Lecture 26: Punchlines and morals
The inspiration for this lecture

[link to fairy tale in True Facts About the Owl, by zefrank1]
What is the moral of our story?

[The Duchess said,] `You’re thinking about something, my dear, and that makes you forget to talk. I can't tell you just now what the moral of that is, but I shall remember it in a bit.'

`Perhaps it hasn't one,' Alice ventured to remark.

`Tut, tut, child!' said the Duchess. `Everything's got a moral, if only you can find it.'
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Data relationships are key

- Between features (as columns) - dimension reduction
- Between items - clustering
- Between variables - graphical models
Example: Learning from geotagged, captioned image data

(Crandall, Backstrom, Huttenlocher, Kleinberg, best paper nominee, WWW 2009)
But there is no free lunch

- Complexity of algorithm, data requirements, need for prior knowledge, ....
Seek a “good” feature space

Cholera deaths (examples based off Edmund Cooper, 1854):

❖ 40 Broad Street: next to gully-hole, drain in good condition, ...

❖ 39 Broadwick St: not next to gully-hole, serviced by new sewer, ...

❖ ...

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Watch for outliers (bad news)

Similar issues with clustering
100% is not the goal

- Don’t get the wrong idea from the two course competitions!

Fig. 4. Over-enthusiastic data fitters
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Fig. 4. Over-enthusiastic data fitters
Watch for outliers (good news)

Somebody on Facebook
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An important outlier
(Backstrom & Kleinberg, best paper CSCW 2014)
Choose the right tool for the job

- Remember canonical cases where methods succeed or fail
- A1: PCA vs. CCA vs. RP
- clustering: k-means likes “round” clusters; Gaussians are good for “ellipses
- Use wishful thinking to your advantage to create new tools!
Ask: do subtle differences matter?

- A1: rotations
- Clustering definitions
- A2: additions of a single point
- Maybe you can come up with new techniques…

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the ADFFFTT model in A3
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the ADFFFTT model in A3

the other ADFFFTT model in A3
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We’ve been up all night preparing the next lecture/assignment/…
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Man, bringing this iClicker to class is getting annoying.
Thanks for ...

❖ ...coming to the weekend lecture with Lars Backstrom
❖ ... helping each other on Piazza
❖ ...your patience with us during our first running of this course
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You guys rule!