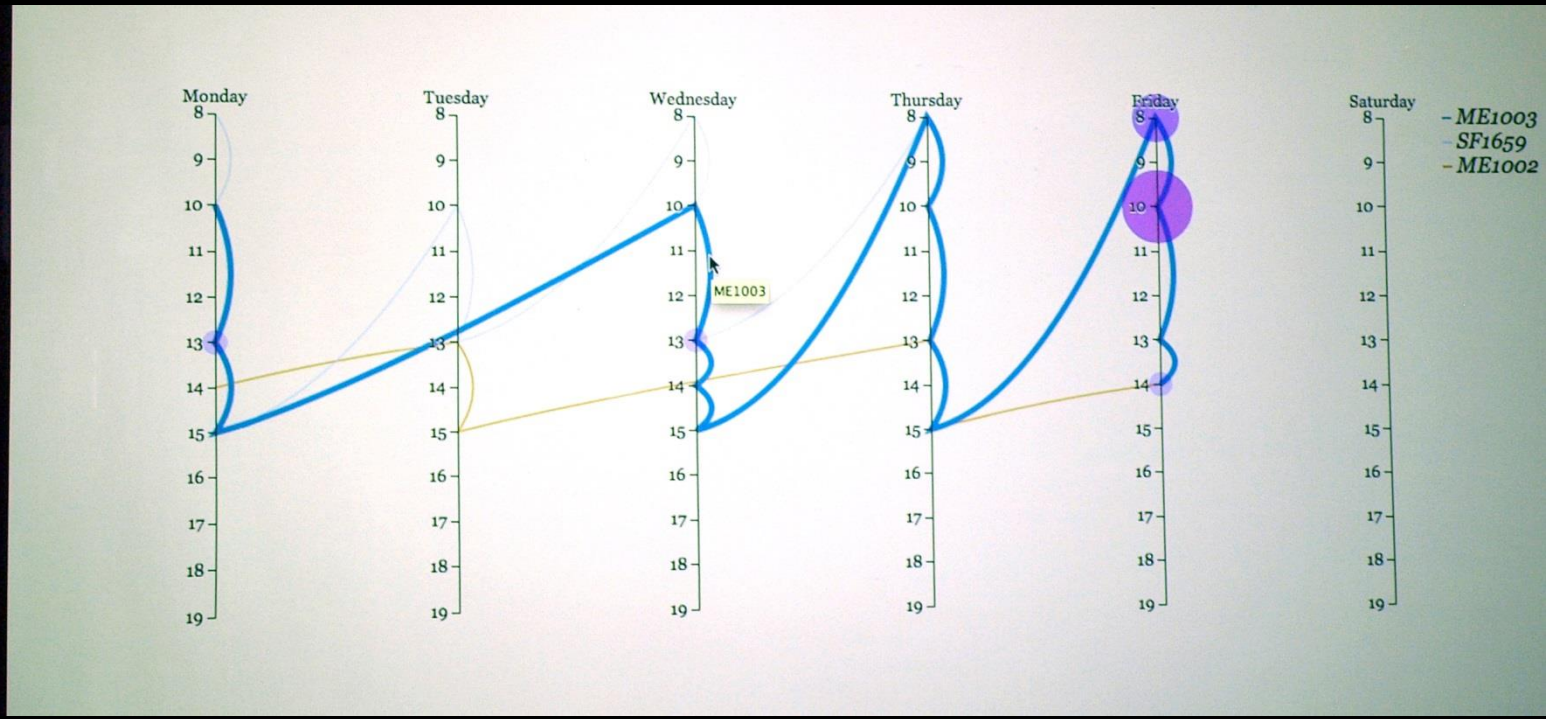
# Mario Romero
2014/02/04

# Information Visualization IVIS14 – Lecture 4

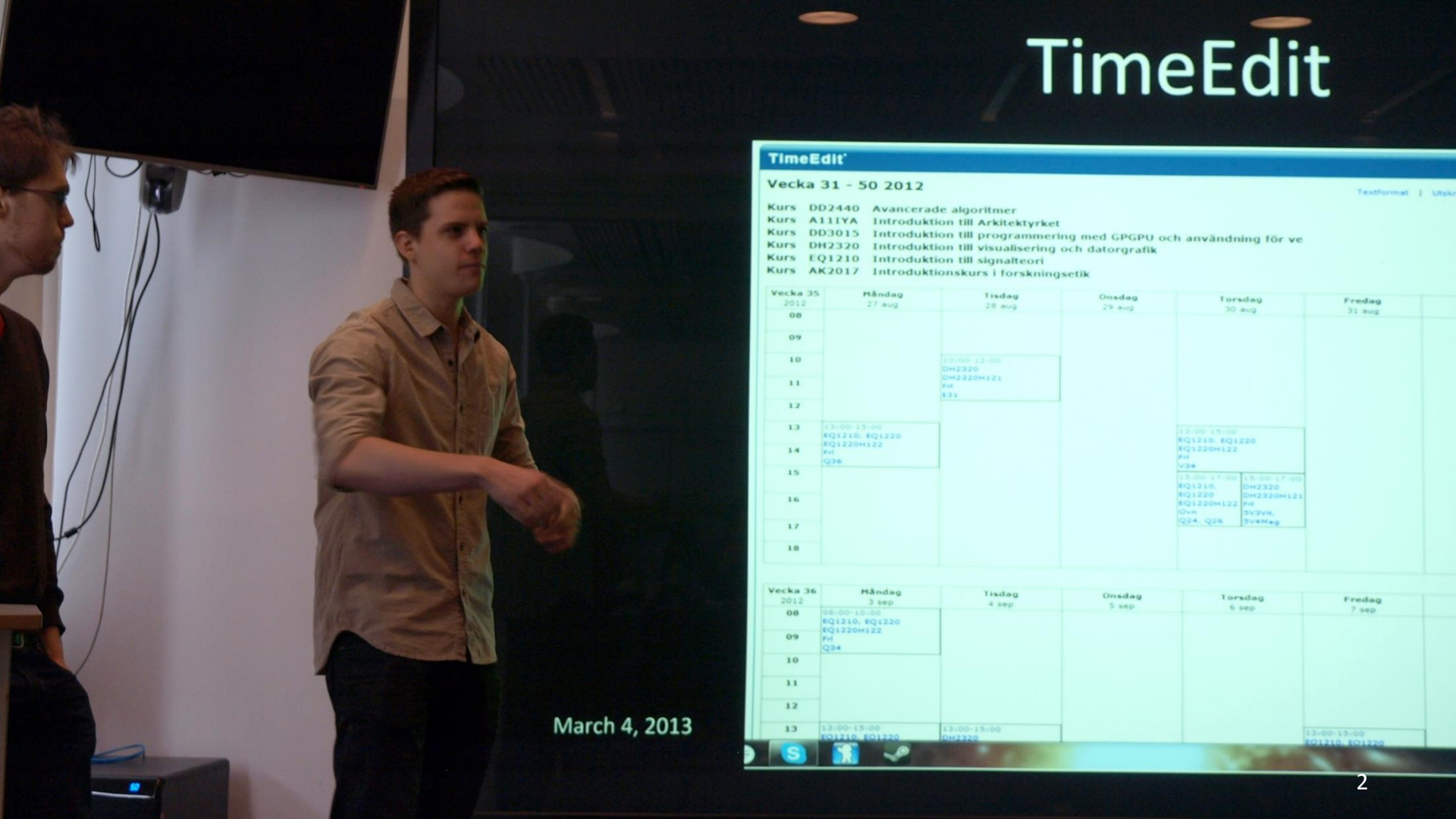


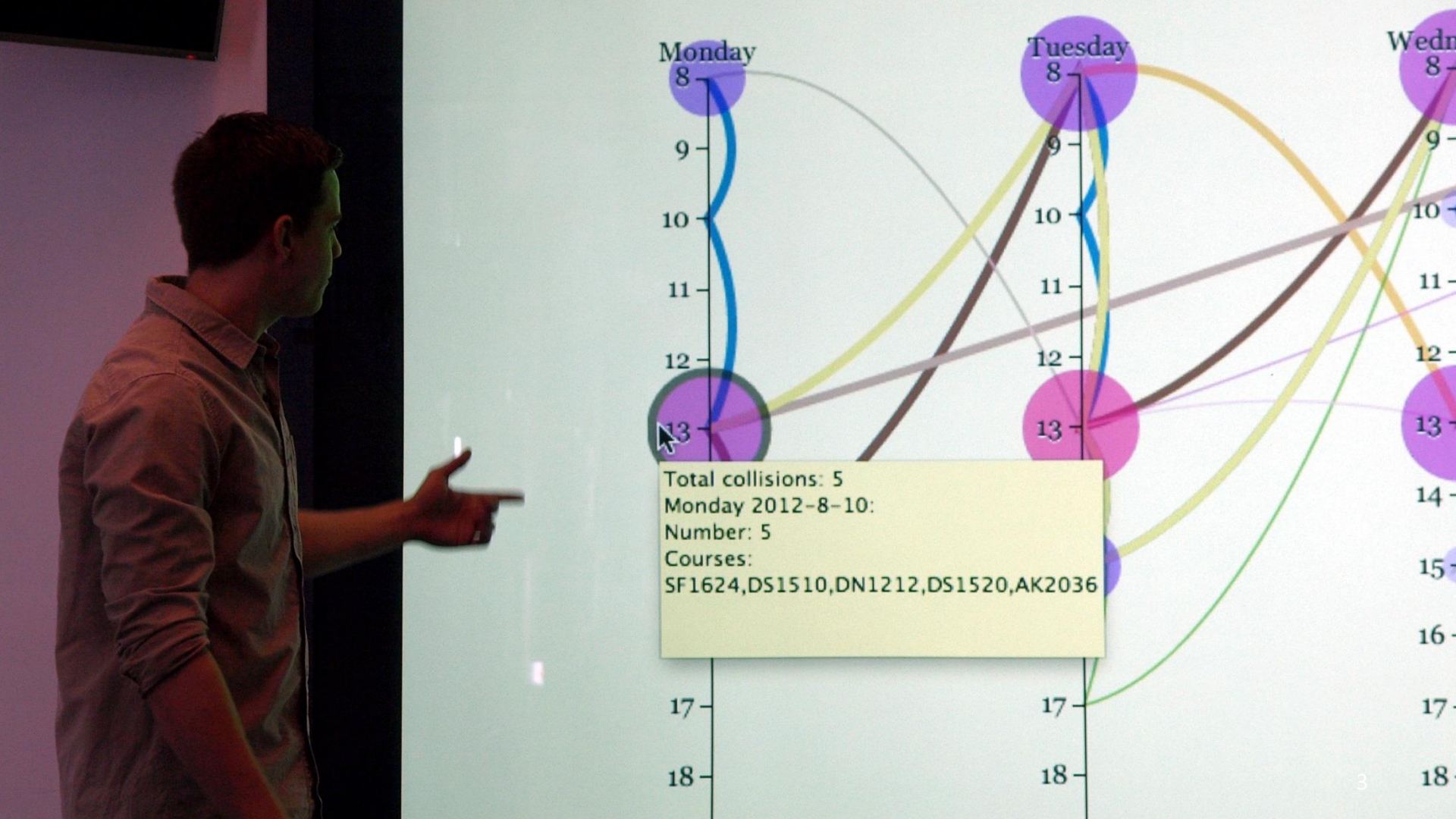

IVIS13 students Markus Felldin and Max Roth presenting their parallel coordinate visualization for scheduling.

KTH VETENSKAP OCH KONST

VICSTHLM
VISUALISATION INTERACTION COLLABORATION

# TimeEdit


TimeEdit
Vecka 31 - 50 2012
Kurs DD2440 Avancerade algoritmer
Kurs A11IYA Introduktion till Arkitektyrket
Kurs DD3015 Introduktion till programmering med GPGPU och användning för ve
Kurs DH2320 Introduktion till visualisering och datorgrafik
Kurs EQ1210 Introduktion till signalteori
Kurs AK2017 Introduktionskurs i forskningsetik
Vecka 35 2012
Måndag 27 aug
Tisdag 28 aug
Onsdag 29 aug
Torsdag 30 aug
Fredag 31 aug
Vecka 36 2012
Måndag 3 sep
Tisdag 4 sep
Onsdag 5 sep
Torsdag 6 sep
Fredag 7 sep
March 4, 2013


Monday
Tuesday
Wedn
8
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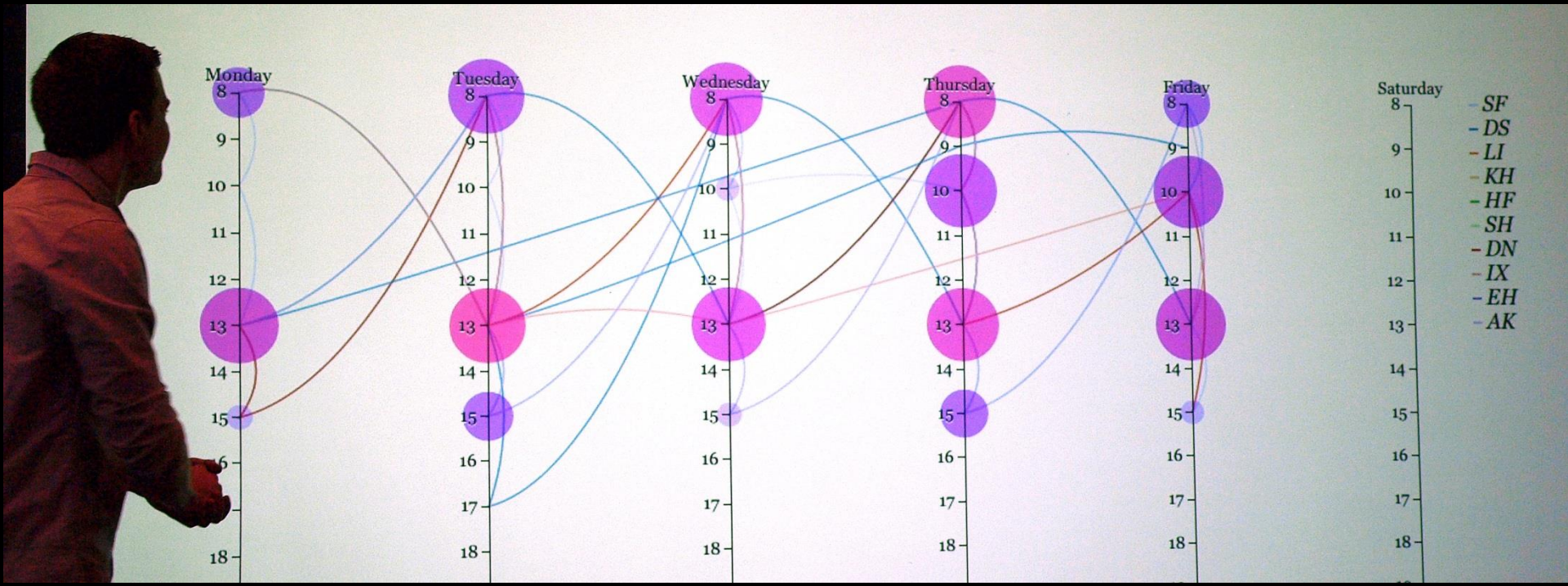
11
12
13
14
15
16
17
18
Total collisions: 5
Monday 2012-8-10:
Number: 5
Courses:
SF1624,DS1510,DN1212,DS1520,AK2036


Monday
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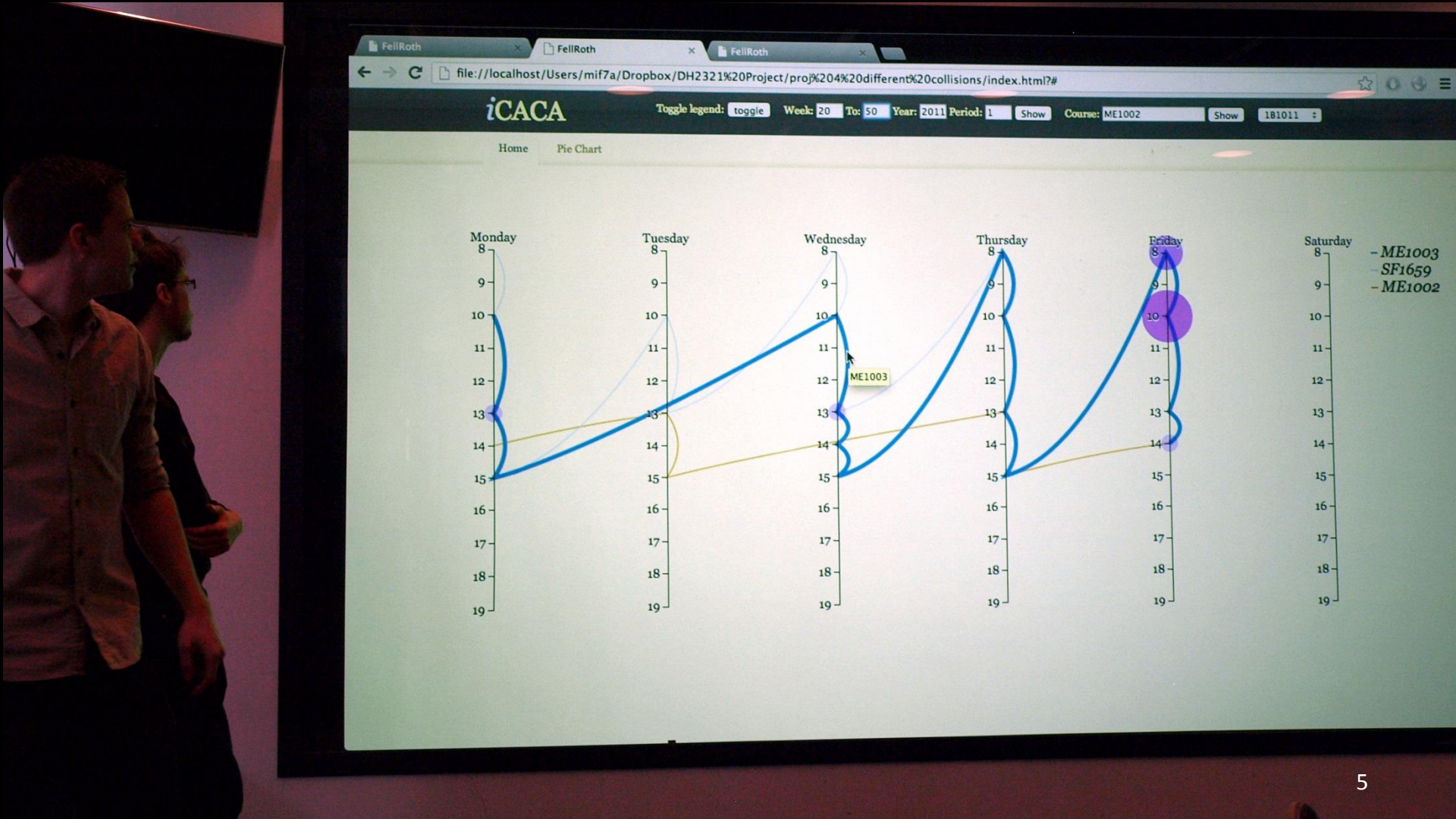

FellRoth
FellRoth
FellRoth
file://localhost/Users/mif7a/Dropbox/DH2321%20Project/proj%204%20different%20collisions/index.html?#
iCACA
Toggle legend: toggle
Week: 20 To: 50 Year: 2011 Period: 1 Show
Course: ME1002 Show
1B1011
Home
Pie Chart
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
8 9 10 11 12 13 14 15 16 17 18 19
ME1003
ME1003
SF1659
ME1002

# Prelude Video

Deb Roy's Ted Talk. "The birth of a word."

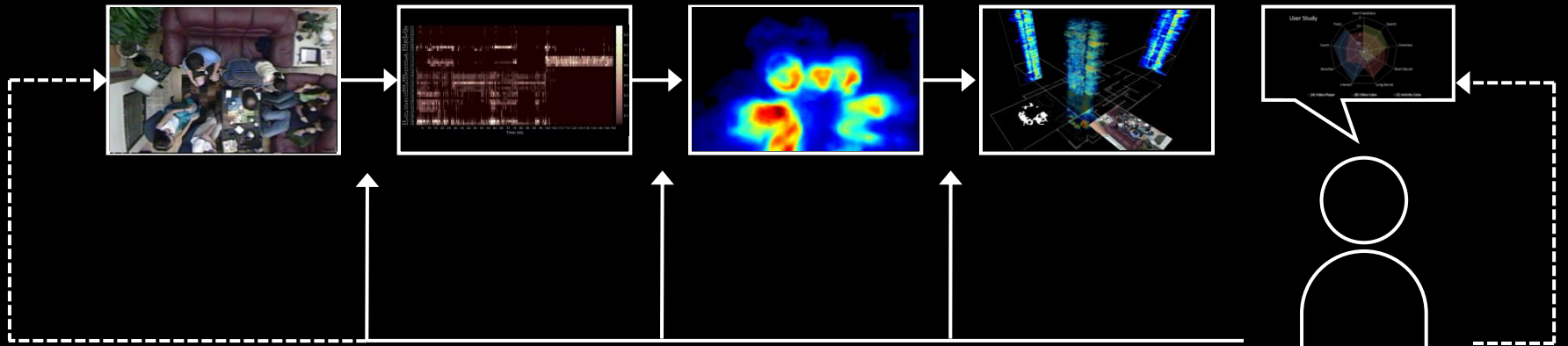
http://www.ted.com/talks/deb_roy_the_birth_of_a_word.html

# Outline

1. Recall last lecture
2. Raw Data
3. Parallel Coordinates
4. Projects 1 and 2 speed dating
5. Project 3
6. Break
7. Student Inc.

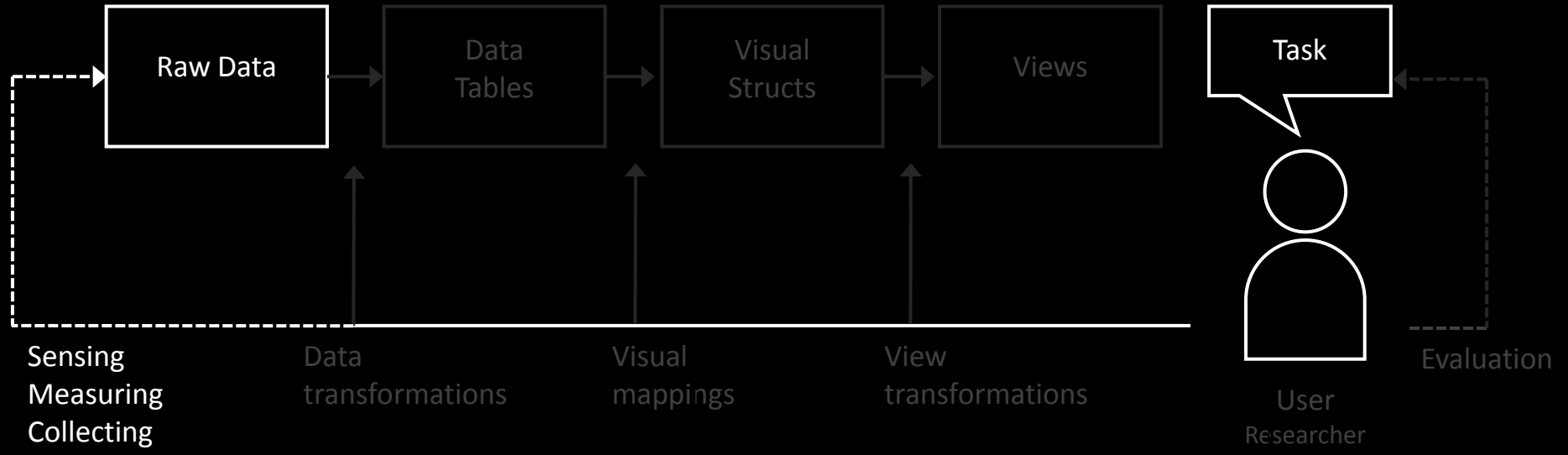
# Information Visualization Pipeline

expanded from **Readings in Information Visualization: Using Vision to Think**
By Stuart K. Card, Jock D. Mackinlay, Ben Shneiderman, 1999



# Demo

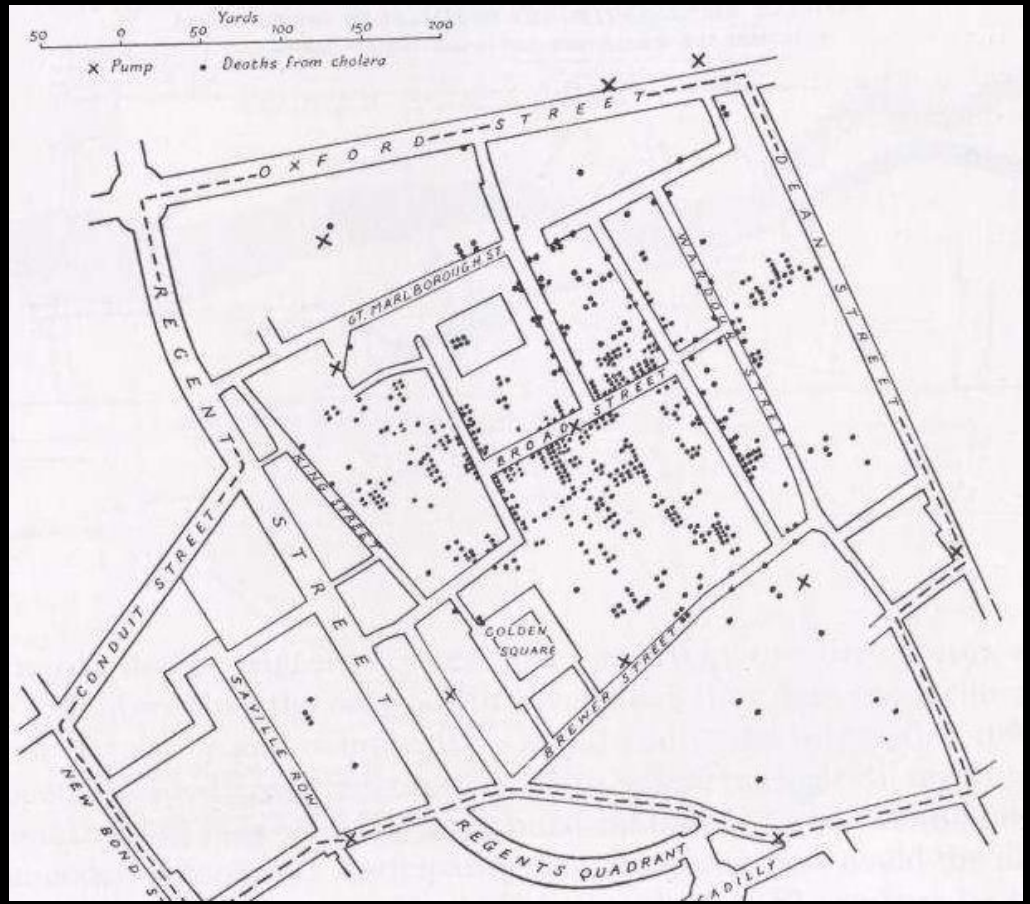
# Data


Raw Data
Data Tables
Visual Structs
Views
Task
Sensing
Measuring
Collecting
Data transformations
Visual mappings
View transformations
User
Researcher
Evaluation

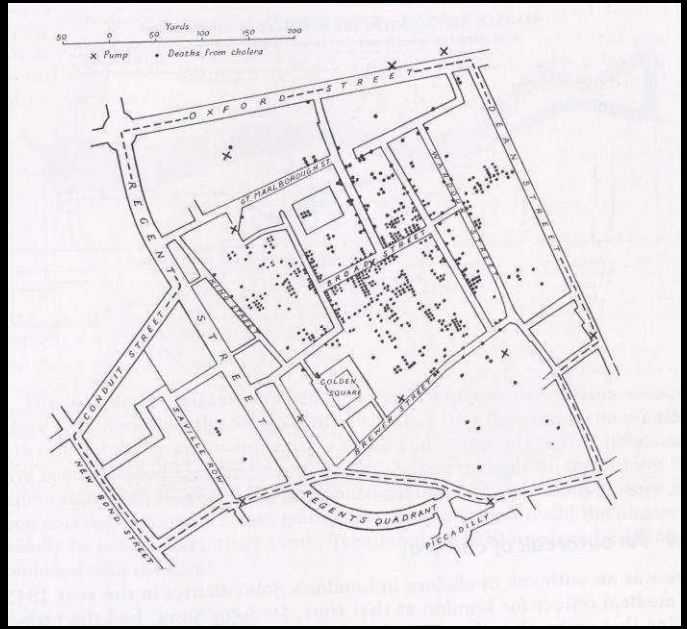
# First Reading for Today

- Mazza - Intro to InfoVis

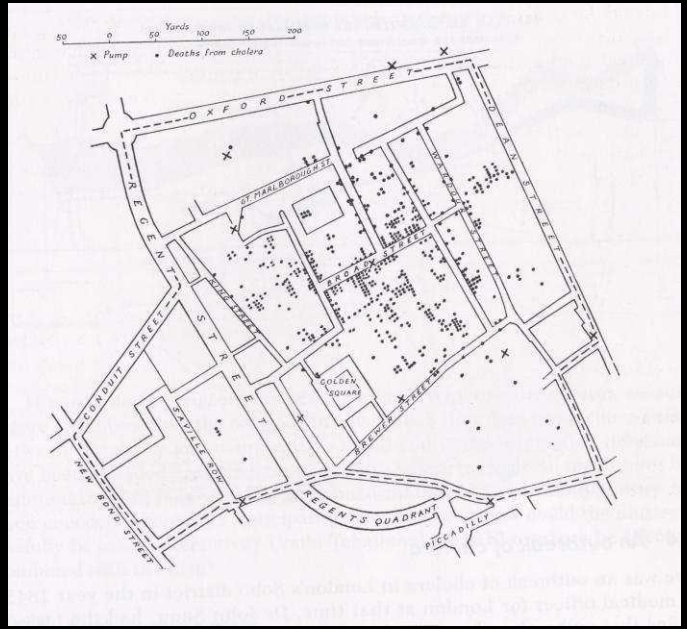
# John Snow's 1845 Map of Soho District, London



# What do you think is the raw data?



# What do you see?



# All about data

- Source
- Type
- Dimension
- Structure

# What are good sources of data?

# What have your learned about raw data in P1 and P2?

# Data Types

- Numerical
  - Integers, reals
- Ordinal
  - Non-numerical but with order (days of week)
- Categorical
  - Data without intrinsic order (names of cities)

- Suggestion: think about the operations you can perform on each data type.

# Data Dimensionality

- Univariate
- Bivariate
- Trivariate
- Multi-variate

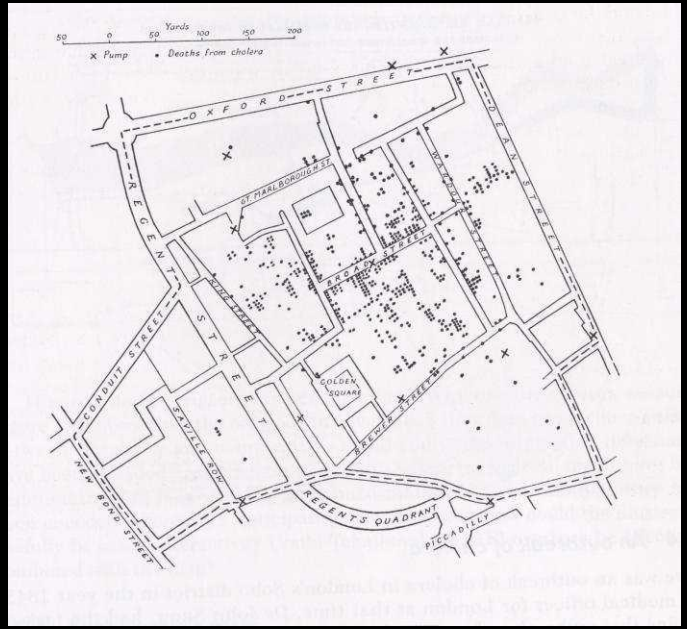
# How many dimensions did you explore in your P1 and P2?

# Data Structures

- Linear
  - Arrays, tables, lists
- Temporal
  - Dynamic over time
- Spatial/geographic
  - Maps, floor plans, 3D cad,
- Hierarchical
  - Taxonomies, organization charts, trees, genealogies
- Network
  - Graph structure, nodes and links

# Once again, what do you see?

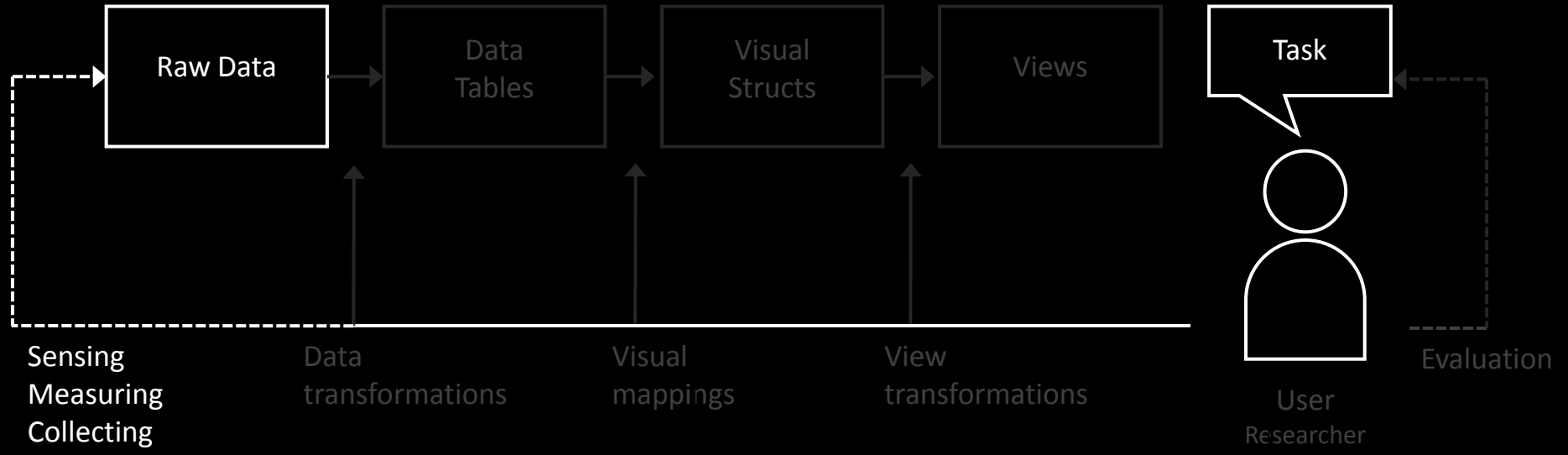
- Data types
  - …
- Data dimensionality
  - …
- Data structures
  - …



# Data Models

- Objects Items of interest
  - (students, courses, terms, …)
- Attributes Characteristics or properties of data
  - (name, age, GPA, number, date, …)
- Relations How two or more objects relate
  - (student takes course, course during term, …)

# Data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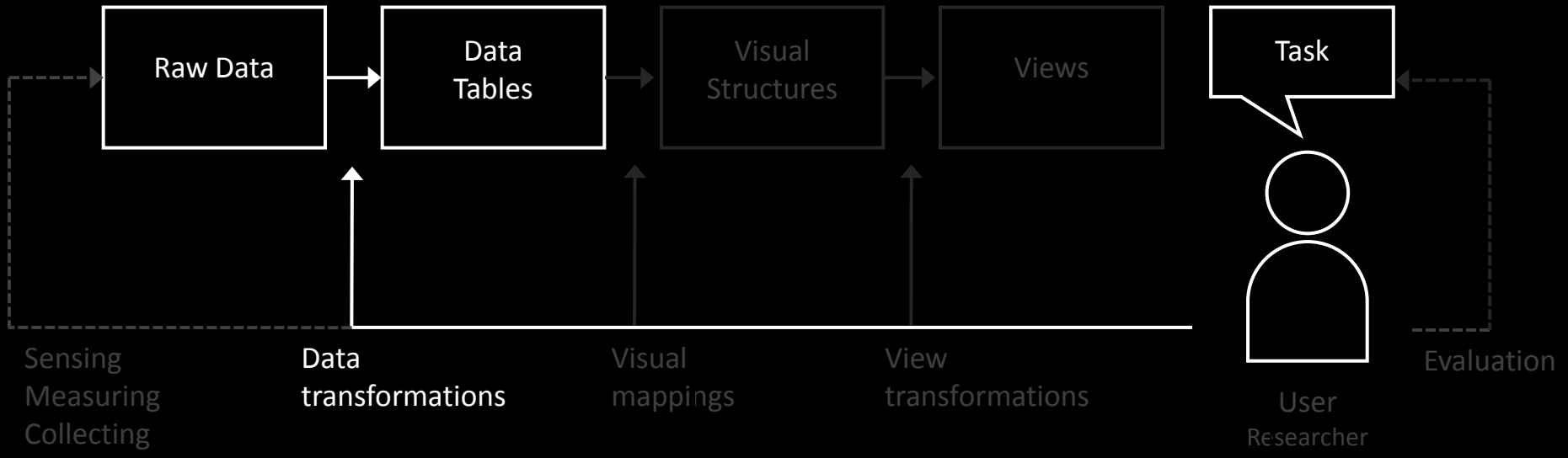
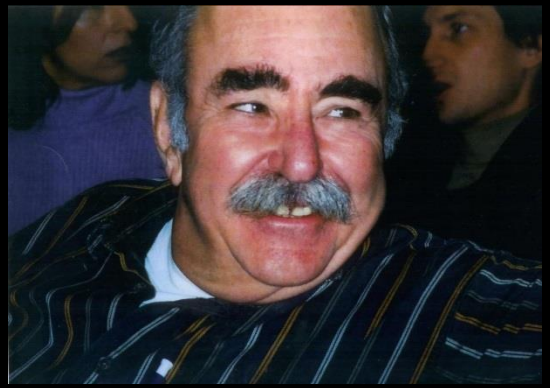
# Data Tables and Data Transformations



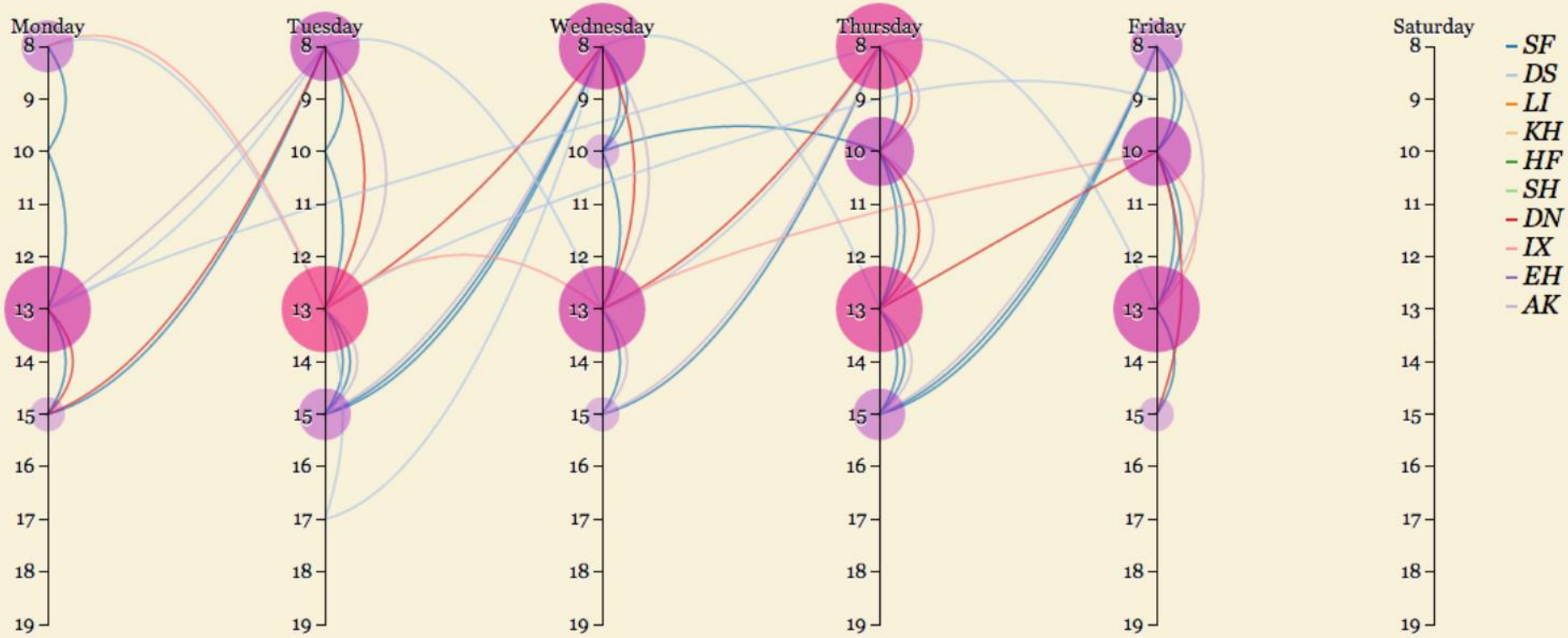
# Parallel Coordinates

# Al Inselberg



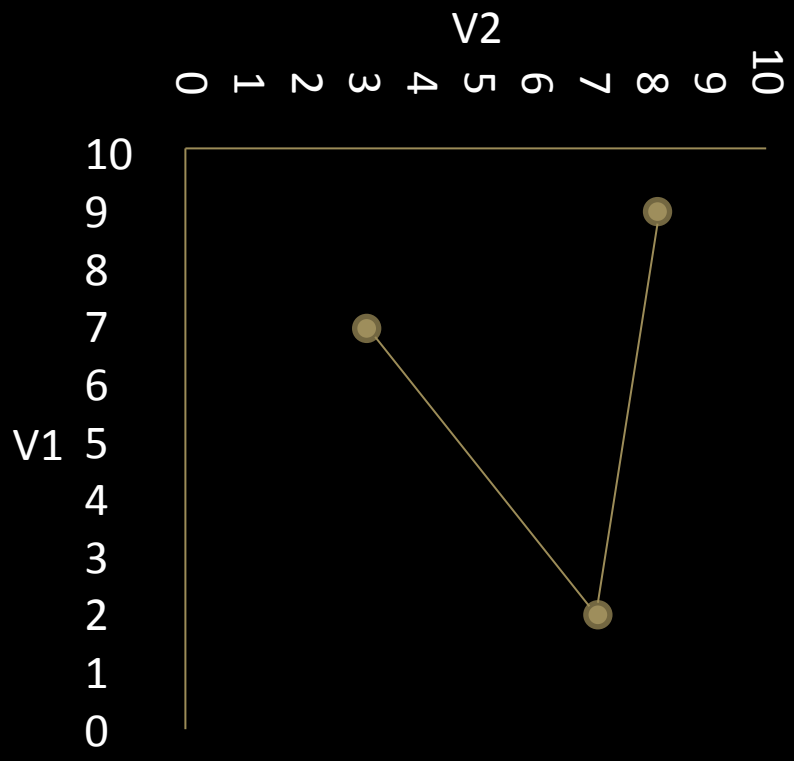
While being a Ph.D. student in Mathematics at the University of Illinois (Champaign-Urbana), and studying multi-dimensional geometry I became frustrated by the *absence* of visualization. Basically, we were doing Algebra which was being interpreted as Geometry but without the fun and benefit of pictures.
I kept wondering about ways to make accurate “multi-dimensional pictures” and derive insights about what may or may not be true in the multi-dimensional worlds. Since*parallelism* is the fundamental concept in geometry, and not orthogonality which uses the plane very fast, I experimented with putting the coordinate axes parallel to each other.

Home Pie Chart



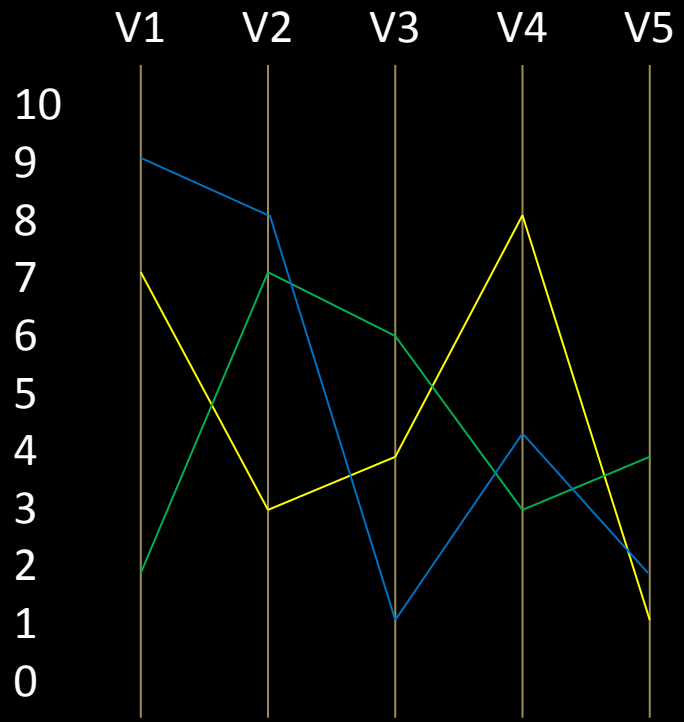
# Scatter Plot

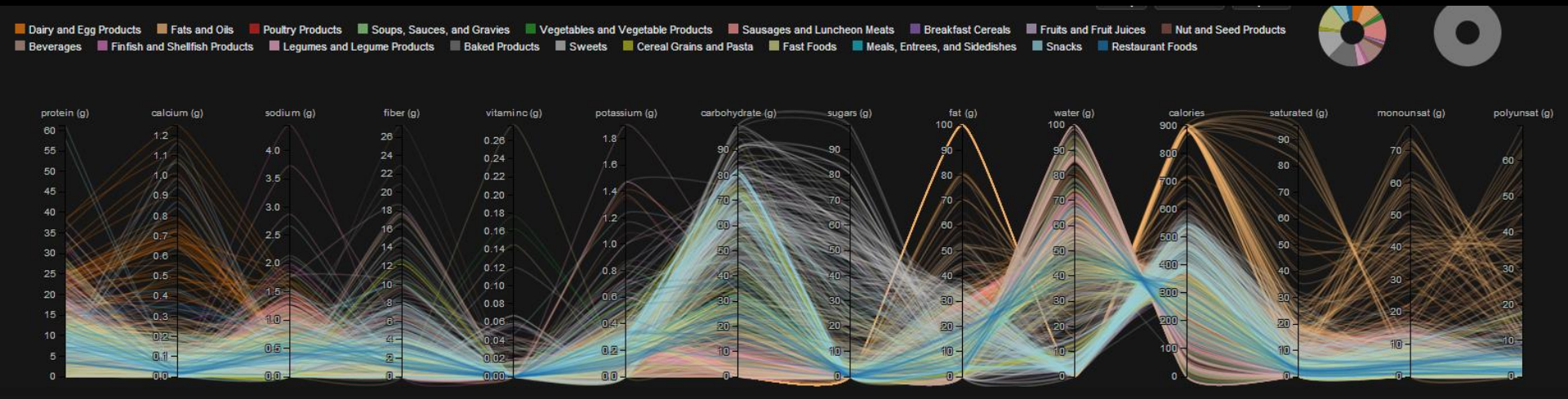
| | V1 | V2 |
|---|---|---|
| D1 | 7 | 3 |
| D2 | 2 | 7 |
| D3 | 9 | 8 |



# Parallel Coordinates

| | V1 | V2 | V3 | V4 | V5 |
|---|---|---|---|---|---|
| D1 | 7 | 3 | 4 | 8 | 1 |
| D2 | 2 | 7 | 6 | 3 | 4 |
| D3 | 9 | 8 | 1 | 4 | 2 |






| name | group | protein (g) | calcium (g) | sodium (g) | fiber (g) | vitaminc... | potassiu... | carbohy... | sugars (g) | fat (g) | water (g) | calories | saturate... | monoun... | polyu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Butter oil, anhydrous | Dairy and Egg Products | 0.28 | 0.004 | 0.002 | | 0 | 0.005 | | | 99.48 | 0.24 | 876 | 61.924 | 28.732 | 3.694 |
| Butter, salted | Dairy and Egg Products | 0.85 | 0.024 | 0.714 | | 0 | 0.024 | 0.06 | 0.06 | 81.11 | 15.87 | 717 | 51.368 | 21.021 | 3.043 |
| Cheese fondue | Dairy and Egg Products | 14.23 | 0.476 | 0.132 | | 0 | 0.105 | 3.77 | | 13.47 | 61.61 | 229 | 8.721 | 3.563 | 0.484 |
| Cheese food, cold pack, american | Dairy and Egg Products | 19.66 | 0.497 | 0.966 | | 0 | 0.363 | 8.32 | | 24.46 | 43.12 | 331 | 15.355 | 7.165 | 0.719 |
| Cheese food, pasteurized process, swiss | Dairy and Egg Products | 21.92 | 0.723 | 1.552 | | 0 | 0.284 | 4.5 | | 24.14 | 43.67 | 323 | 15.487 | 6.801 | 0.6 |
| Cheese spread, cream cheese base | Dairy and Egg Products | 7.1 | 0.071 | 0.673 | | 0 | 0.112 | 3.5 | 3.5 | 28.6 | 58.5 | 295 | 18.02 | 8.071 | 1.033 |
| Cheese, blue | Dairy and Egg Products | 21.4 | 0.528 | 1.395 | | 0 | 0.256 | 2.34 | 0.5 | 28.74 | 42.41 | 353 | 18.669 | 7.778 | 0.8 |
| Cheese, brick | Dairy and Egg Products | 23.24 | 0.674 | 0.56 | | 0 | 0.136 | 2.79 | 0.51 | 29.68 | 41.11 | 371 | 18.764 | 8.598 | 0.784 |

# Speed dating Project 1

- Set up two rows of chairs
- Present Project 1 for 1 minute
- Give constructive feedback for 1 minute
- Switch roles
- Move on
- Stop at 20 minutes

# Speed dating Project 2

- Set up two rows of chairs
- Present Project 2 for 1 minute
- Give constructive feedback for 1 minute
- Switch roles
- Move on
- Stop at 20 minutes

# Watching Assignments

1. Watch and closely observe how Sweden's Rosling presents:
    1. Hans Rosling's 200 Countries, 200 Years, 4 minutes - The Joy of Stats - BBC Four – link
    2. Hans Rosling's Religions and babies, TED Talk - 13 minutes - link
    3. Hans Rosling's Global population growth, box by box- 10 minutes – link
2. Read "Seeing Science" by Alyssa Goodman – link
3. Write a 100-word impression on this material.
4. Post this impression together with project 3.

# Project 3

1. Learn to use very, very, VERY well Gapminder – link
2. Write a 50-word critique of Gapminder focusing on what it can do better?
3. Download as many datasets you want to explore deeply – link
4. Use https://google-developers.appspot.com/chart/ to make (3) a reality.
   - If Google Charts above can't do what you are looking for, find a tool that will.
5. Create a URL with text explaining your online interactive visualization.
6. Prepare (rehearsing) a 5-minute "Rosling" presentation of your tool and discovery.
7. Present next class – February 11
8. Be ready to give constructive feedback to your peers

# Break & Student Inc.

Student Inc.
Powered by KTH Innovation & Excitera

# Thank you!

marior@kth.se