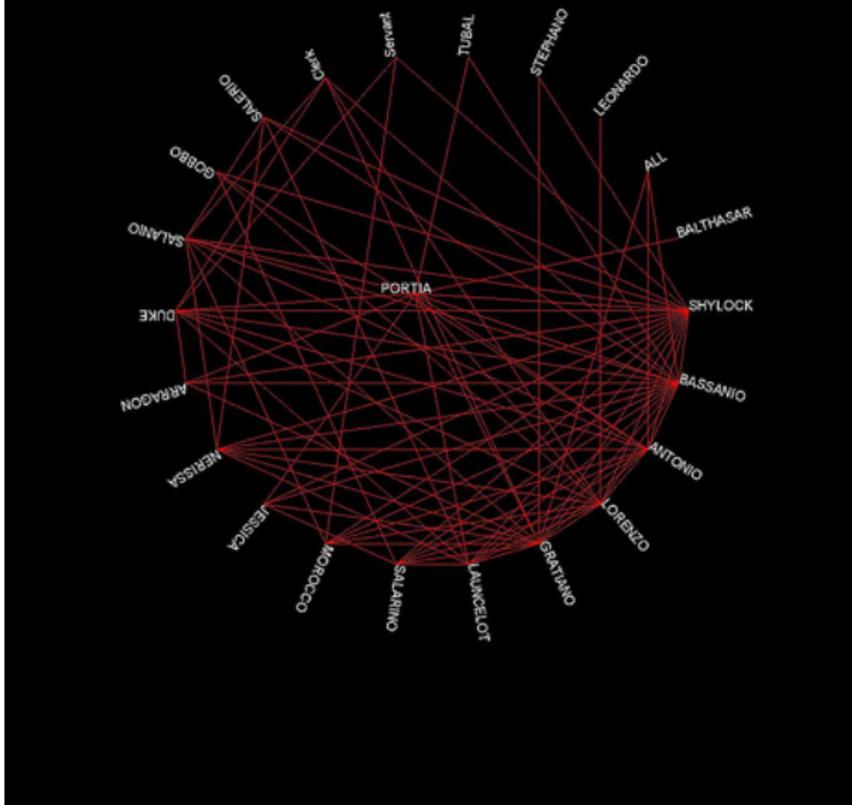


TROILUS AND CRESSIDA
Number of **35** | 40% Network density



OTHELLO
Number of **24** | 55% Network density

[https://flowingdata.com/2015/12/30/
shakespeare-tragedies-as-network-graphs/](https://flowingdata.com/2015/12/30/shakespeare-tragedies-as-network-graphs/)



Act 4, Scene 1

Perseus And I am nothing else to stink his hand.
Medea Creon is the chough, I like it not.

Perseus And therefore have I little talked of love.

Perseus Look, see, how comes the belly towards my self.

Perseus Needs me not let us go on.

Perseus That we do, we do, we do, we do.

Perseus What is he that comes? Thee, Perseus, mad?

Perseus What is he that comes?

Perseus Come to me, make no noise.

Perseus No noise, that's all I want you to do.

Perseus No noise, no noise, no noise, no noise.

Perseus I will speak to you of your loves.

Perseus So what, I will speak to you too.

Perseus Being spylid before your family, than to your face.

Perseus How now, why is he not here and there.

Perseus The trees have given me nothing by that.

Perseus This aysperg, noches que son, que son.

Perseus And what is aysperg, I update it to thy bark.

Perseus My bark is tree, and dead wood is wood.

Perseus Or shall I come to you at evening mass.

Medea My bane serves me, peruse daughter, now.

Perseus juliet, on Thursday early will I noise ye.

Perseus just hope, just cure, just help.

Medea I hear thou must, and nothing may prologue it.

Tell me not, friar, that thou
hear'st of this.

Thou hast the strength of will to slay thyself.

Act 5, Scene 1

My dreams presage some joyful news at hand.

Author: Her body sleeps in Capels' monument.

ANSWER I will hence to-night.

[Author:] I do beseech you, sir, have patience.

Sustaining the Environment

get thee gone.

Winnipeg

That the life-weary taker may fall dead.

in mystery. But Martha's love

famine is in thy cheeks.

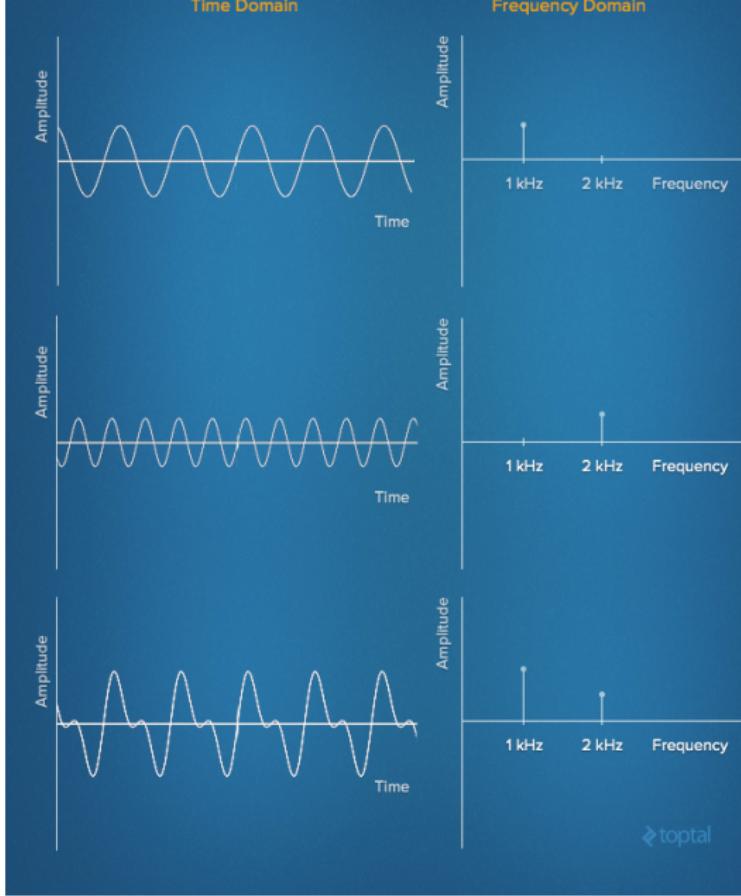
III Hypothesis

Put this in any liquid thing you want.

— There is thy gold, we

http:

//www.nand.io/visualisation/understanding-shakespeare



toptal

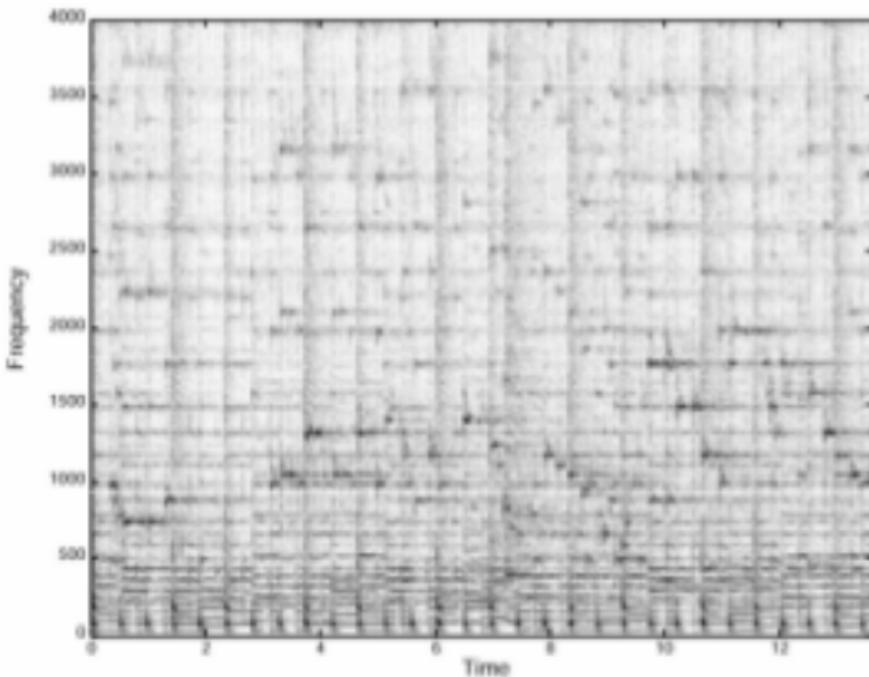


Fig. 1A - Spectrogram

https:

//www.ee.columbia.edu/~dpwe/papers/Wang03-shazam.pdf

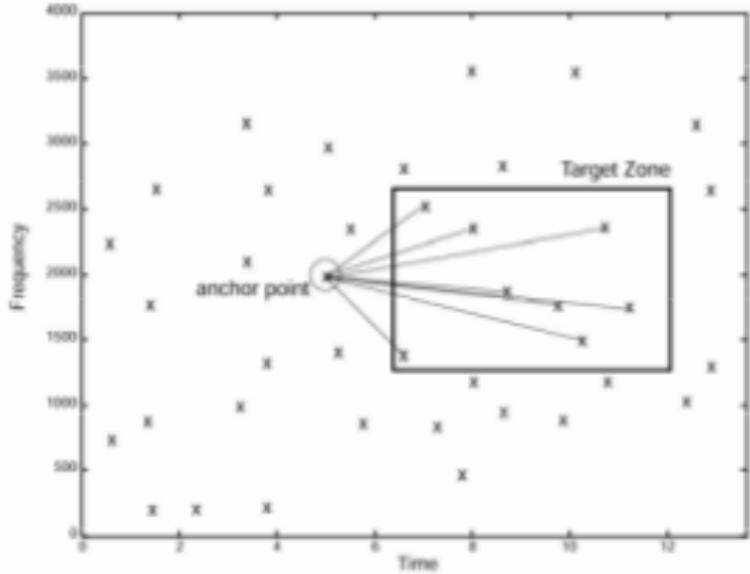
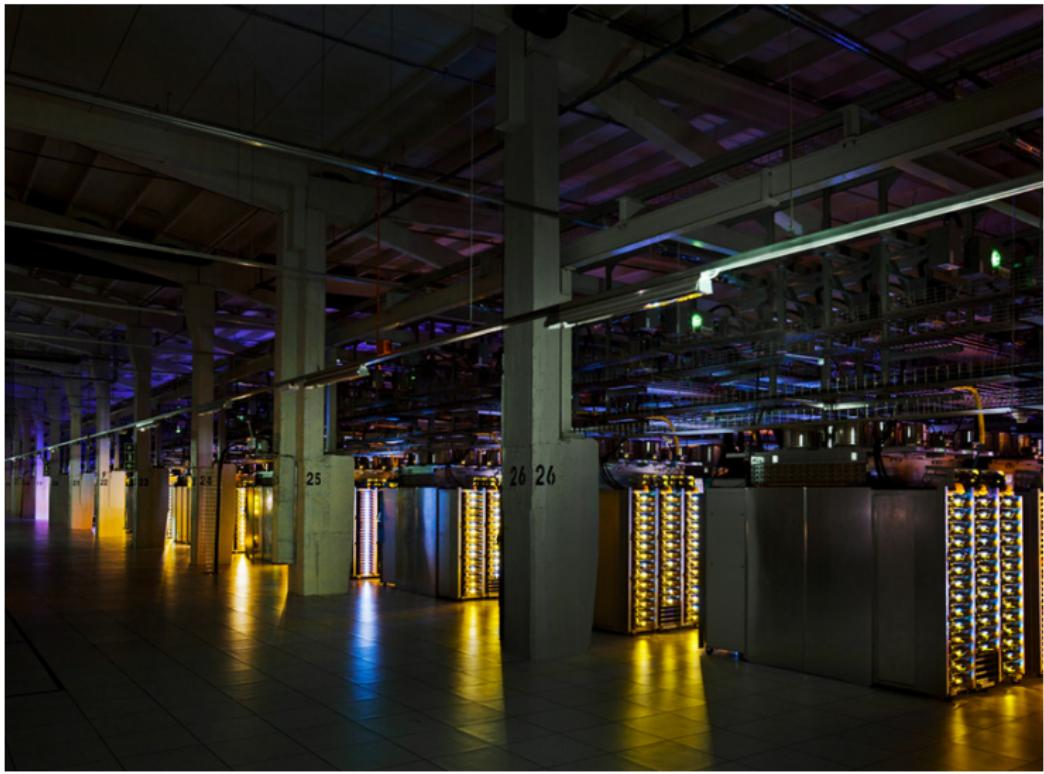


Fig. 1C - Combinatorial Hash Generation

[https:](https://www.ee.columbia.edu/~dpwe/papers/Wang03-shazam.pdf)

//www.ee.columbia.edu/~dpwe/papers/Wang03-shazam.pdf



Google

Big data?

http://aadrake.com/

command-line-tools-can-be-235x-faster-than-your-hadoop-cluster.html

Some maths...

- 100 features
- int (*4 bytes per feature*)
- 16 GB RAM
- $O(n \log n)$ in RAM

$$400N + (400N) \log(400N) < 16 \cdot 10^9$$

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- int (*4 bytes per feature*)
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$$N \approx 2 \cdot 10^6$$

Questions?