Quiz!

Please write down any material you'd like me to cover before the midterm on Friday!

October 17, 2016

Eigenvalues and the power method

In this class:

- *Review of the eigenvalue problem*
- *Why you should care (a lot!) about eigenvalues.*
- *How you (probably) learned how to find them*
- *Useful properties of eigenvalues + eigenvectors*
- *The power method!*
- *The power method in practice.*

Next class

Catchup & Review

G&C – Chapter 12.1.1

Next next class

Midterm

G&C – Chapter 6, 7, 12 (sections)

An opportunity!

I'm giving a lecture tomorrow (10:30-11:30am in LWSN 3102) on how we can use eigenvalues and eigenvectors to find important ecosystems and identify anonomalous groups in Twitter among other things.

We will allow up to 15 people (determined by order of emailing the TA with your PUID) to use this lecture to either

- Make up a missed class
- Allow yourself to miss a class during the final week of mandatory lectures.

(But not both).

If you interesting, you *must* receive a slip from us ahead of time (hence the email).

$$(\lambda, \mathbf{x})$$

eigenpair

$$\mathbf{A}\mathbf{x} = \lambda\mathbf{x}$$

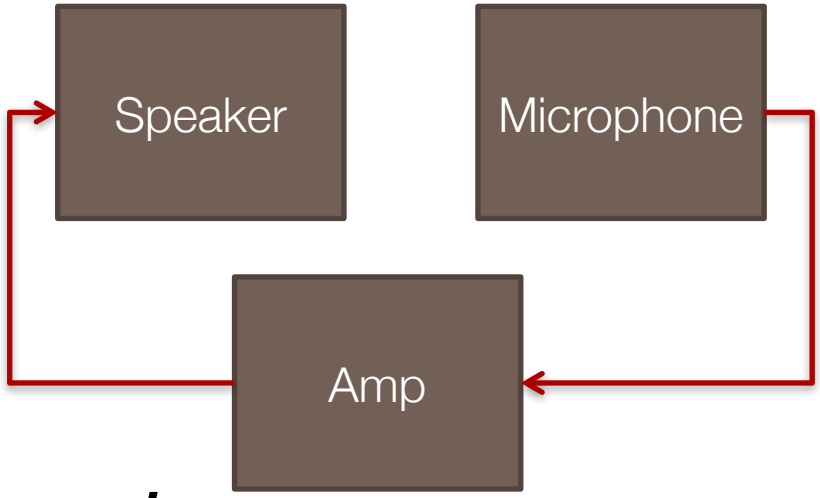
an important direction

$$\det(\mathbf{A} - \lambda\mathbf{I}) = 0$$

roots of the characteristic polynomial

eigenvalues and eigenvectors
show up everywhere

Feedback of speaker & microphone



$$\frac{d\mathbf{x}}{dt} = \mathbf{A}\mathbf{x}(t) + \mathbf{f}(t)$$

Gaussian quadrature

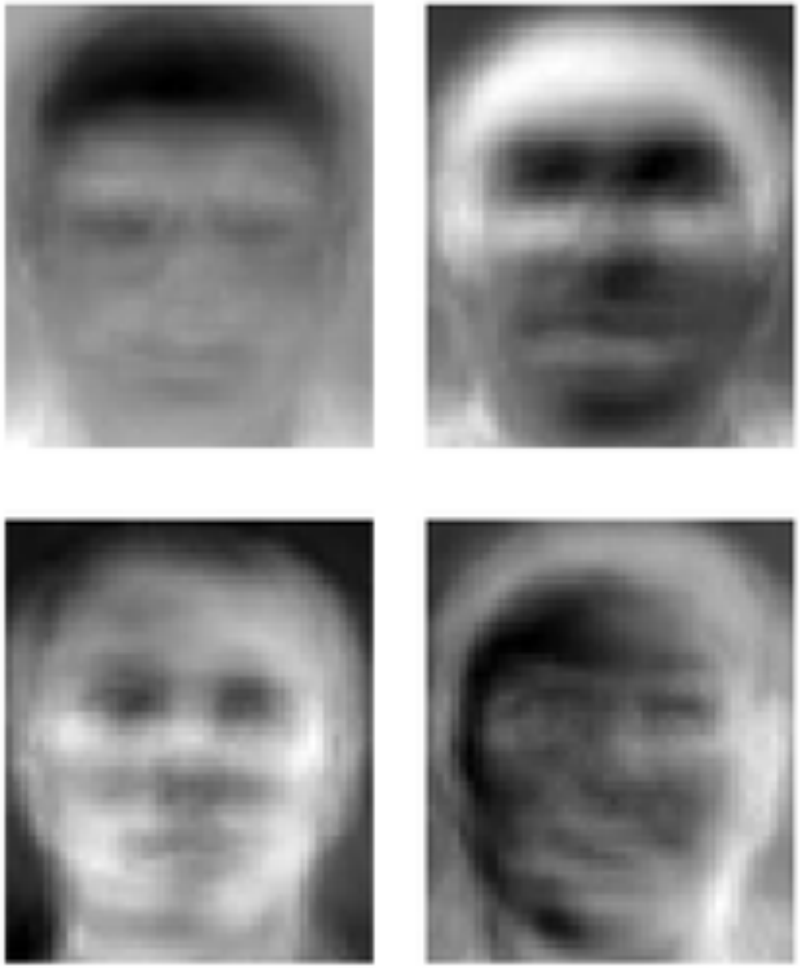
$$\int_a^b f(x)\,dx \approx \sum_{i=1}^{N} f(x_i)\,w_i$$

$x_i =$ nodes $\qquad w_i =$ weights

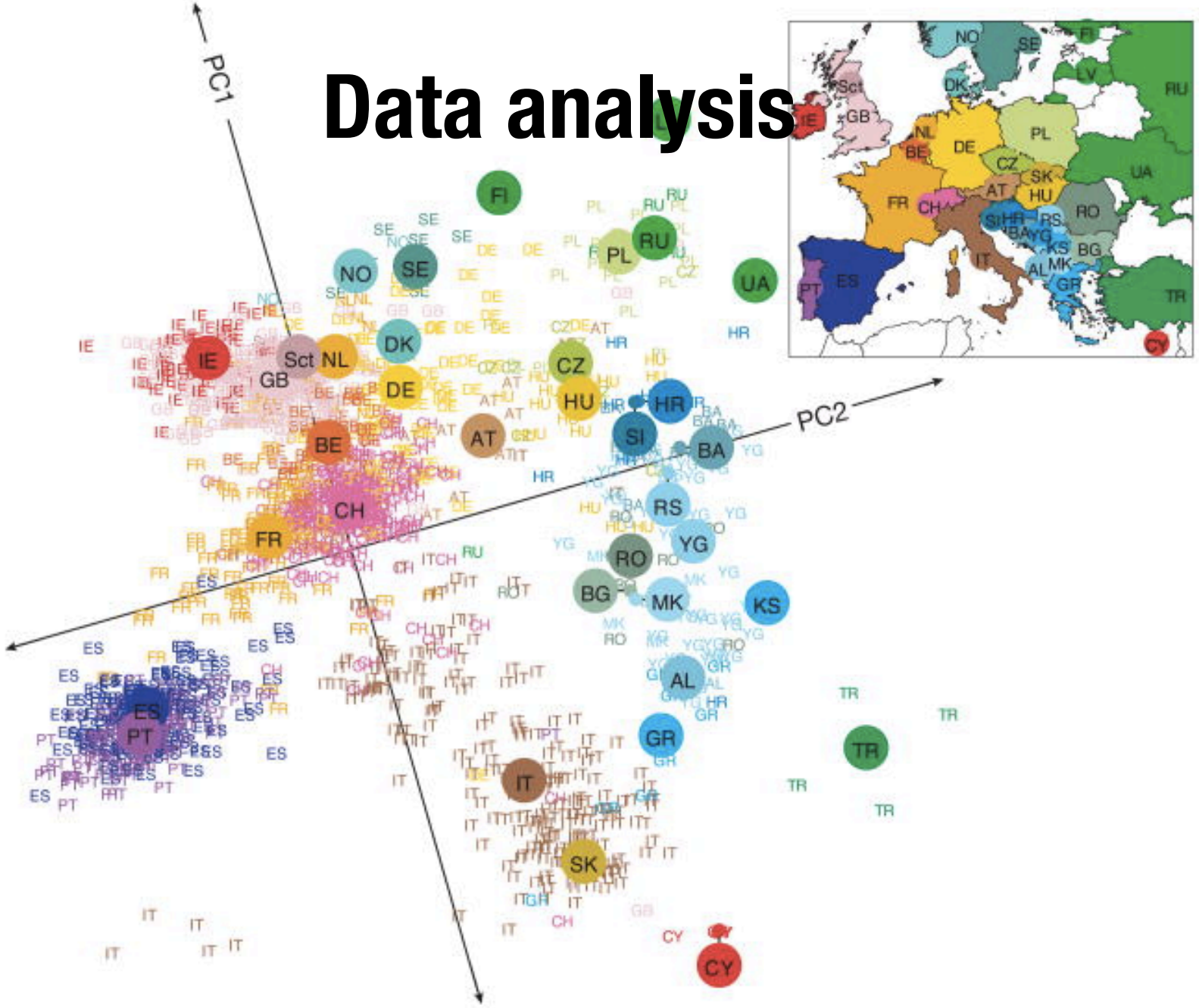
$$(\lambda_1, \mathbf{v}_1), \ldots, (\lambda_N, \mathbf{v}_N)$$ Eigenvalues, vectors

$$x_i = \lambda_i \qquad w_i = v_{i,1}^2$$

Data analysis



Data analysis



Structural analysis