STAT 215A Fall 2017
Week 5

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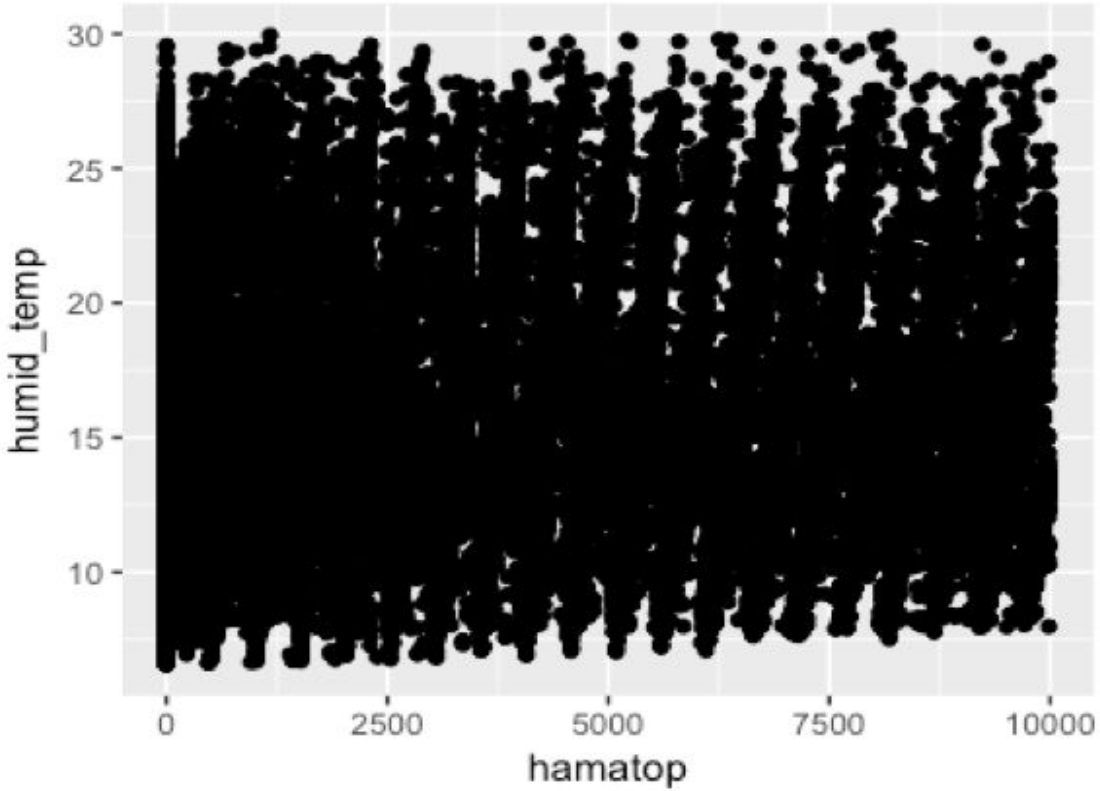
09/22/2017

Peer review

Image source: http://bit.ly/x2pms8

Overplotting



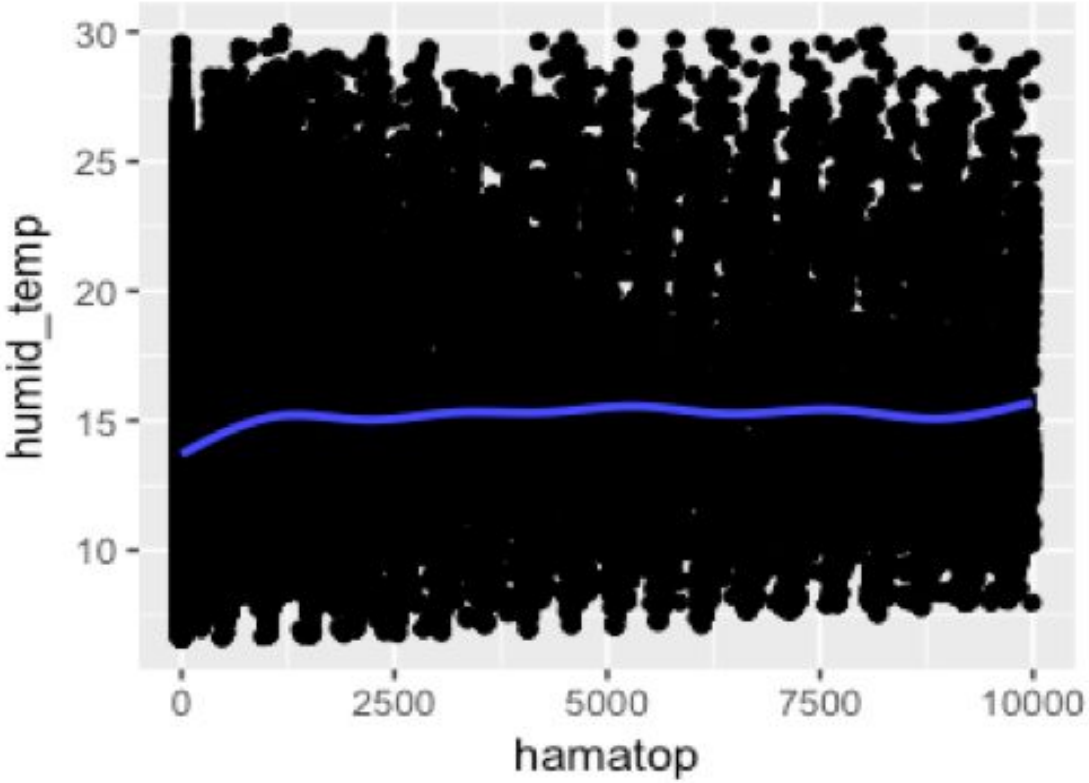
Overplotting

Some report file sizes were so large that I couldn't open them!

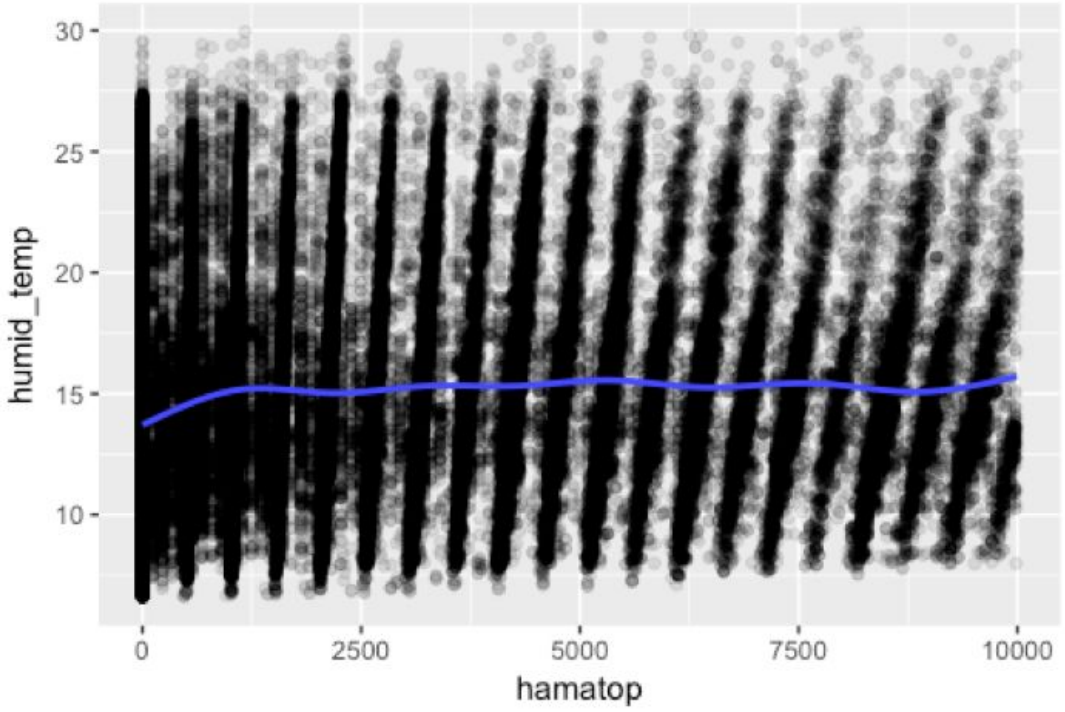
You need to make sure that your figures are rendered as png rather than pdf...

```
<<dev = "png", dpi = 300>>=
ggplot(big_df) + …
@
```

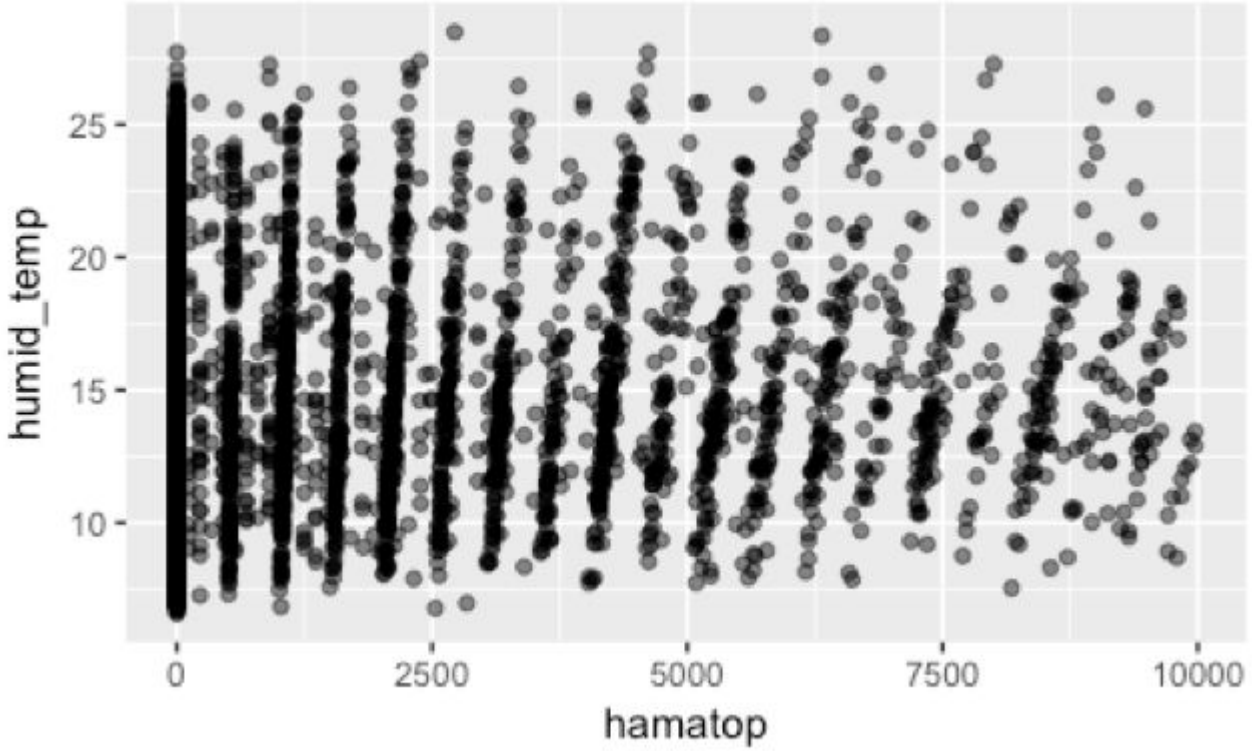
Overplotting: **add a trendline?**



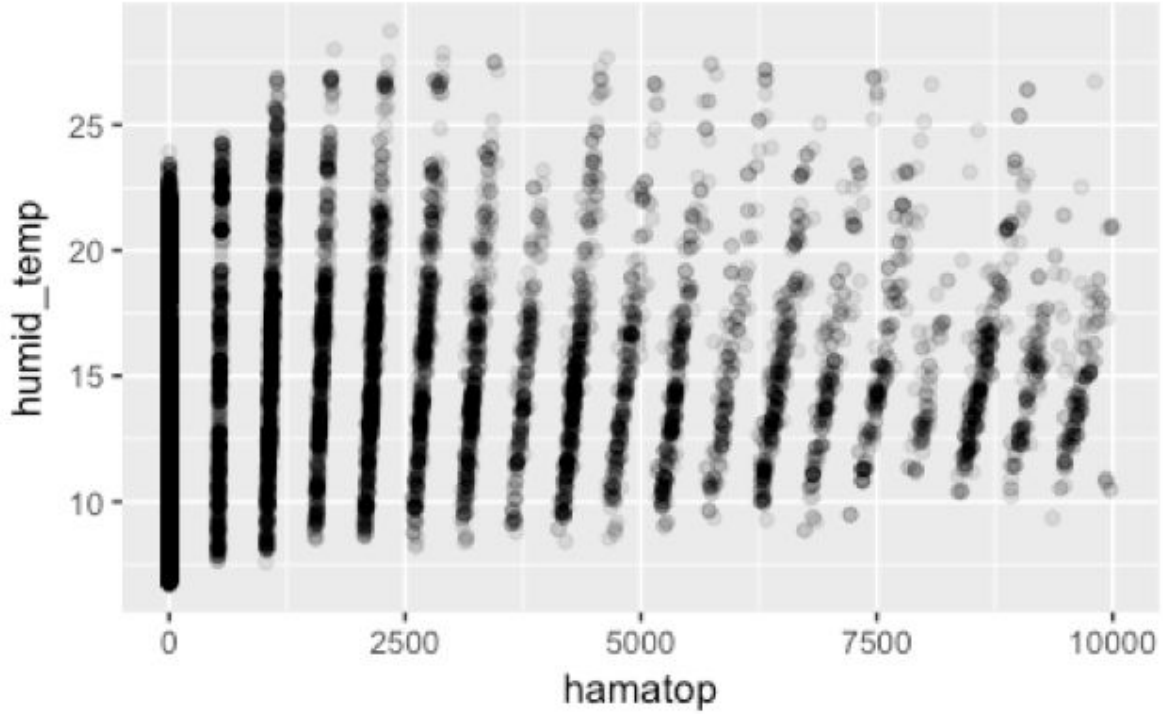
Overplotting: **add transparency?**



Overplotting: **subsampling 10,000 points?**

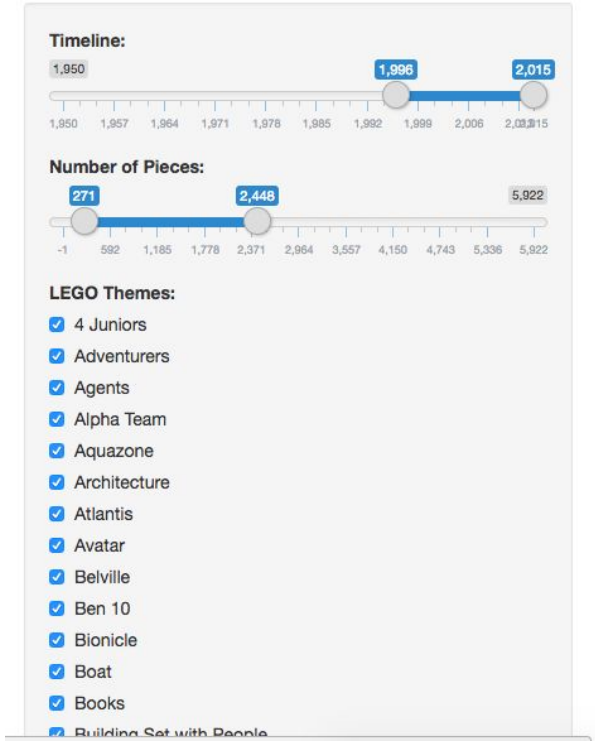


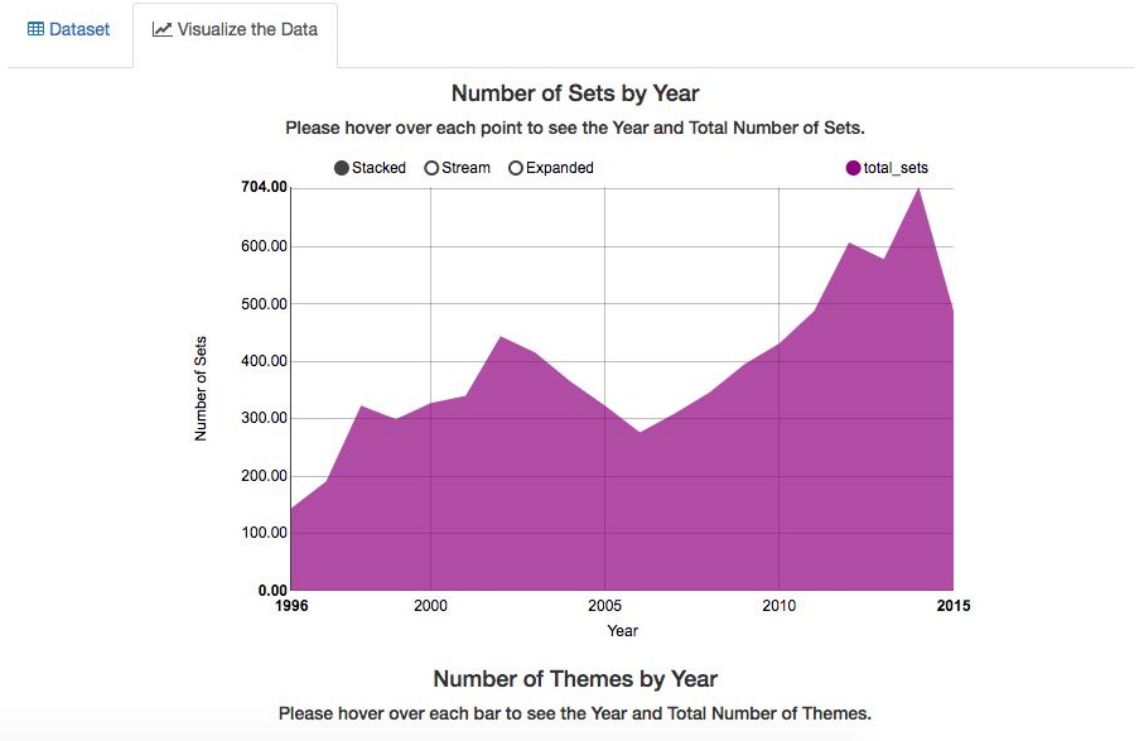
Overplotting: **meaningful subsampling** (plotting only a single node)?



Interactive plotting: shiny apps

https://shiny.rstudio.com/gallery/lego-set.html

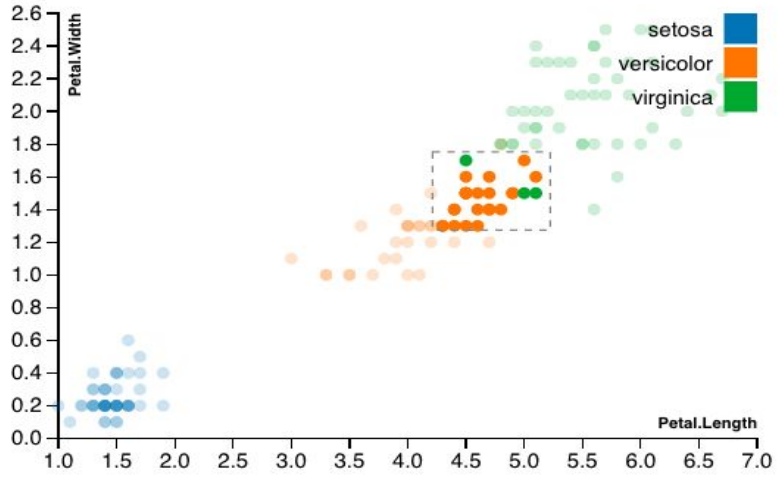


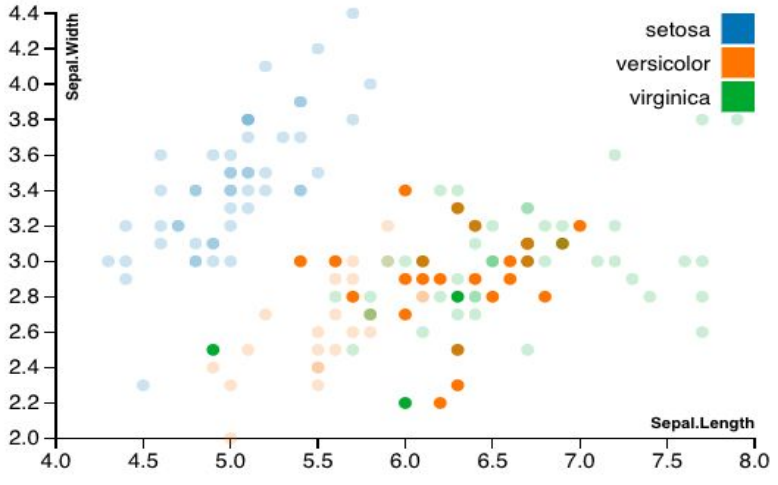


Interactive plotting: linked brushing via crosstalk

https://rstudio.github.io/crosstalk/using.html

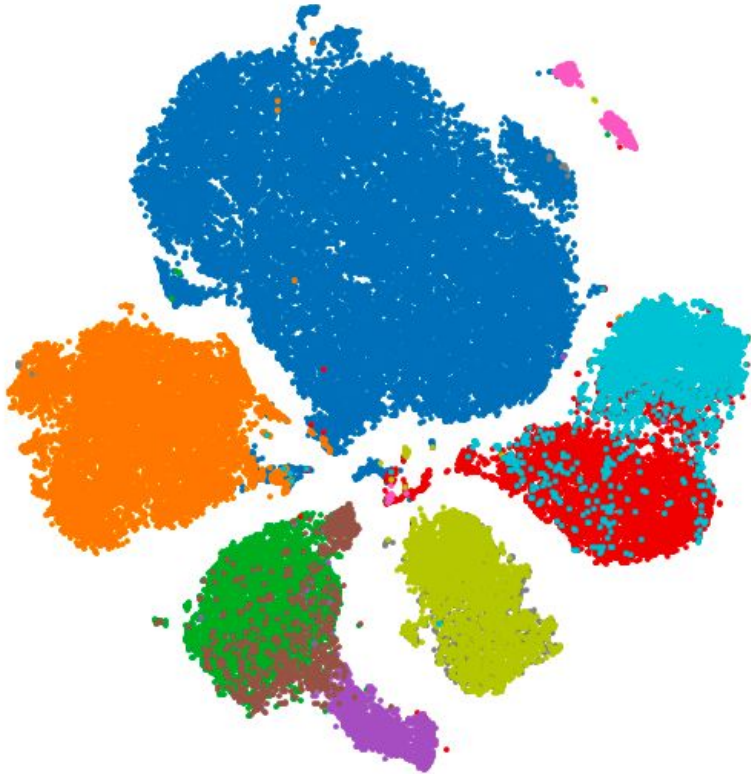
```
library(crosstalk)

shared_iris <- SharedData$new(iris)
bscols(
  d3scatter(shared_iris, ~Petal.Length, ~Petal.Width, ~Species, width="100%", height=300),
  d3scatter(shared_iris, ~Sepal.Length, ~Sepal.Width, ~Species, width="100%", height=300)
)
```





Clustering

K-means
Hierarchical clustering
Spectral clustering
...



Silhouette plots

A measure of the separation between clusters

$$s(i) = \frac{b(i) - a(i)}{\max\{a(i), b(i)\}}$$

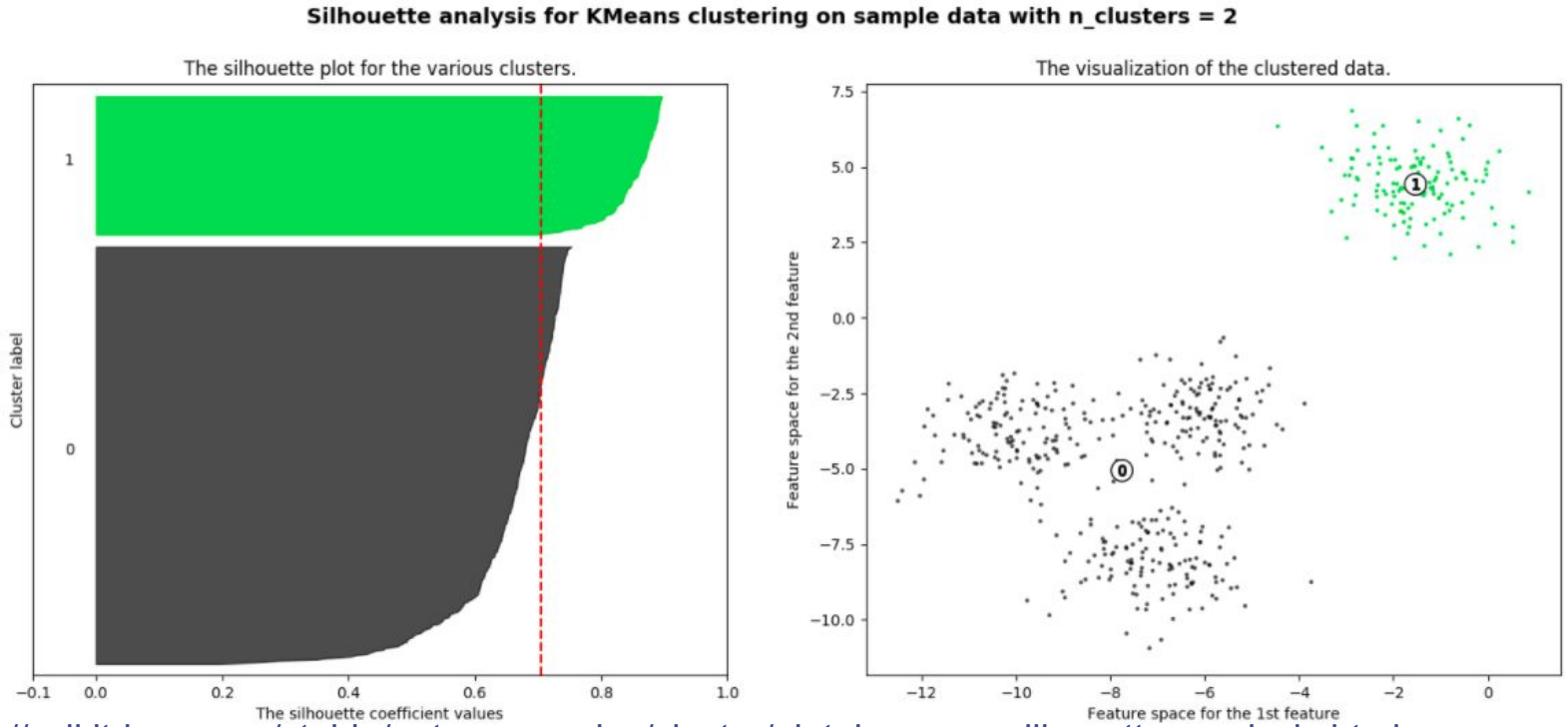
average dissimilarity of data point *i* with all other data within the **same cluster**

lowest average dissimilarity of data point *i* to any **other cluster**

https://en.wikipedia.org/wiki/Silhouette_(clustering)

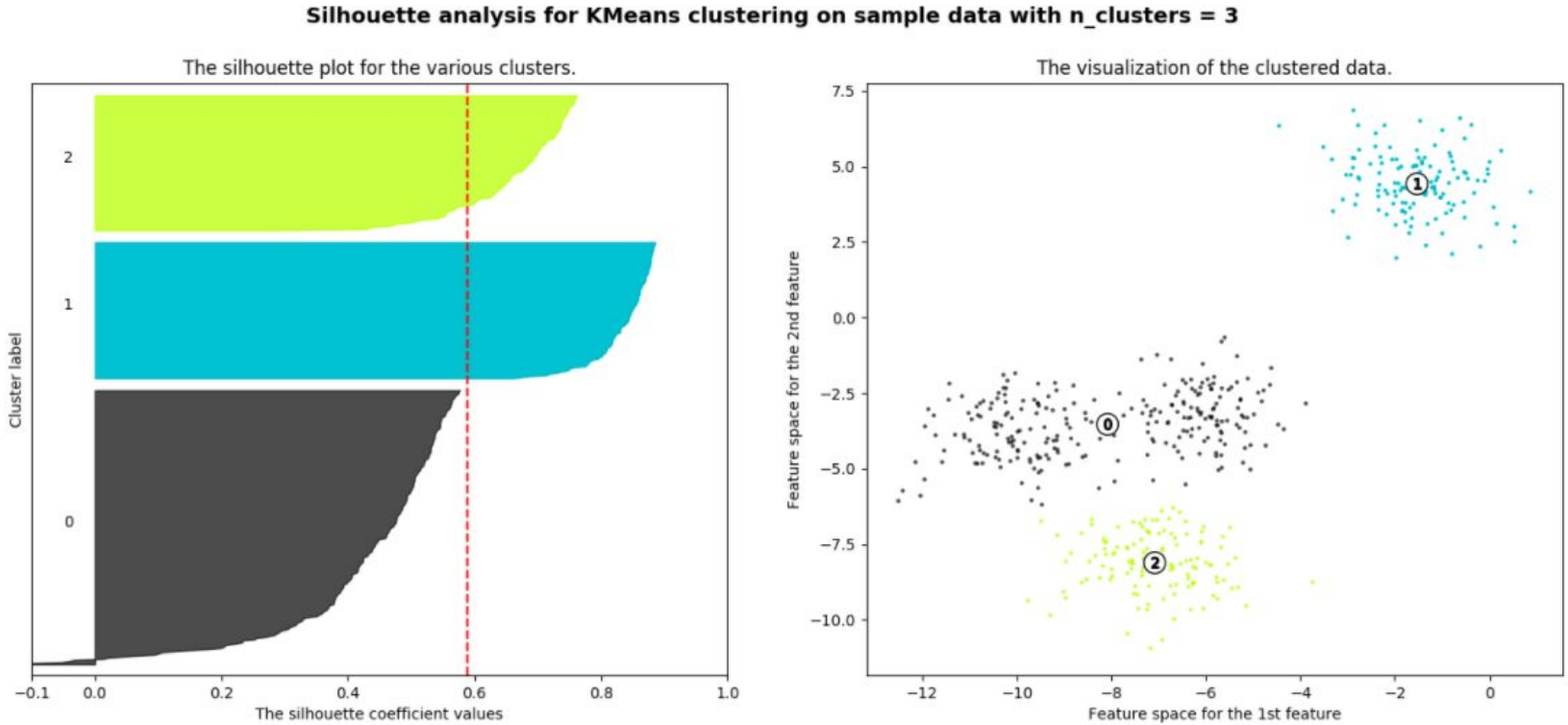
Silhouette plots (**average sil = 0.70**)

Plot silhouette widths in decreasing order, grouped by cluster



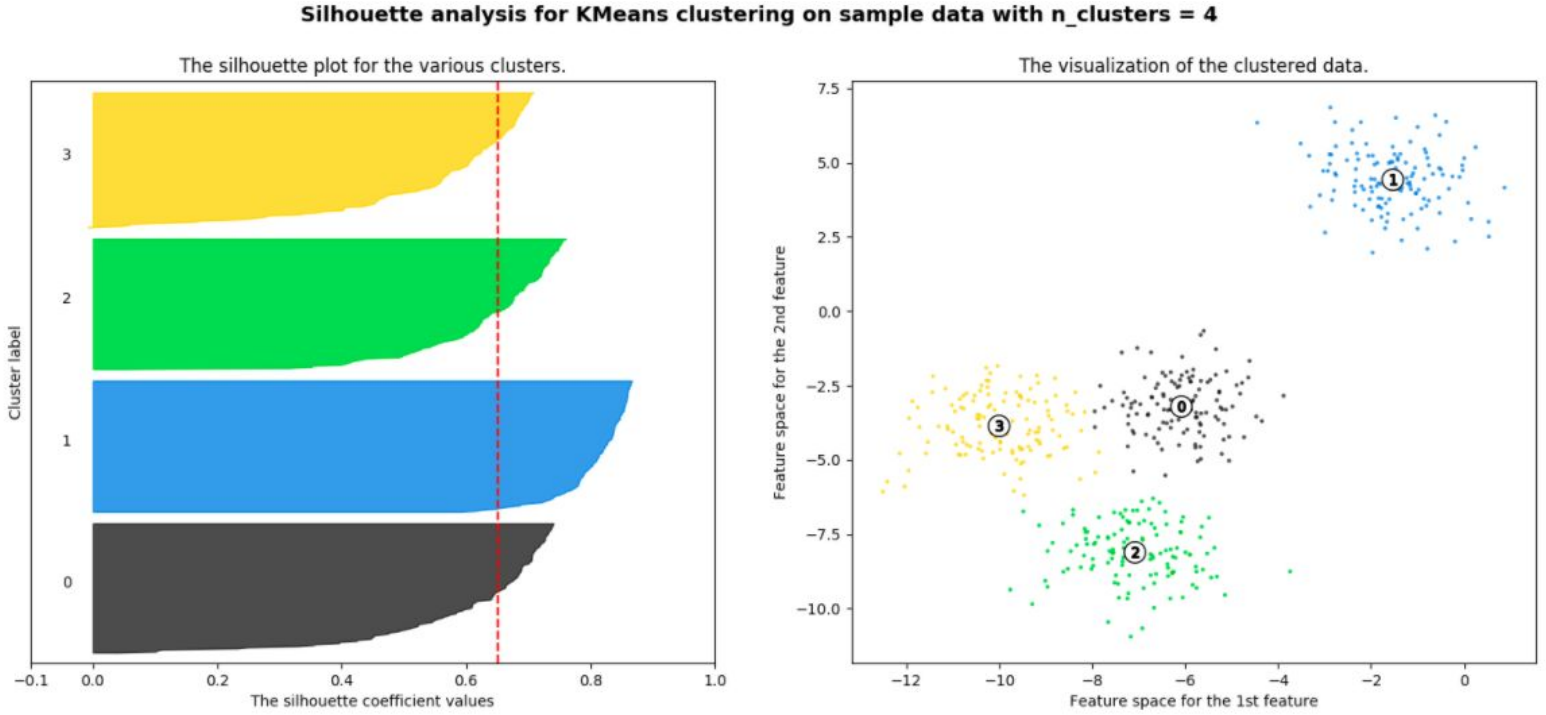
http://scikit-learn.org/stable/auto_examples/cluster/plot_kmeans_silhouette_analysis.html

Silhouette plots (**average sil = 0.59**)



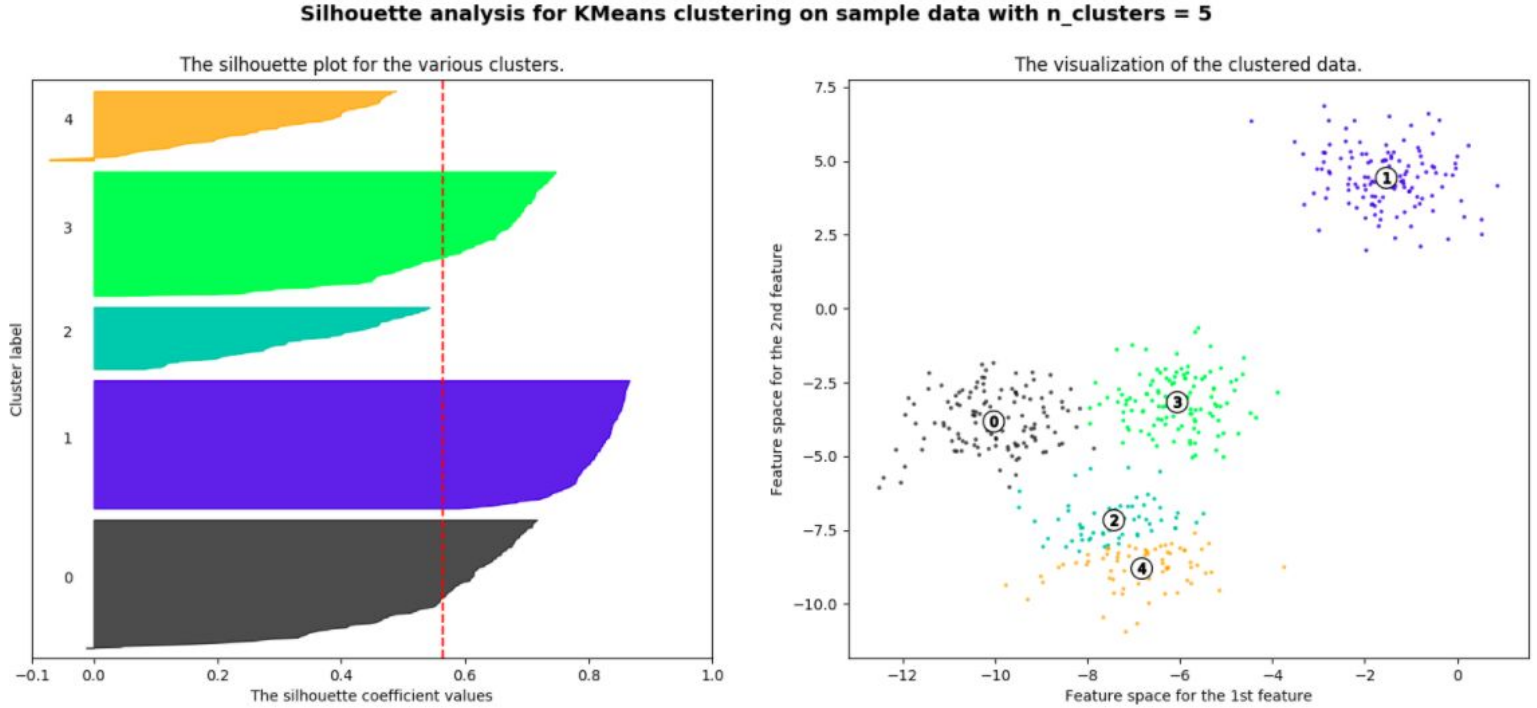
http://scikit-learn.org/stable/auto_examples/cluster/plot_kmeans_silhouette_analysis.html

Silhouette plots (**average sil = 0.65**)



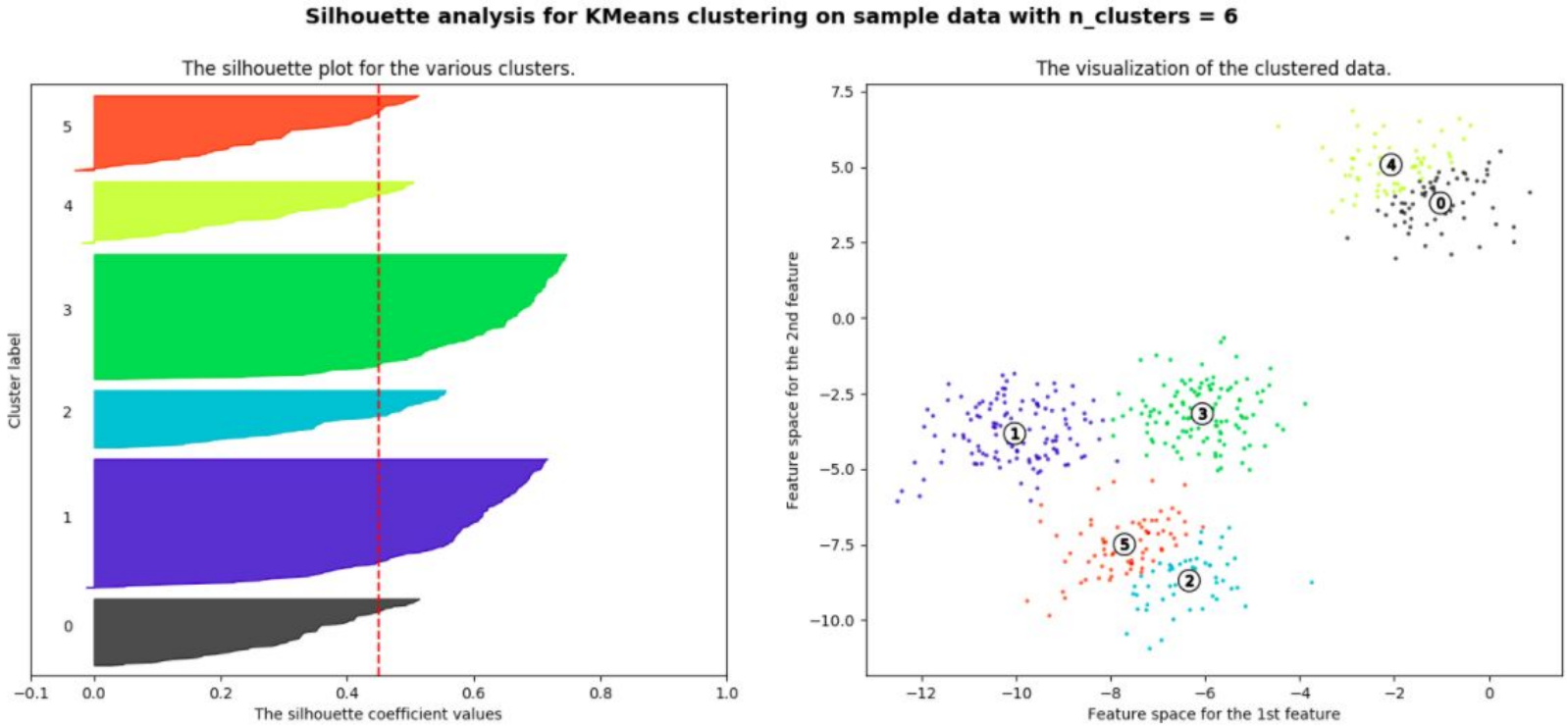
http://scikit-learn.org/stable/auto_examples/cluster/plot_kmeans_silhouette_analysis.html

Silhouette plots (**average sil = 0.56**)



http://scikit-learn.org/stable/auto_examples/cluster/plot_kmeans_silhouette_analysis.html

Silhouette plots (**average sil = 0.45**)



http://scikit-learn.org/stable/auto_examples/cluster/plot_kmeans_silhouette_analysis.html

Silhouette plots (**k = 2 is the best!**)

```
For n_clusters = 2 The average silhouette_score is : 0.704978749608
For n_clusters = 3 The average silhouette_score is : 0.588200401213
For n_clusters = 4 The average silhouette_score is : 0.650518663273
For n_clusters = 5 The average silhouette_score is : 0.563764690262
For n_clusters = 6 The average silhouette_score is : 0.450466629437
```

http://scikit-learn.org/stable/auto_examples/cluster/plot_kmeans_silhouette_analysis.html

Clustering exercises

1. Load wine.csv (14 characteristics of 178 wines from 3 different cultivars)
2. Plot the wines in the space defined by the first two principal components. Color each wine by its cultivar (type).

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3. **Run k-means with 3 cluster centers using all variables (except cultivar). Color each point in your previous plot by cluster.**

Clustering exercises

1. Load wine.csv (14 characteristics of 178 wines from 3 different cultivars)
2. Plot the wines in the space defined by the first two principal components. Color each wine by its cultivar.
3. Run k-means with 3 cluster centers using all variables (except cultivar). Color each point in your previous plot by cluster.
4. **Run k-means using the first two principal components only. Color each point in your plot by cluster. Compare the spectral clustering to the standard k-means clustering.**

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5. **Re-run steps 3 and 4 each four times. Do the results change?**

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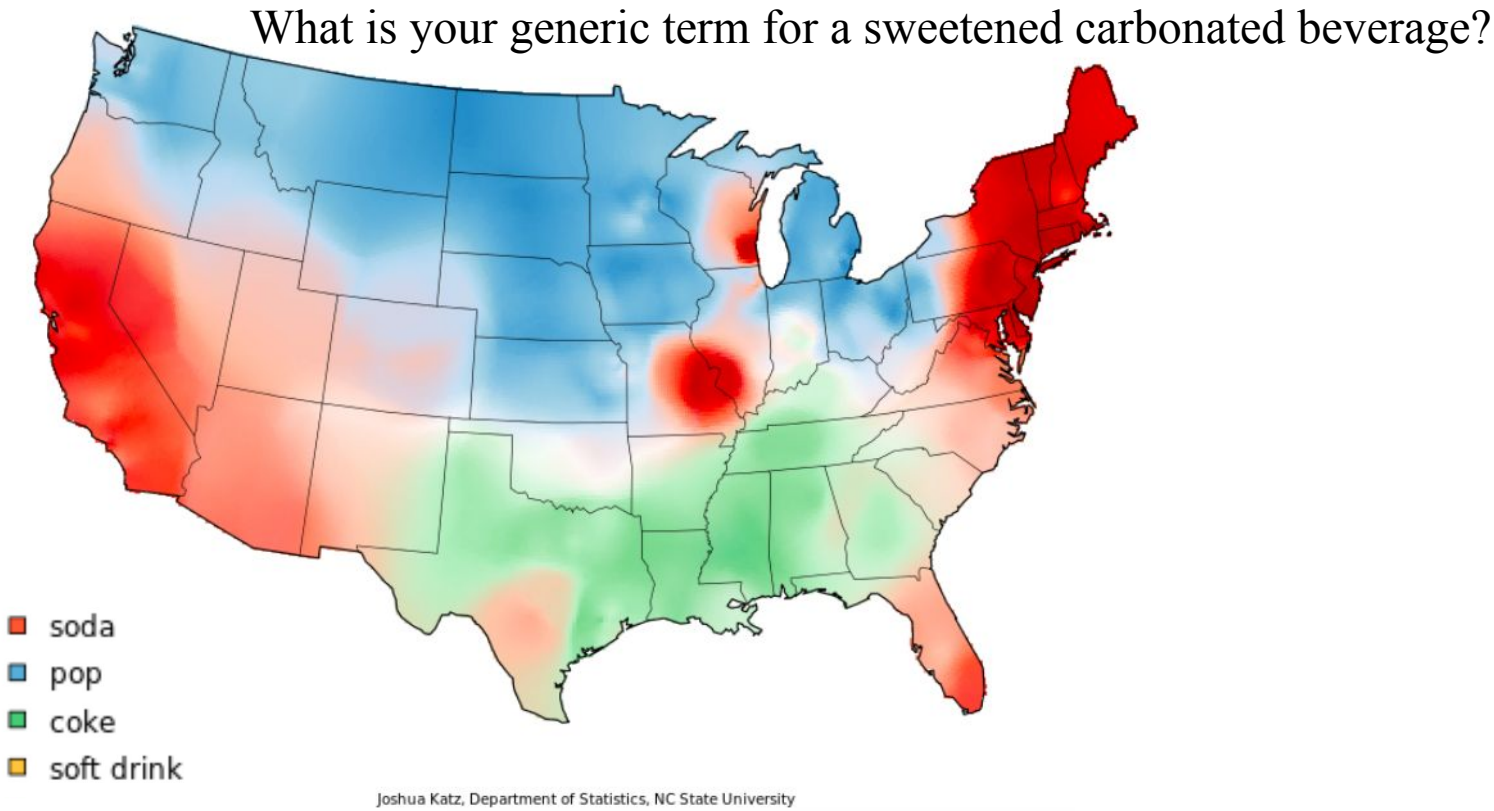
5. Re-run steps 3 and 4 each four times. Do the results change?
6. **Re-run steps 3-5 with 10 cluster centers. Compare silhouette plots.**

Introducing Lab 2



http://www.businessinsider.com/22-maps-that-show-the-deepest-linguistic-conflicts-in-america-2013-6