

# ML Week

Bonjour !

Jeff Abrahamson

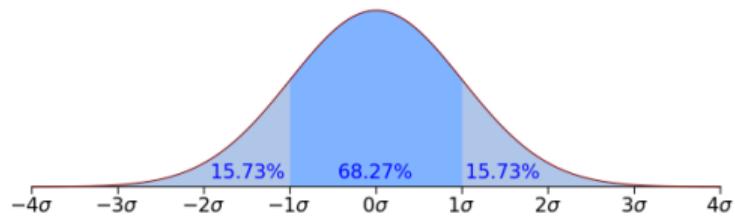
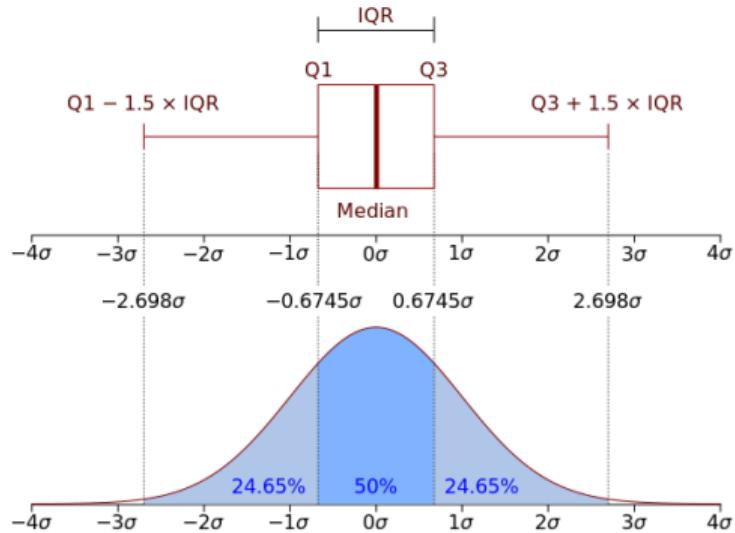
23 mai 2017

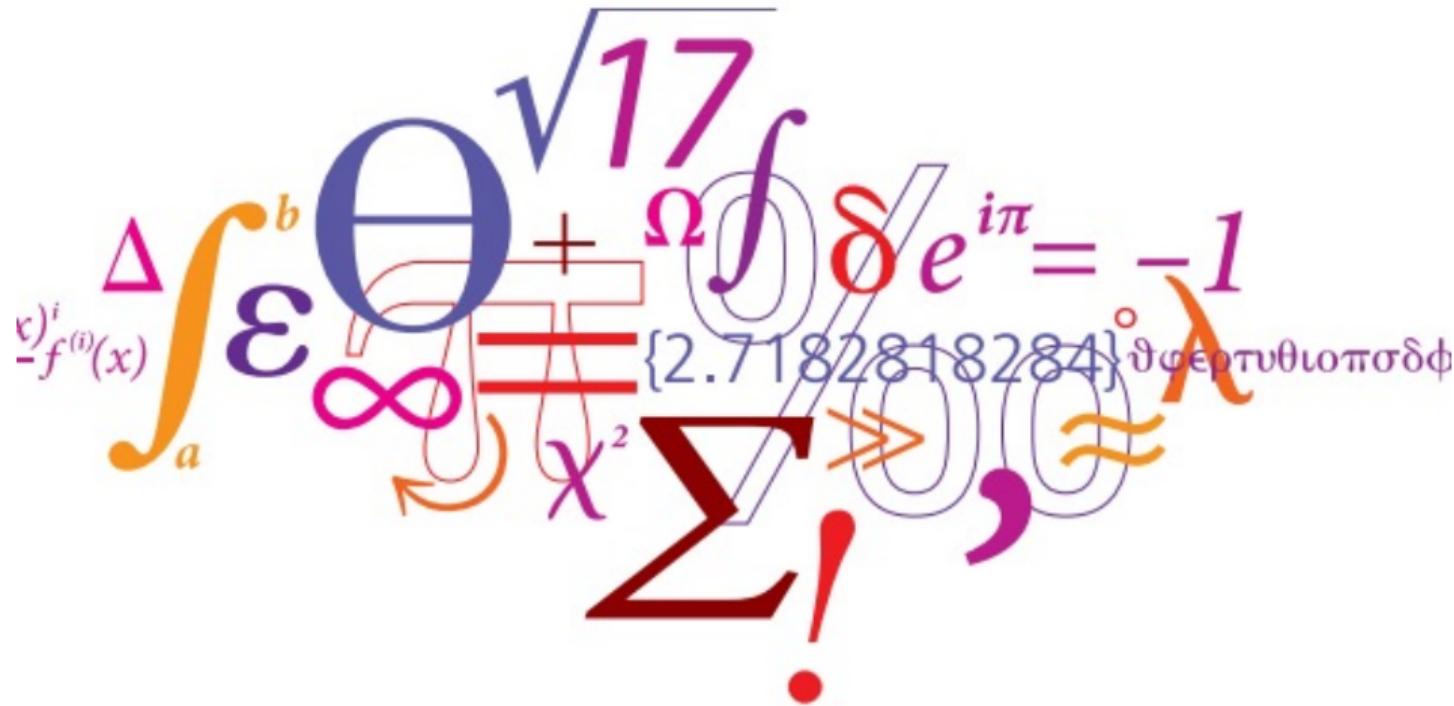
# Machine Learning

# Apprentissage automatique

# Data Science

# Statistiques

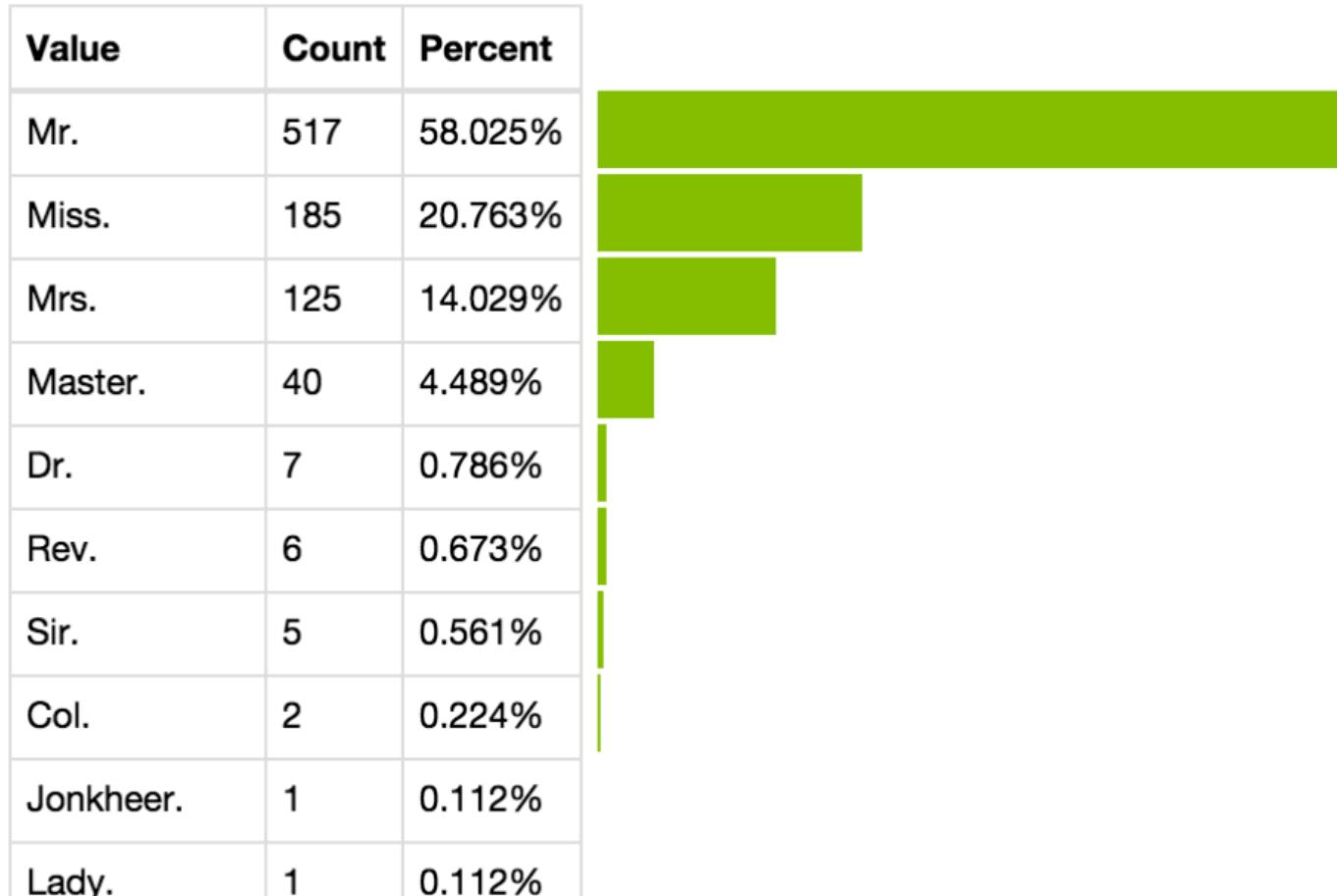


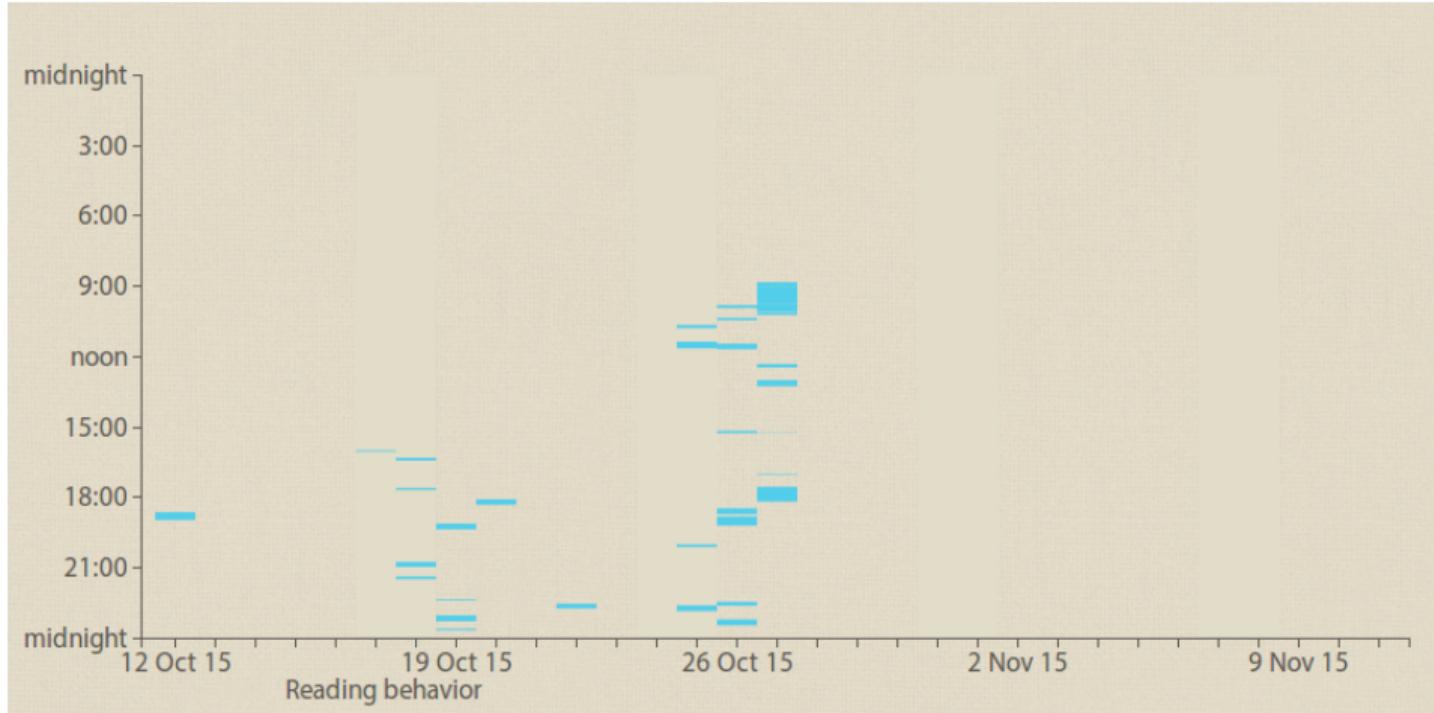


Espace vectoriel

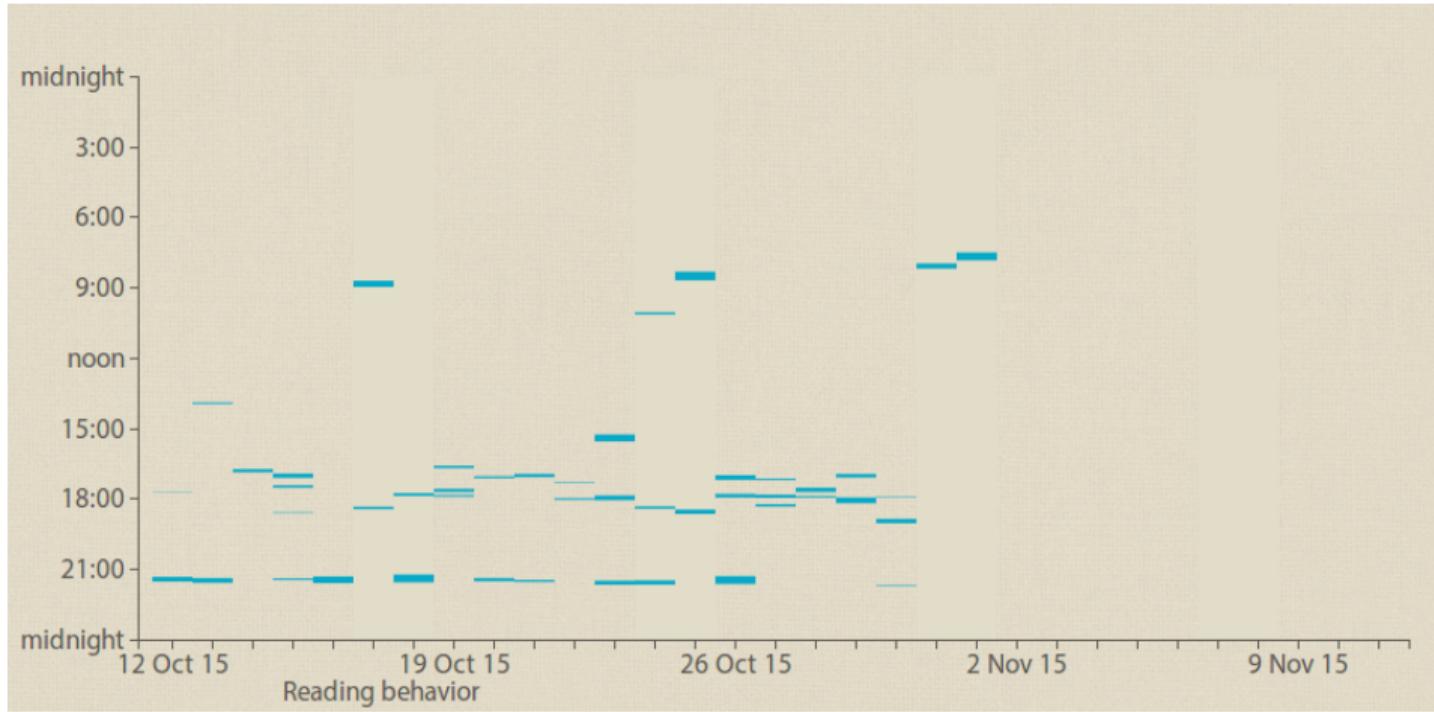
Critères

Feature engineering

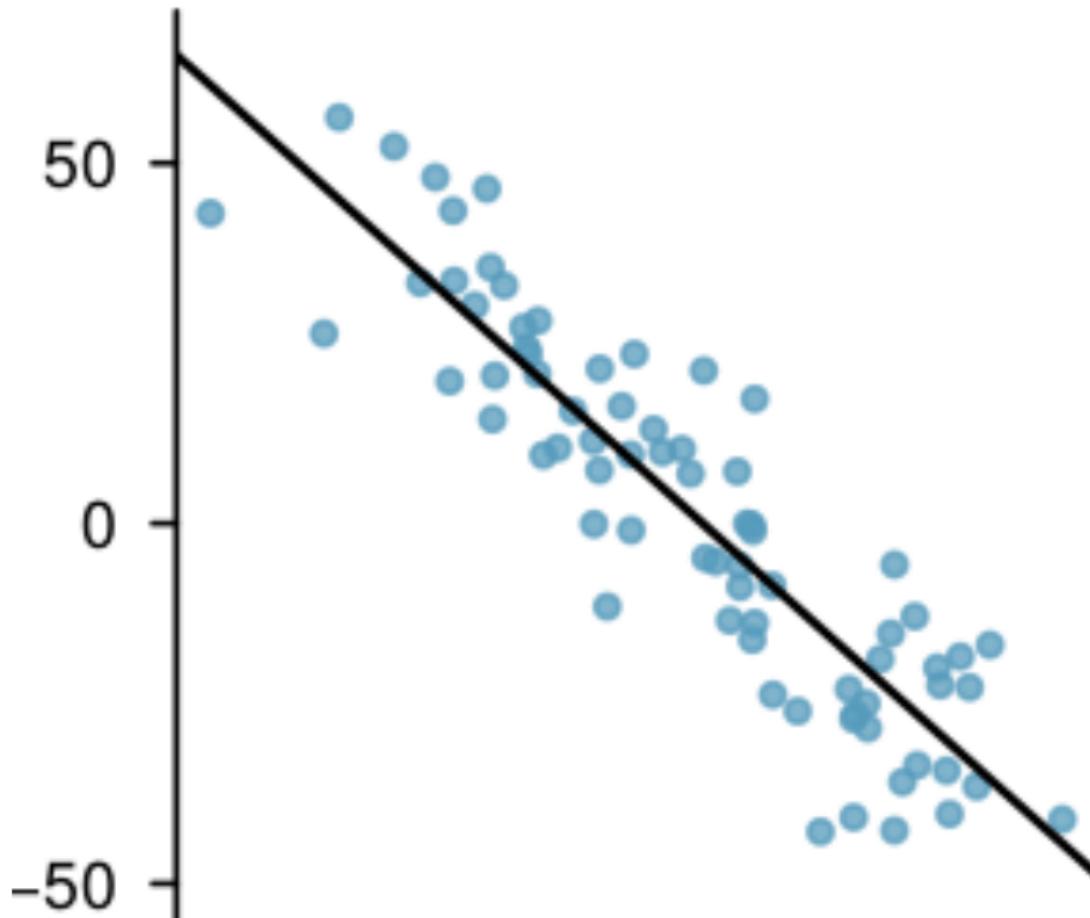


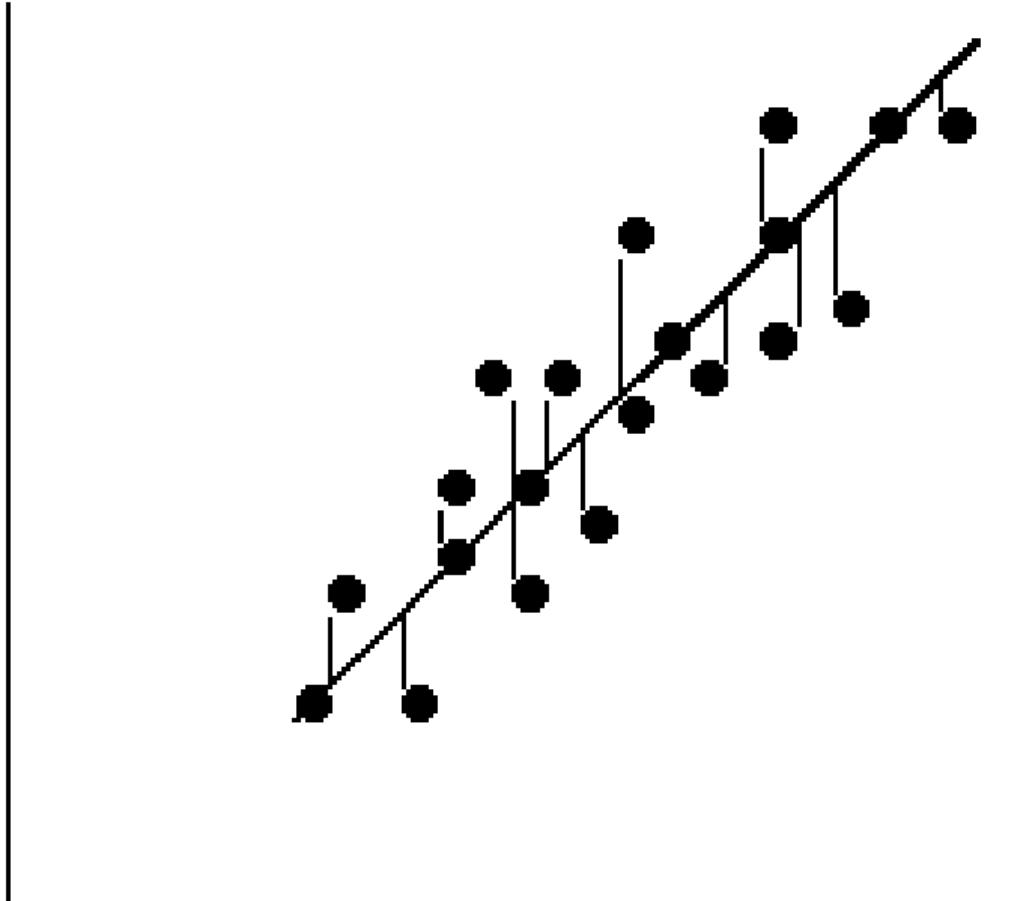


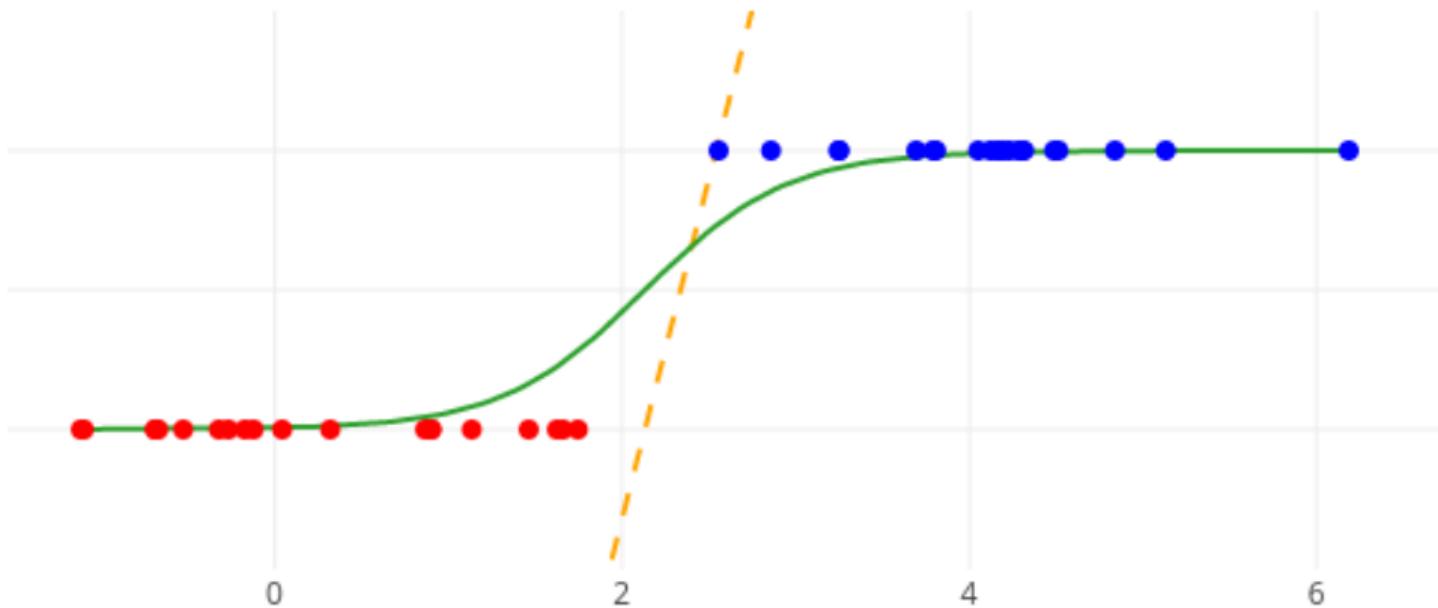
*Jellybooks*

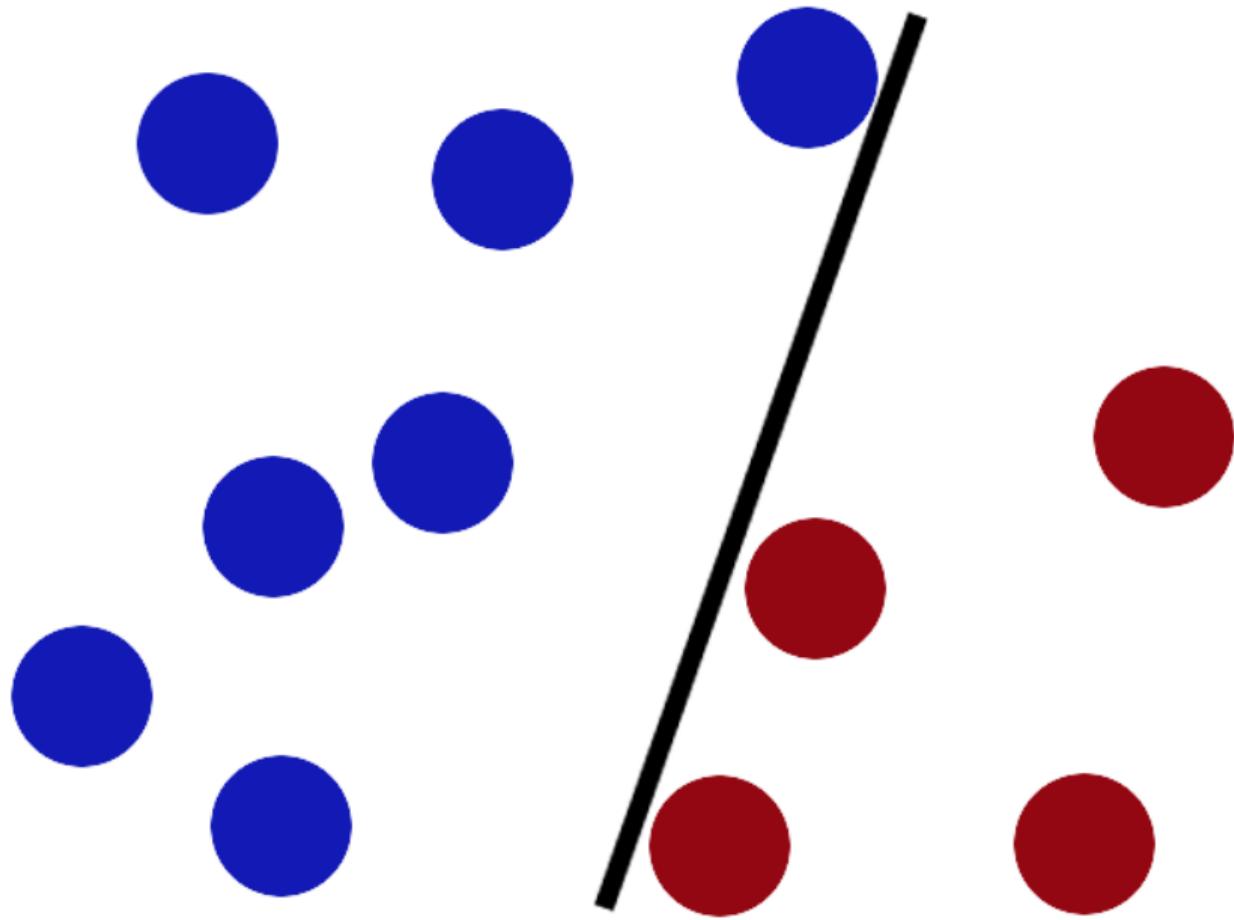


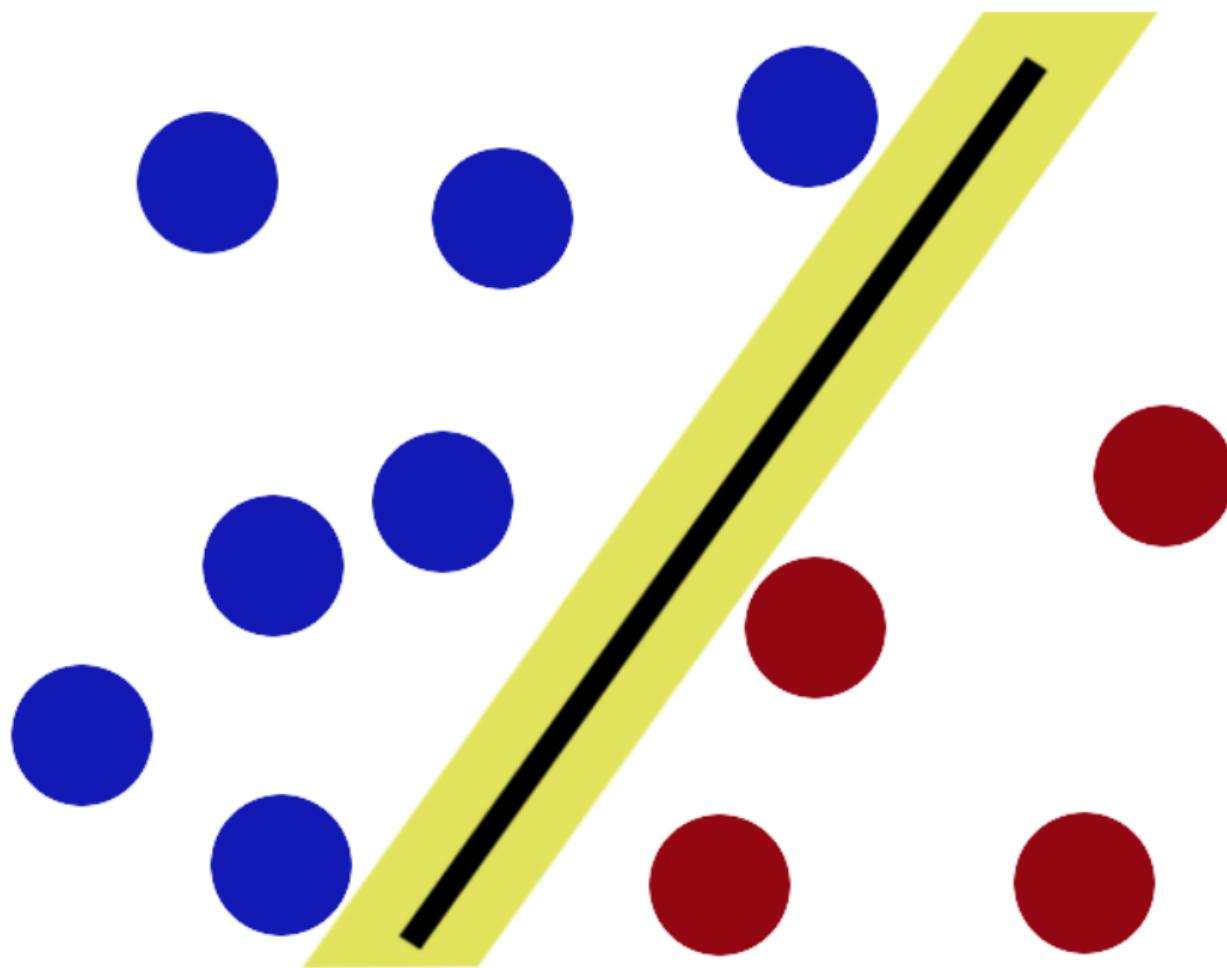
*Jellybooks*

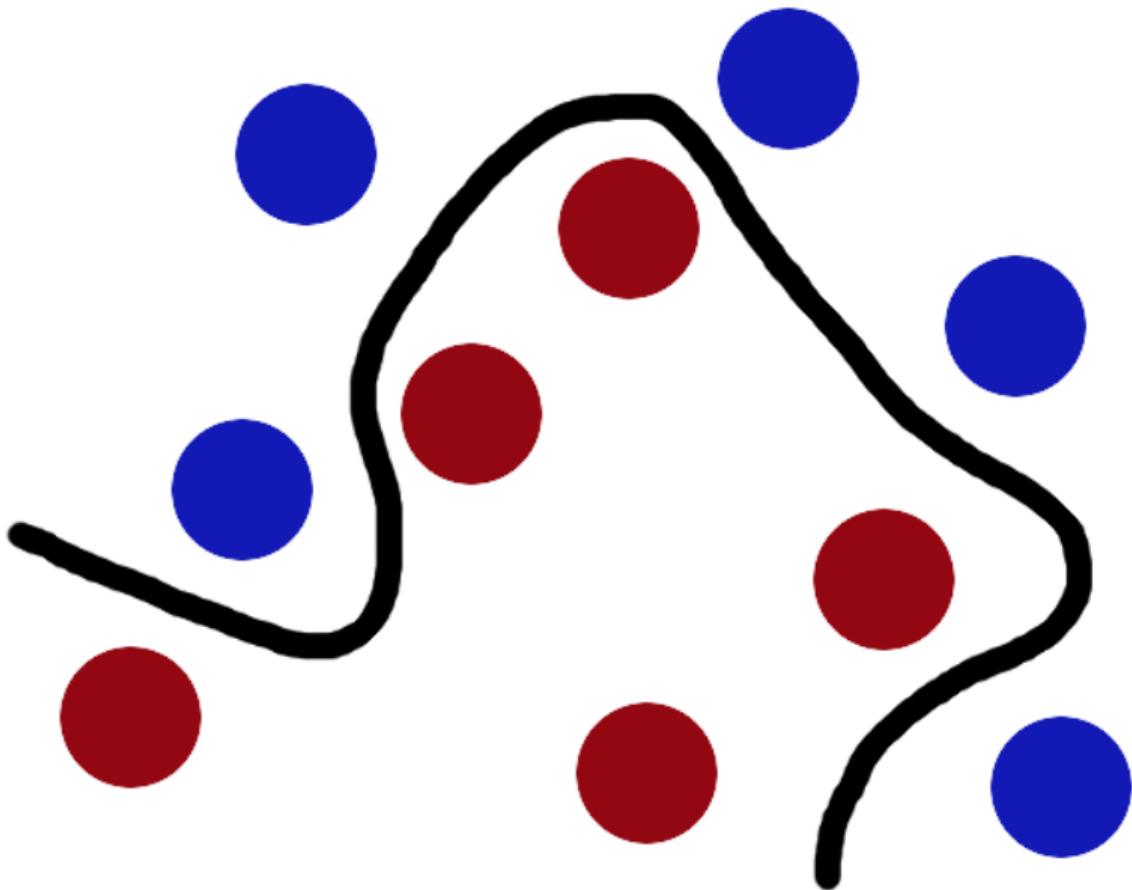


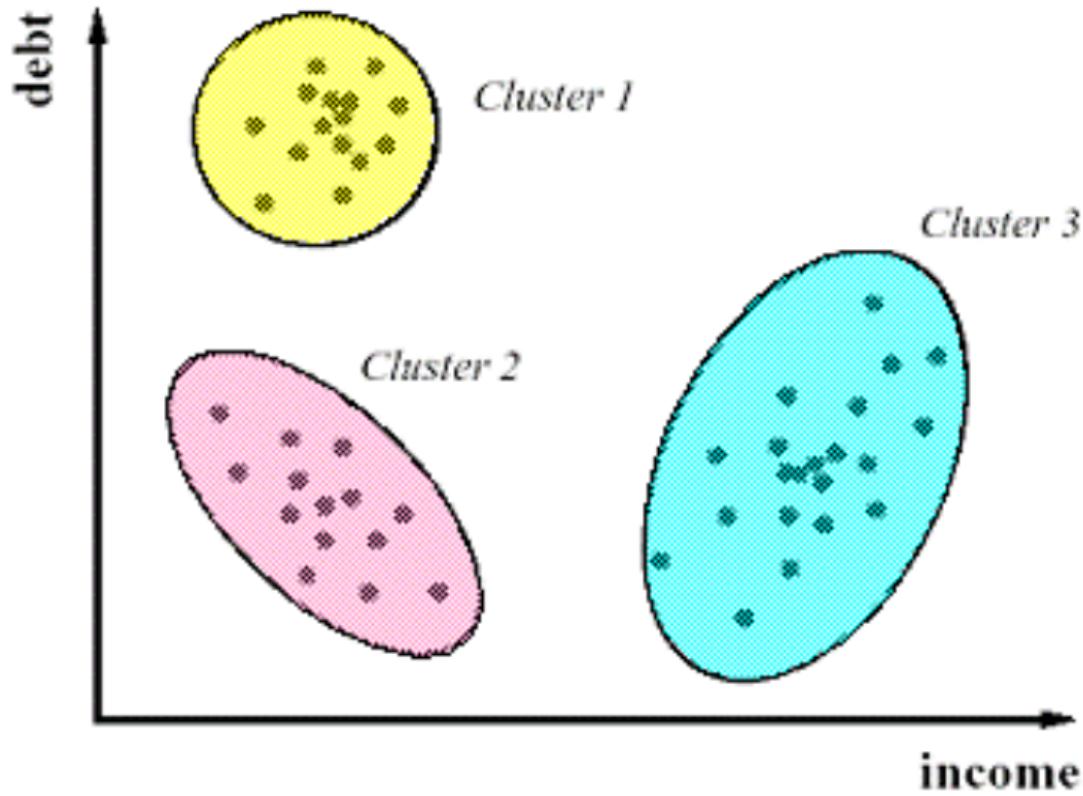




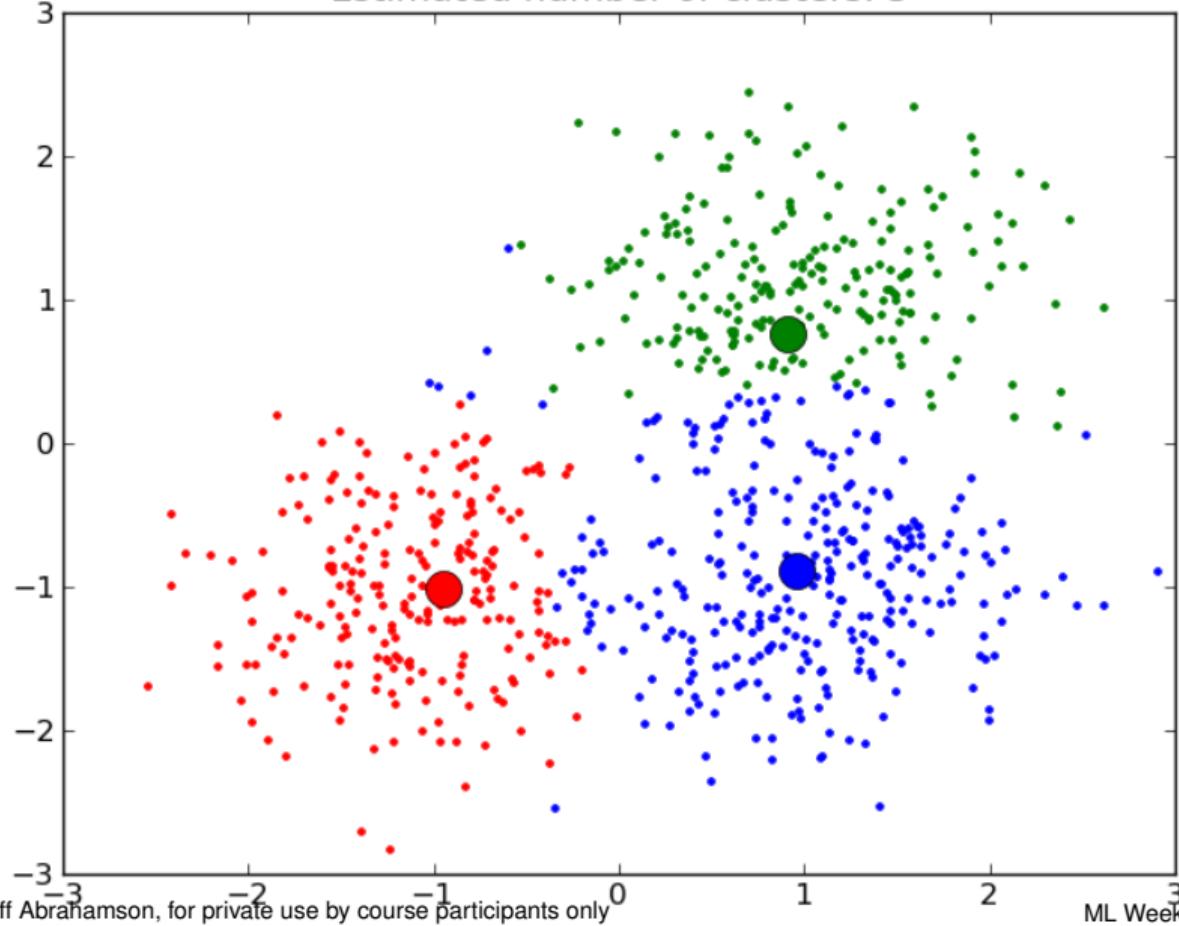


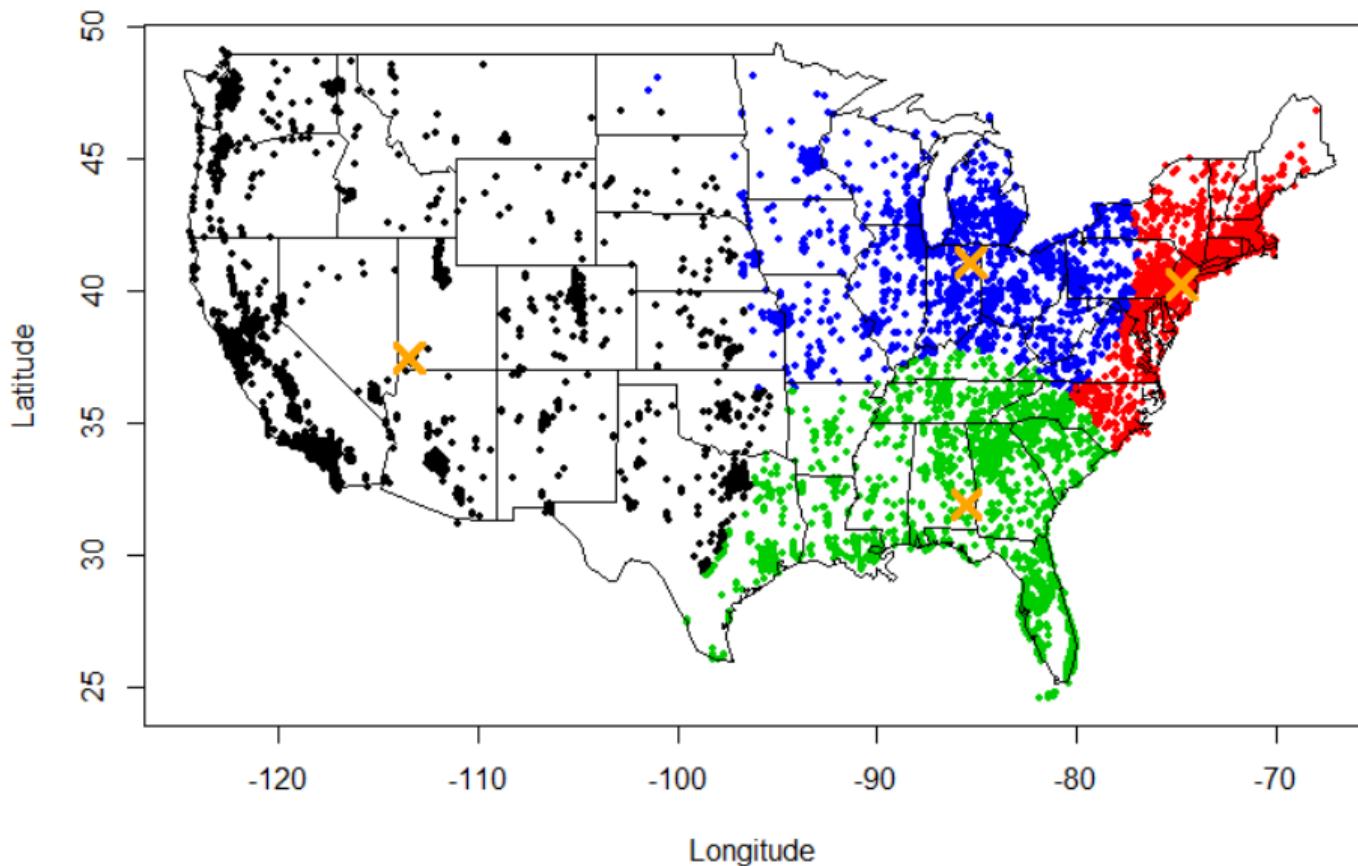




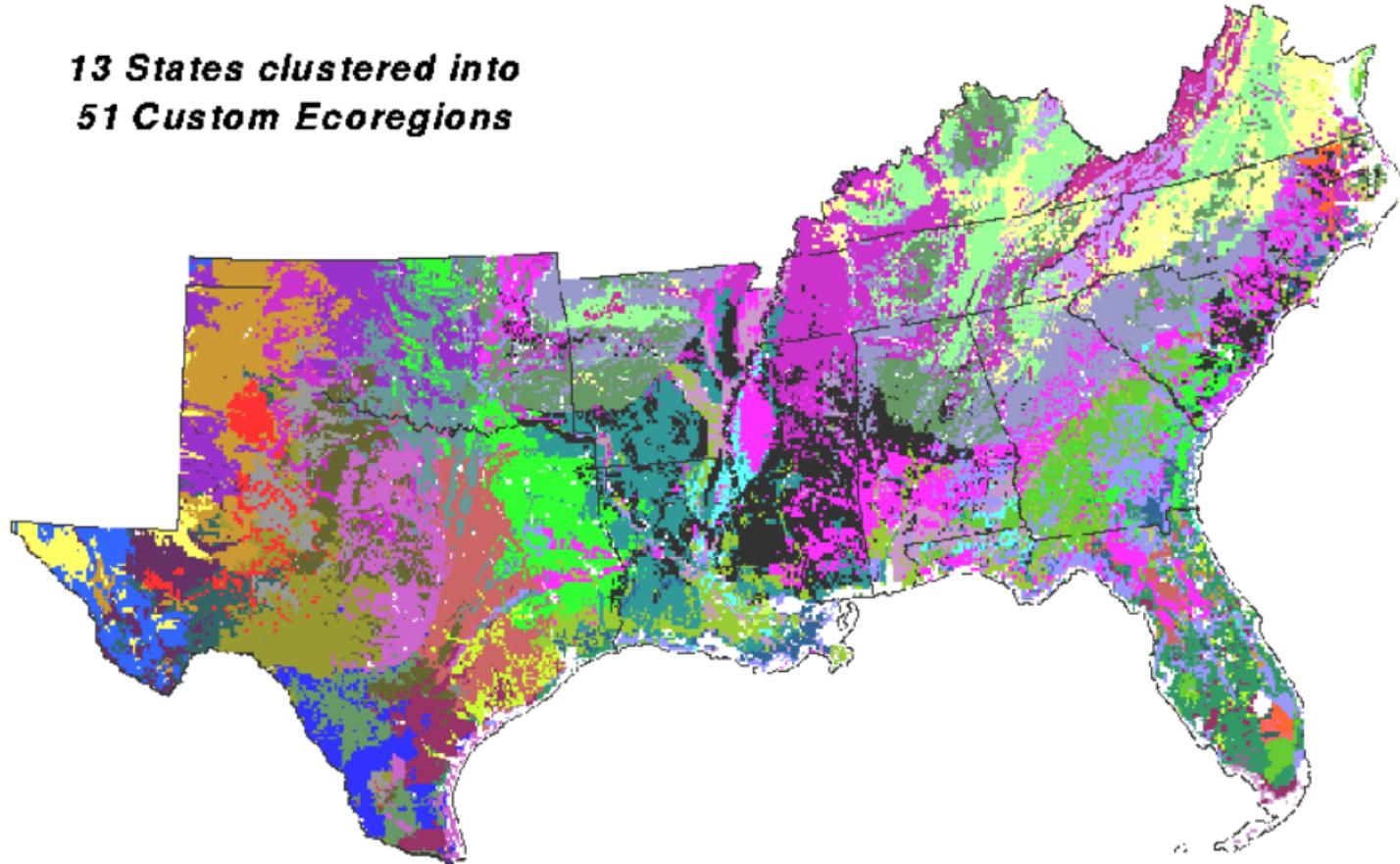


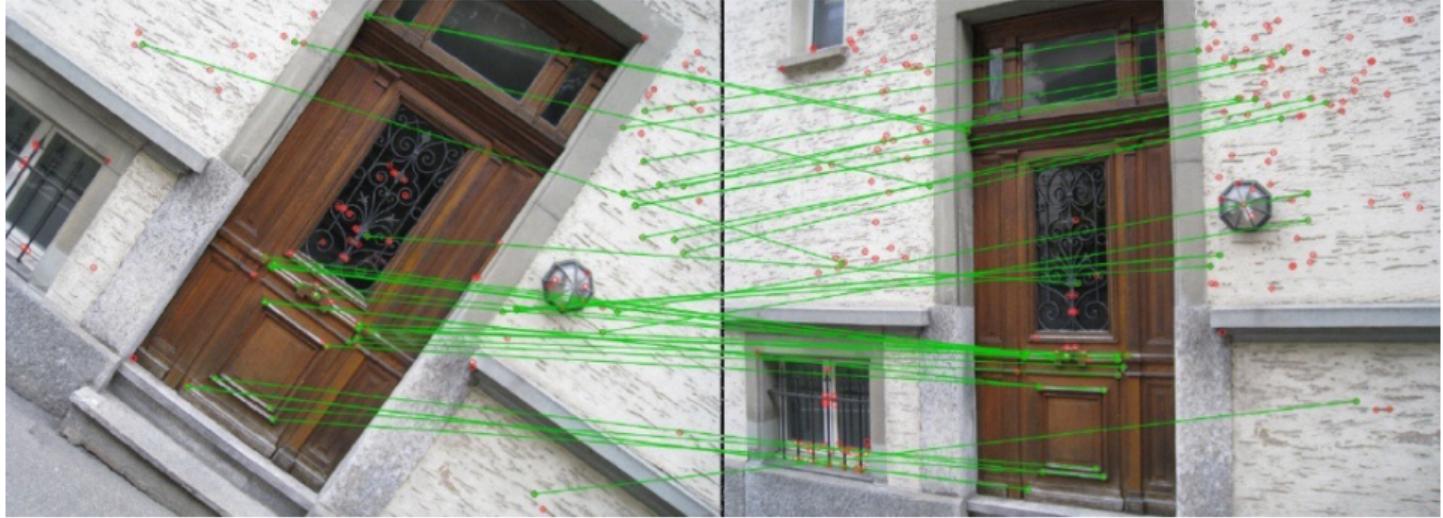
Estimated number of clusters: 3





*13 States clustered into  
51 Custom Ecoregions*





Eddie Bell @ Lyst



*Eddie Bell @ Lyst*

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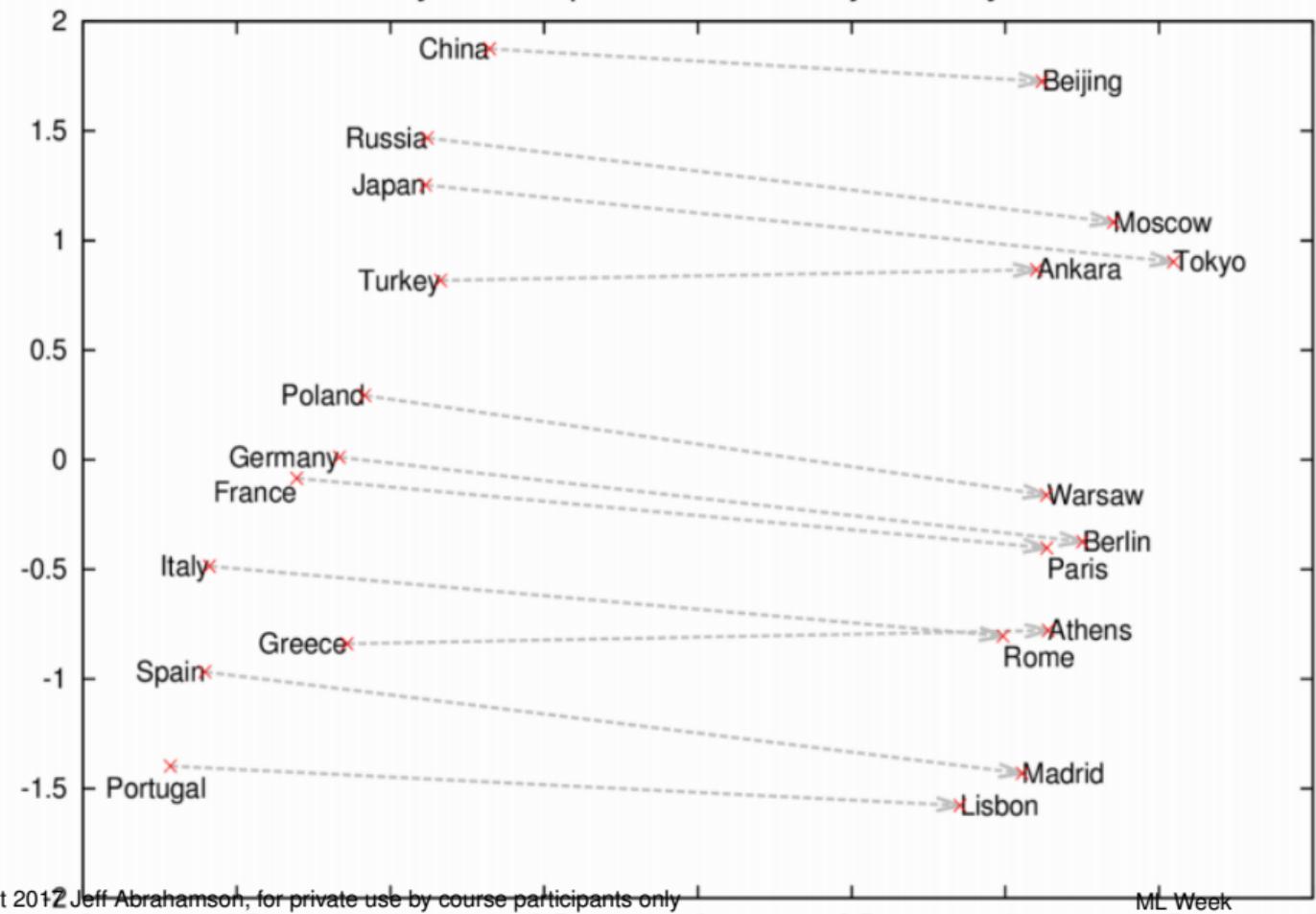
-1	0	+1
-2	0	+2
-1	0	+1



-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?*

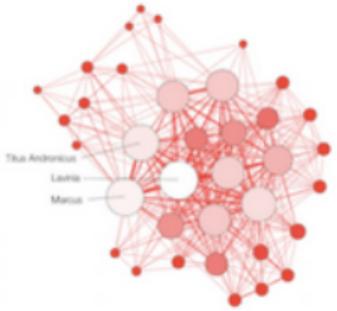


## A bunch of bananas hanging from a tree

*Google?*

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



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



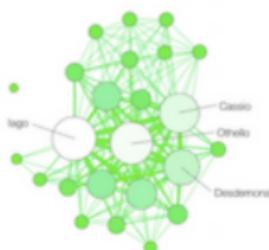
**JULIUS CAESAR**  
Number of **46** | 34% Network density



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

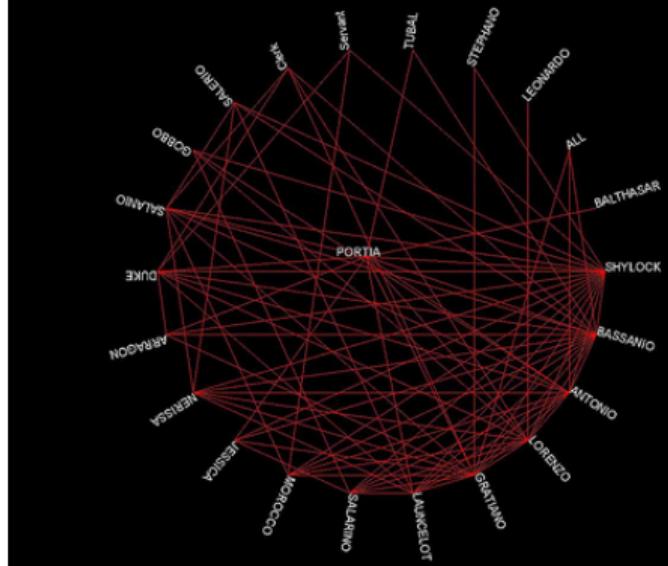


**TROILUS AND CRESSIDA**  
Number of **35** | 40% Network density



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

Merchant of Venice : diagram showing who speaks to who (most connected in the middle)  
Public Domain - <http://www.pgogy.com/bill/>



Friar Laurence: *No leisure required.*  
 Friar: And I am nothing else to start his horse.  
 Friar Laurence: *Unknown is the course, I like it not.*

**And therefore have I little talked of love.**

Friar Laurence: *Look, sir, here comes the lady towards my cell.*

Friar: *Pardon me, my lady and my wife.*  
**How now, my lady, where comest thou?**  
 Friar: *From my poor master, from my Thursday-morn.*  
**What trouble dost thou?**  
 Friar Laurence: *That's a secret too.*

Friar Laurence: *Come to make confession to the father.*  
**To a priest that's wholly without sin,**  
 Friar: *Be not sorry to see that you have me.*  
**And confesse to you your thoughts,**  
 Friar: *For all I have seen, that you have sin.*  
**Being square behind your back, stand to your fate.**  
 Friar: *For such thy back is crooked shouldst thou die.*  
**The tears have got small victory by that,**  
 Friar: *How angry is man that sees all that again.*  
**And what I say, I say it to thy face,**  
 Friar: *Thou hast sinned, and thou hast deserved it.*  
**Or shall I come to you at evening mass.**  
 Friar Laurence: *My leisure serves me, gentle daughter, now.*  
 Friar: *Juliet, on Thursday early will I rouse ye.*  
**put hope, put courage, put help,**  
 Friar Laurence: *I hear thou must, and nothing may prorogue it.*

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

Friar Laurence: *Thou hast the strength of will to slay thyself.*

**My dreams presage some joyful news at hand.**

Reverent: *Her body sleeps in Capels' monument.*

*I will hence to-night.*  
*I do beseech you, sir, have patience.*  
**Tush, thou art deceived.**

*No import bid.*

**get thee gone.**

*Who calls me bid.*

**That the life-weary taker may fall dead.**

*But Mardon's here.*

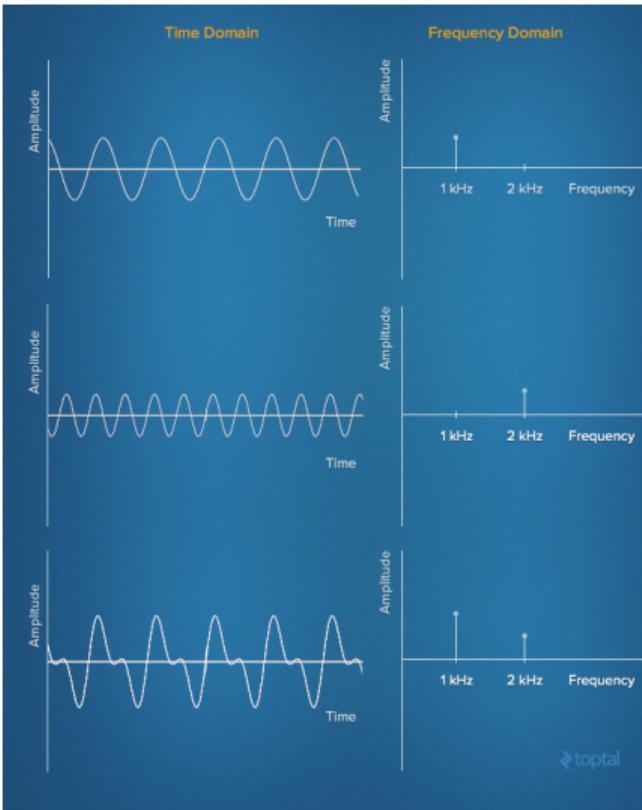
**famine is in thy cheeks.**

*No answer bid me bid no more.*

*Long-hair'd, and my self.*

*Put this in any liquid thing you will.*

**There is thy gold, worse poison to men's souls.**



<http://www.toptal.com/algorithms/>

*shazam-it-music-processing-fingerprinting-and-recognition*

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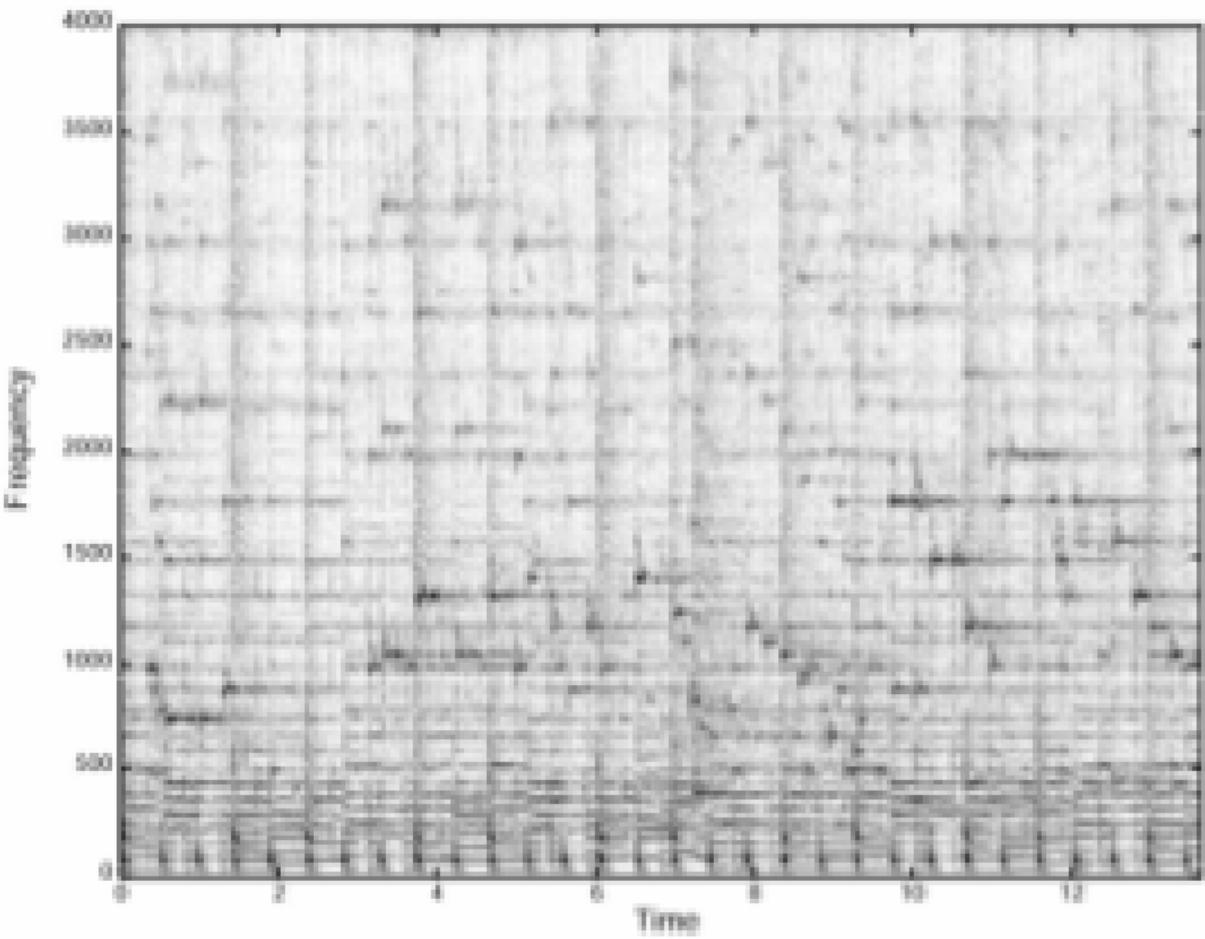


Fig. 1. Spectrogram

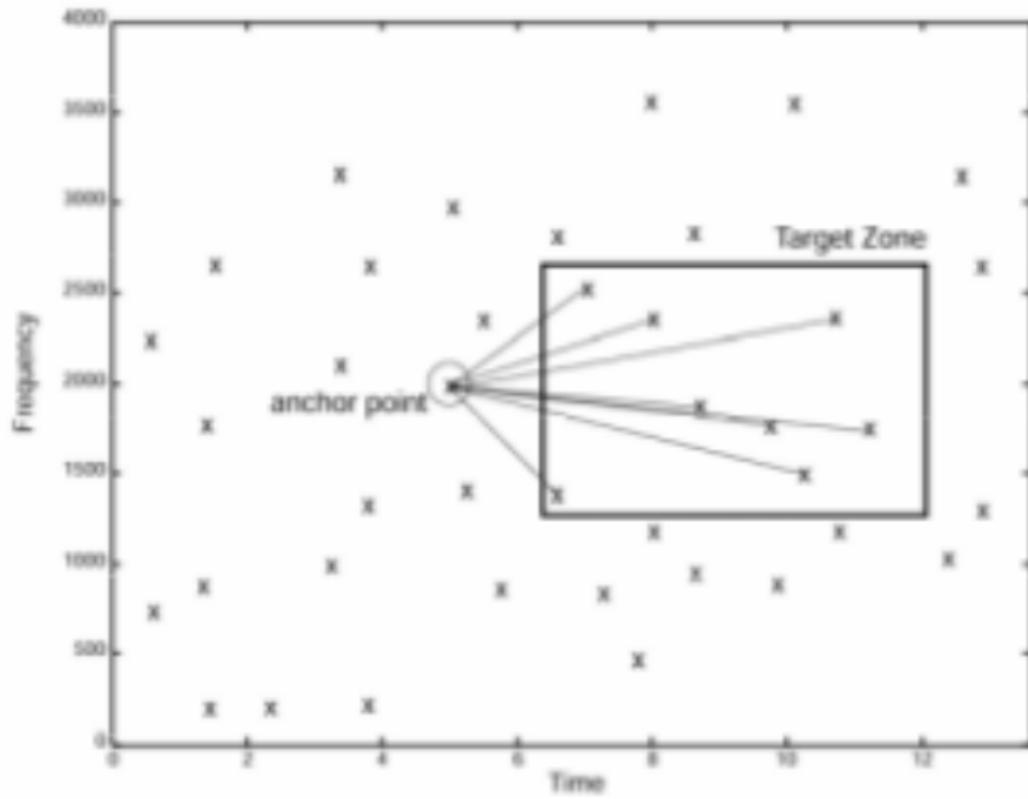


Fig. 1C - Combinatorial Hash Generation



## **Big data?**

*[http://aadrake.com/  
command-line-tools-can-be-235x-faster-than-your-hadoop-cluster.html](http://aadrake.com/command-line-tools-can-be-235x-faster-than-your-hadoop-cluster.html)*

## Un peu de maths...

- 100 critères
- int (*4 octets par critère*)
- 16 GB RAM
- $O(n \log n)$  en mémoire

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

# Un peu de maths...

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$$N \approx 2 \cdot 10^6$$

# Questions?