Week 6 Video 3

Visualization
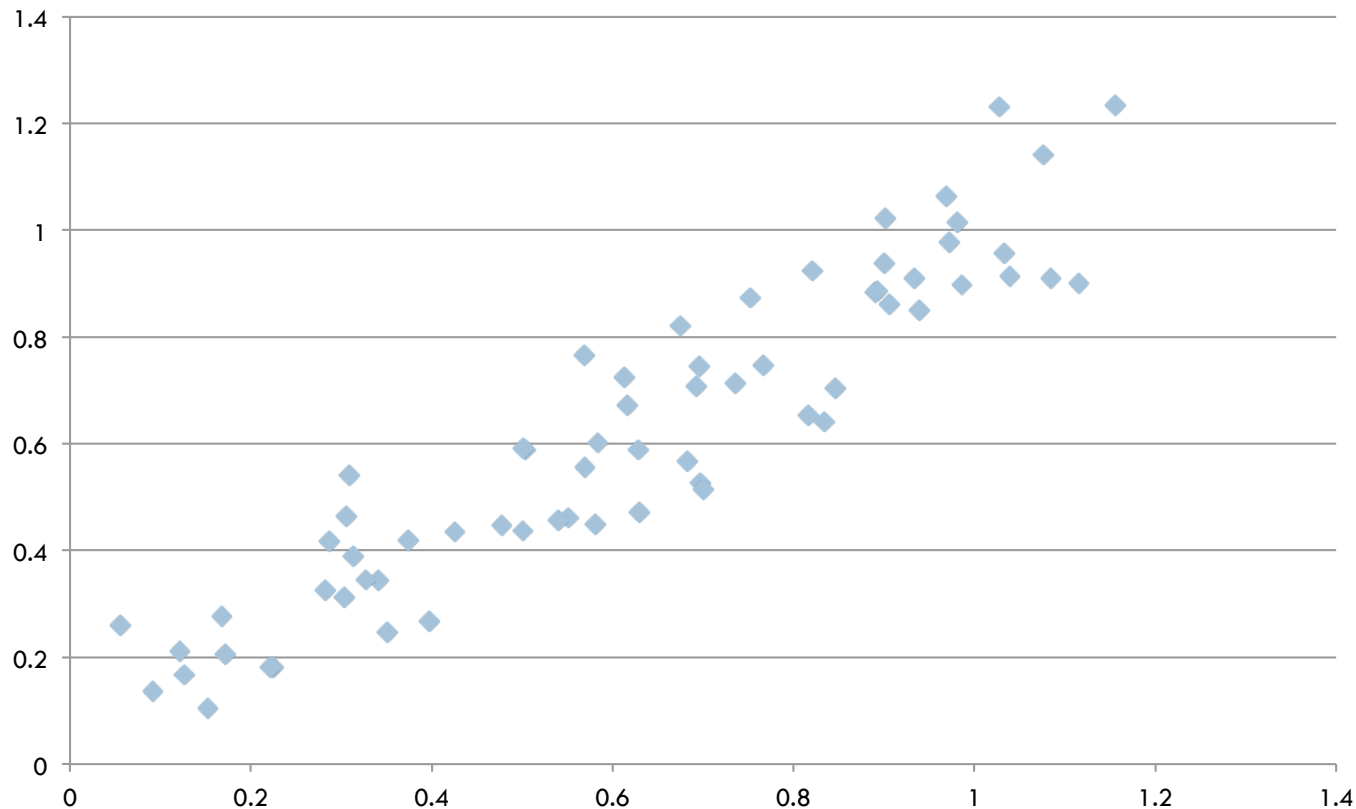
Scatterplots

Heat Maps

Parameter Space Maps

Scatterplots (Scatter Plots)

□ A classic type of visualization
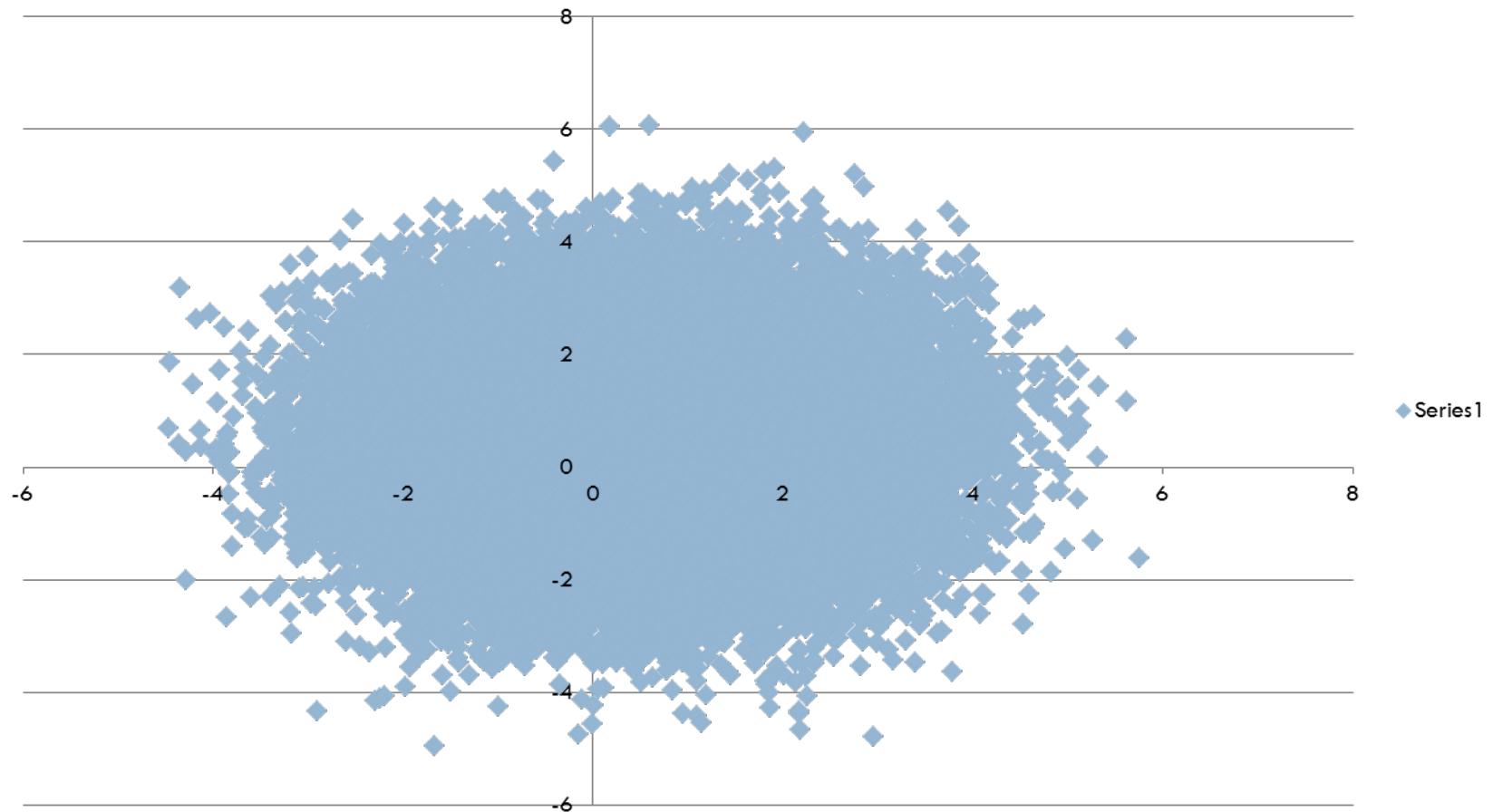
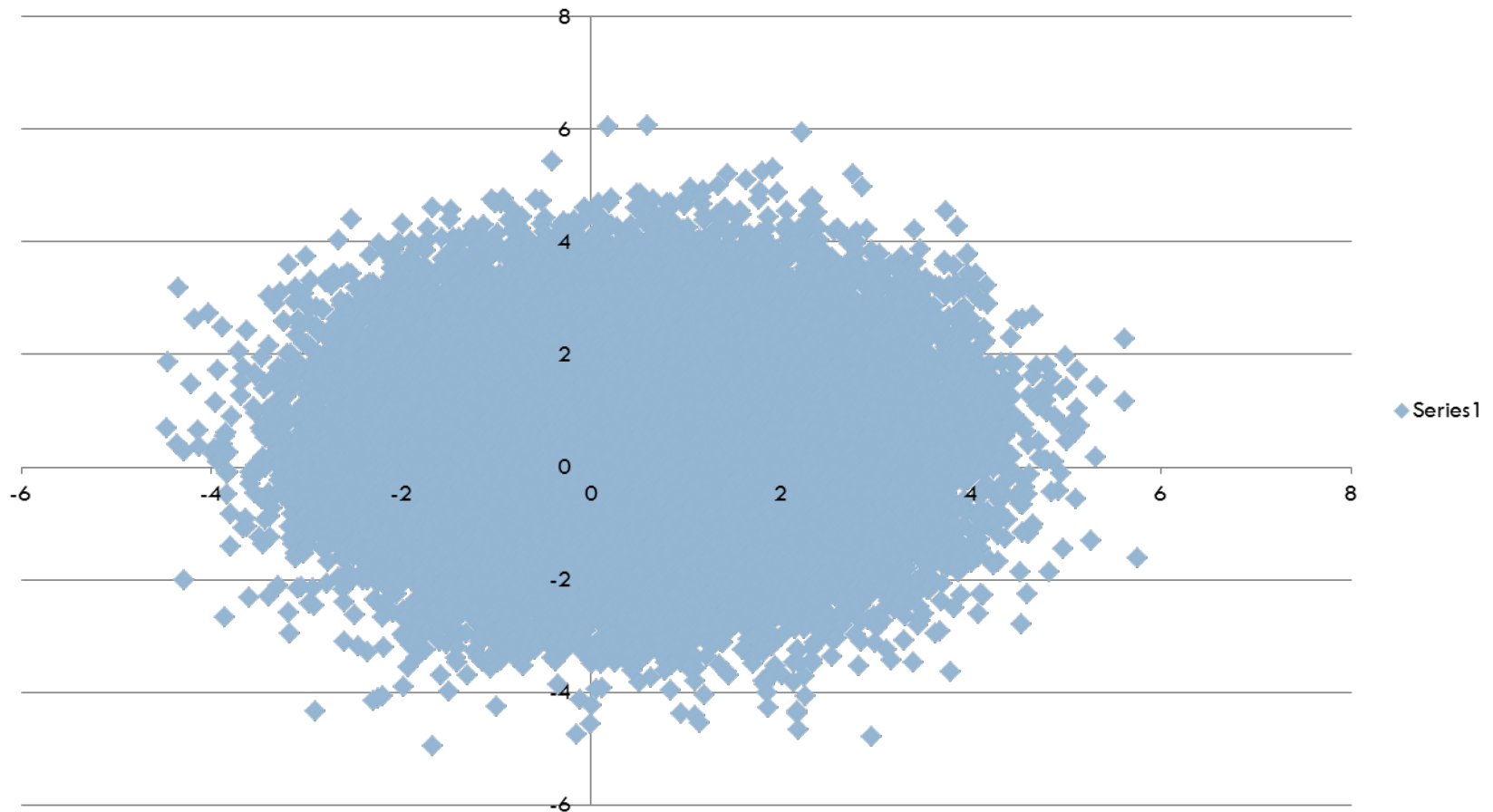# Many say…

- Always look at a scatterplot of your data!

But there's a problem…

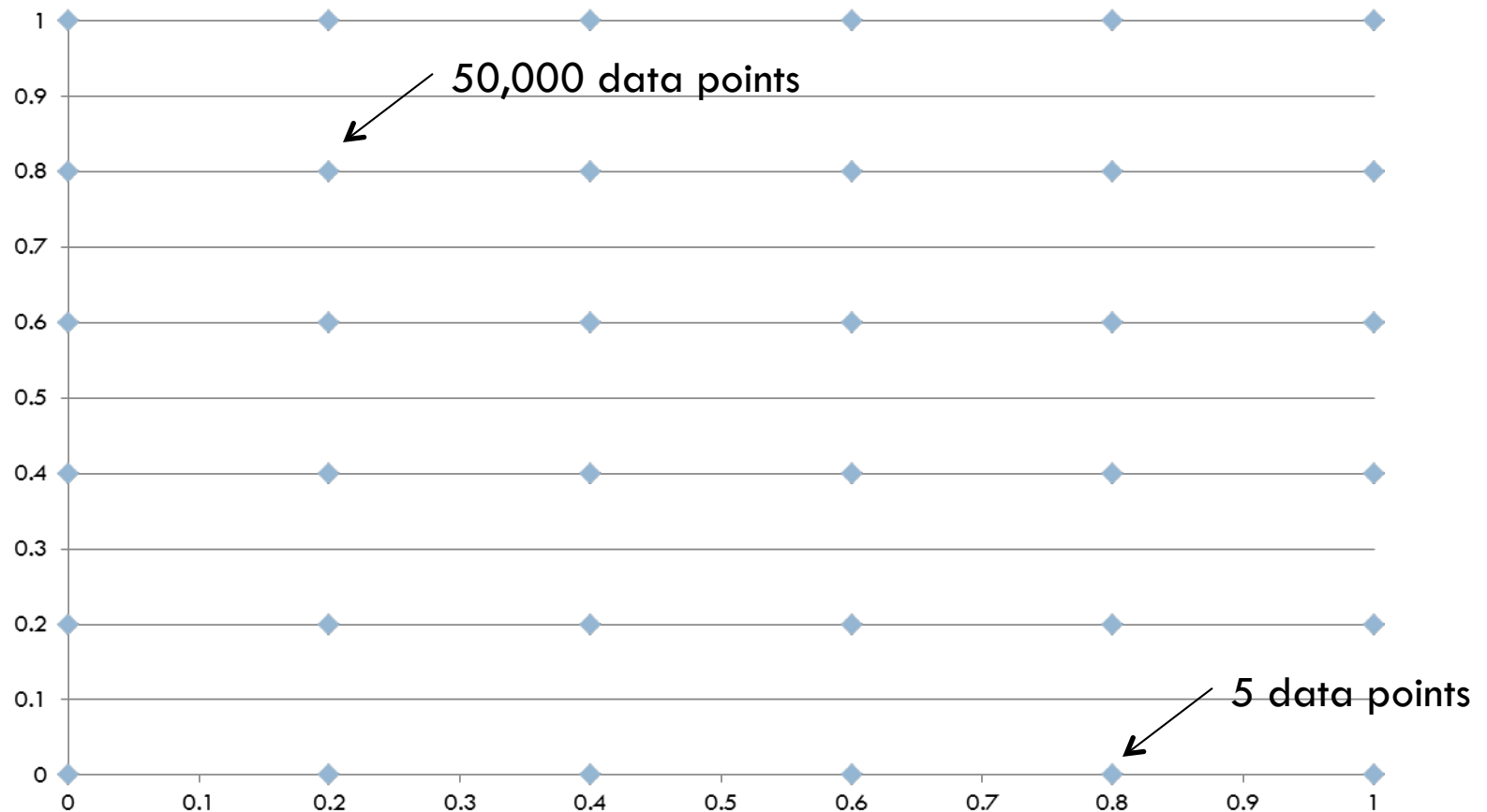☐ Scatterplots don't scale well to large data sets

With lots of data points

□ You get giant blobs

Or if the data is not that granular
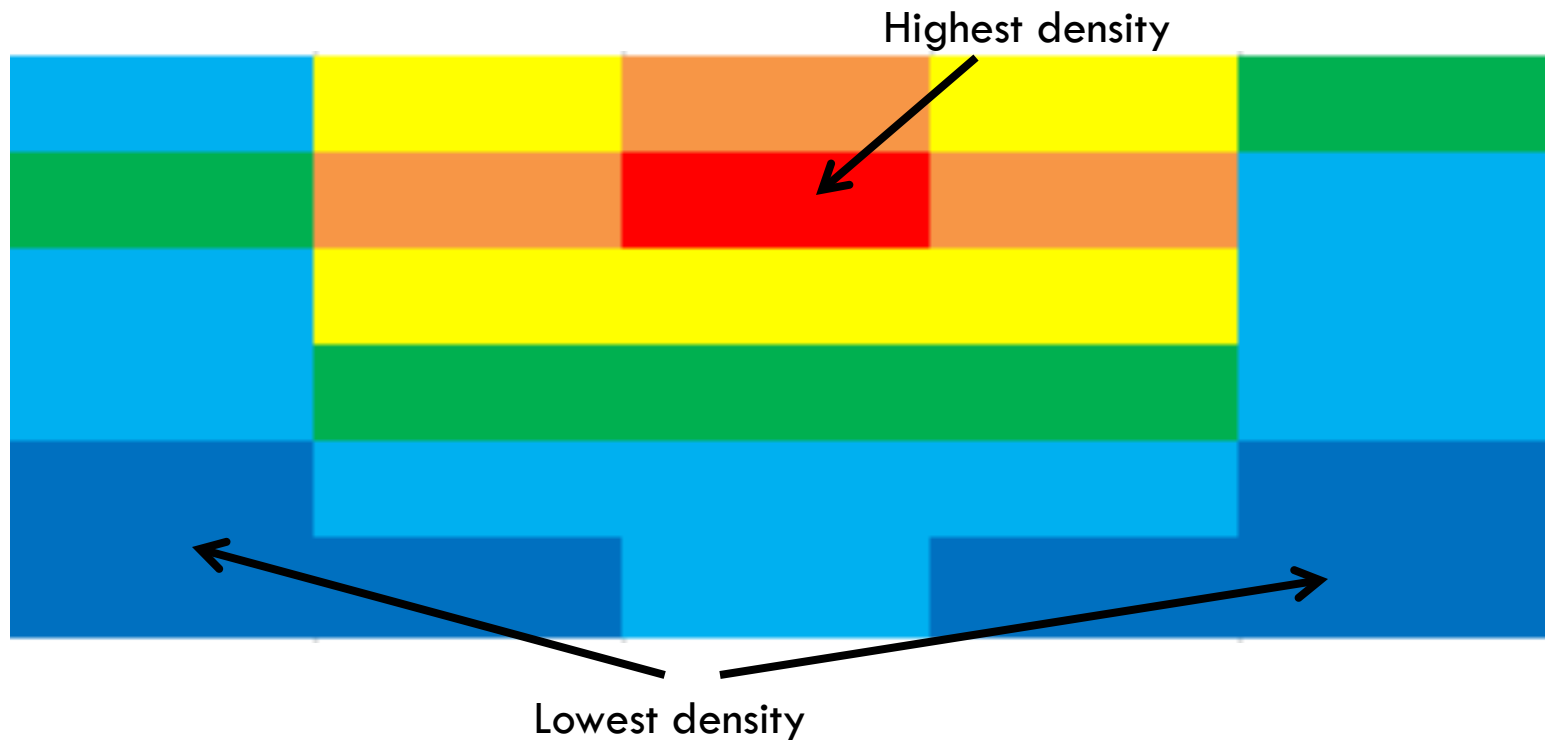
☐ You get single points hiding lots of data points

You can increase data point size

- But it can be hard to display size differences accurately
  - 500,000 versus 5? A point 100,000 times bigger?

- And if data is somewhat granular, data points may get covered

Heat Maps

- Show the density of data in specific regions

Heat Maps

□ Do better with large-scale data

□ Important to get the right box size
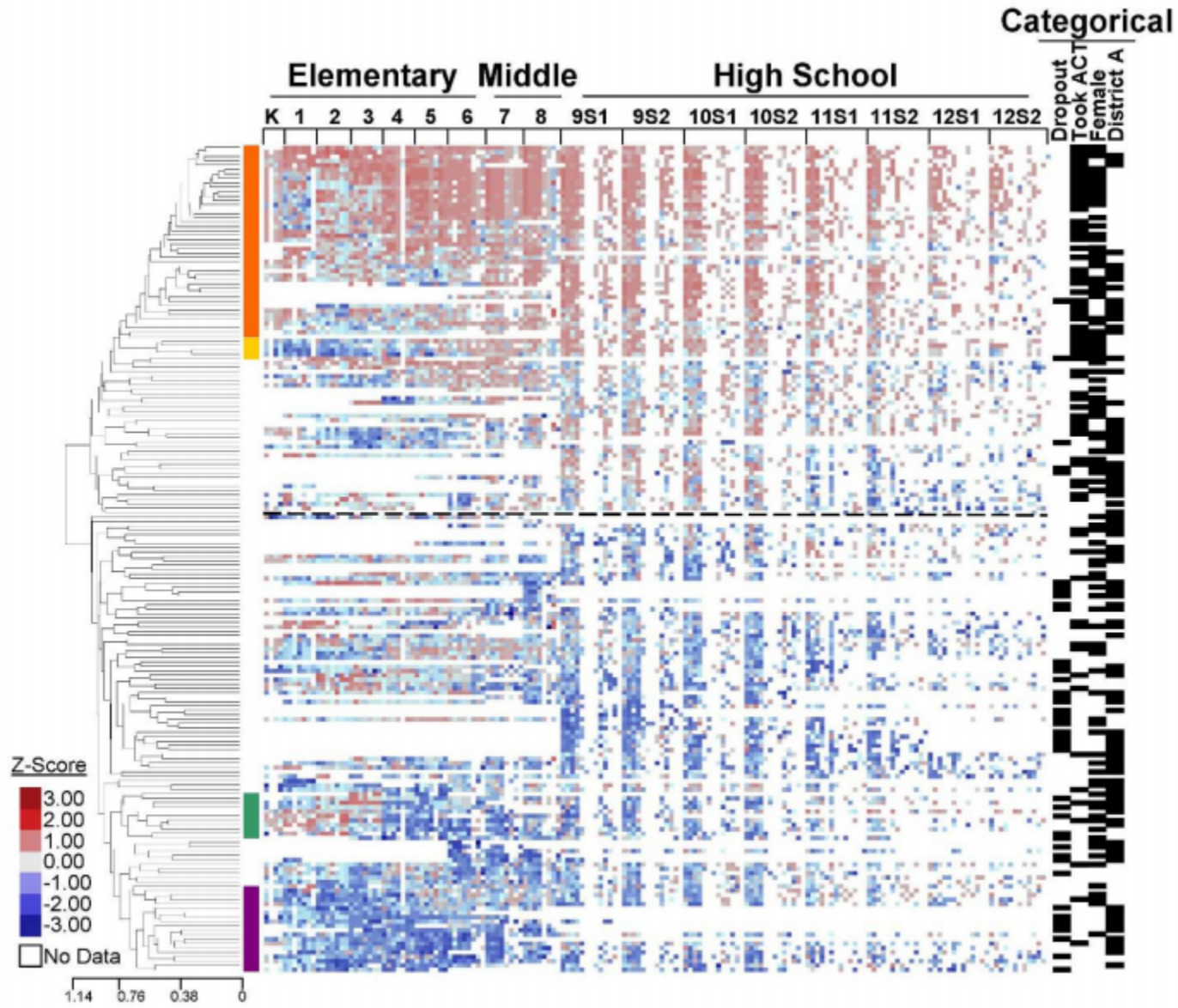
■ OK to experiment a little

Not just a substitute for scatterplots

- Can be used for intensity as well as density

Example (Bowers, 2012):
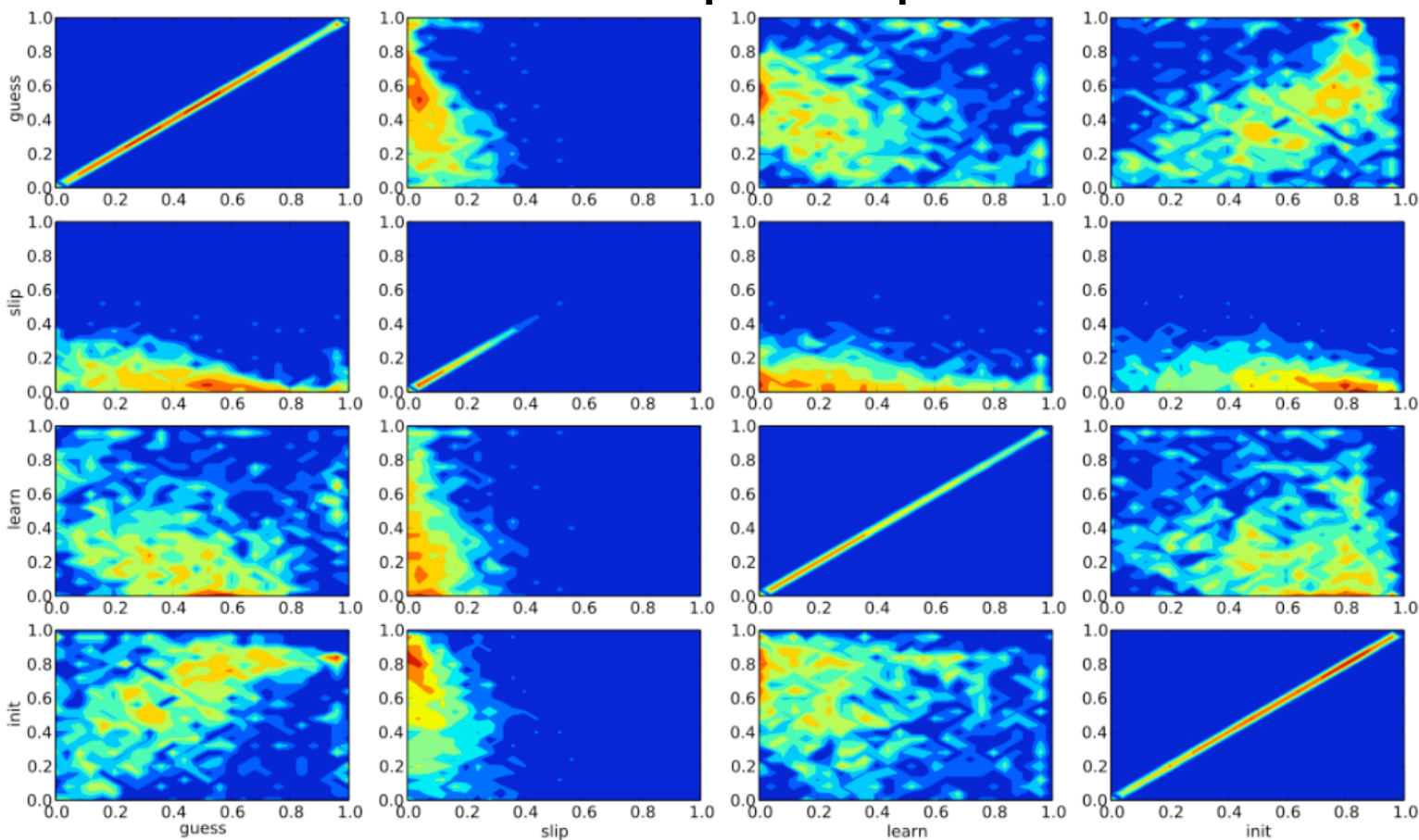## Color shows grade (red = poor, blue = good)

Parameter Space Maps

- Important Special Case of Heat Maps
- Used to look at the goodness of various parameters, particularly for BKT (Week 4)
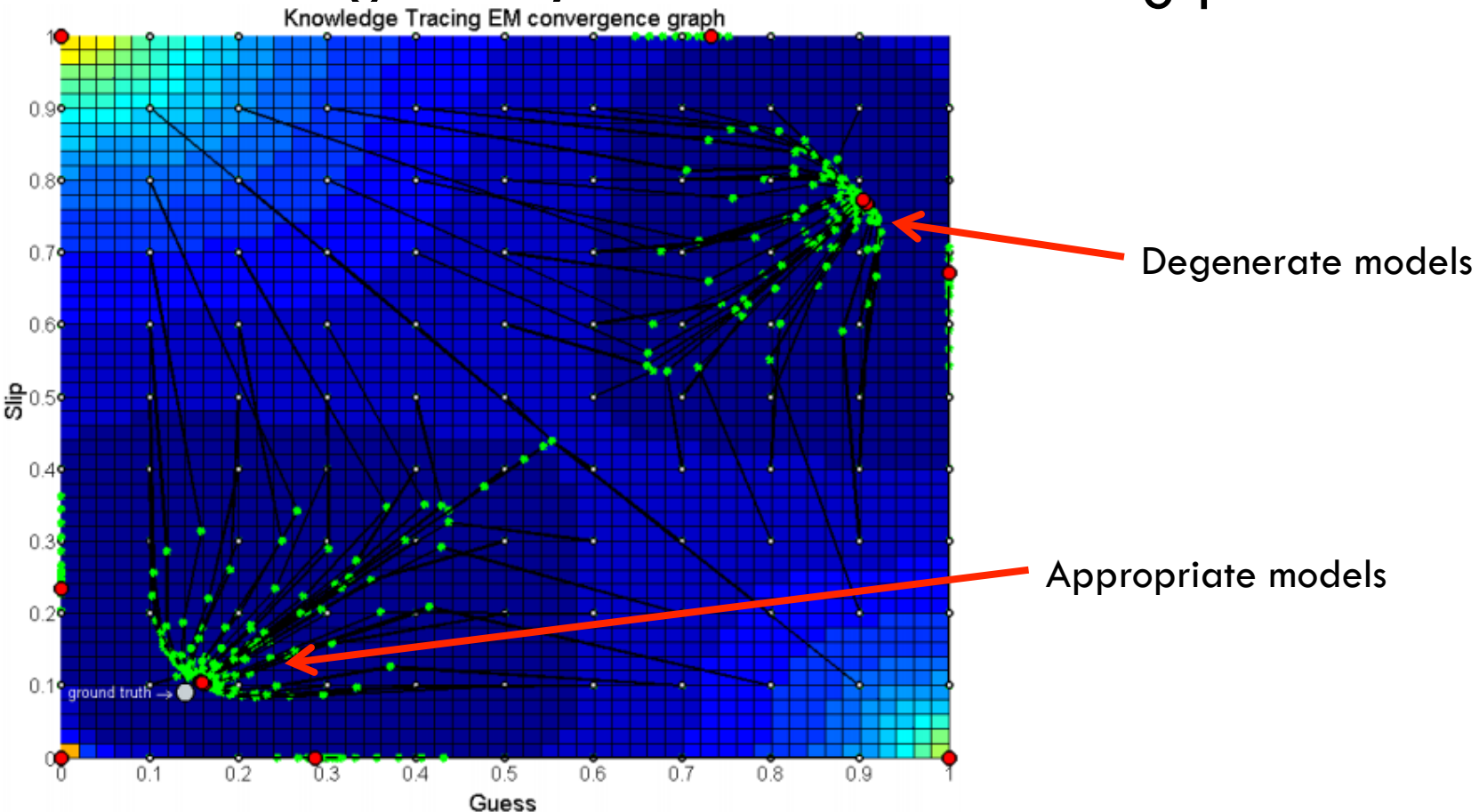
(Ritter et al., 2009)

- Proportion of skills in Cognitive Tutor where best BKT model ends up with parameter values
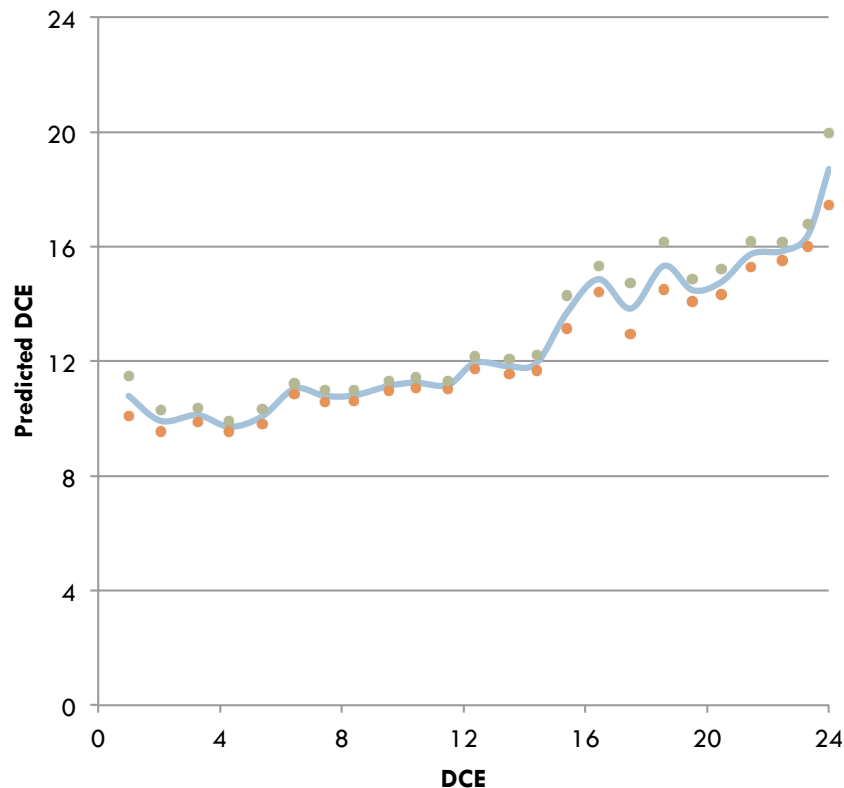
Pardos & Heffernan, 2010

☐ Analyzed the convergence of BKT models for the EM algorithm, with different starting points

Knowledge Tracing EM convergence graph

Degenerate models

Appropriate models

Average Graphs

- Another alternative to scatterplots
- The Y axis shows the average value (+- 1 SD) for each value of the X axis

Bottom line

- Lots of alternatives to classical scatterplots
- Make this visualization more useful for big data

Next lecture

- State Space Networks