

Topic 1:

Introduction to Data Mining

Credits: Chris Volinsky

Types of Data: Flat File Data

A diagram illustrating a flat file data matrix. It consists of a 3x4 grid of cells. The first row contains the values 2.3, -1.5, ..., and -1.3. The second row contains 1.1, 0.1, ..., and -0.1. The third row contains four ellipses (...). To the left of the grid, a red curly brace spans the three rows and is labeled 'n'. Below the grid, a red curly brace spans the four columns and is labeled 'p'.

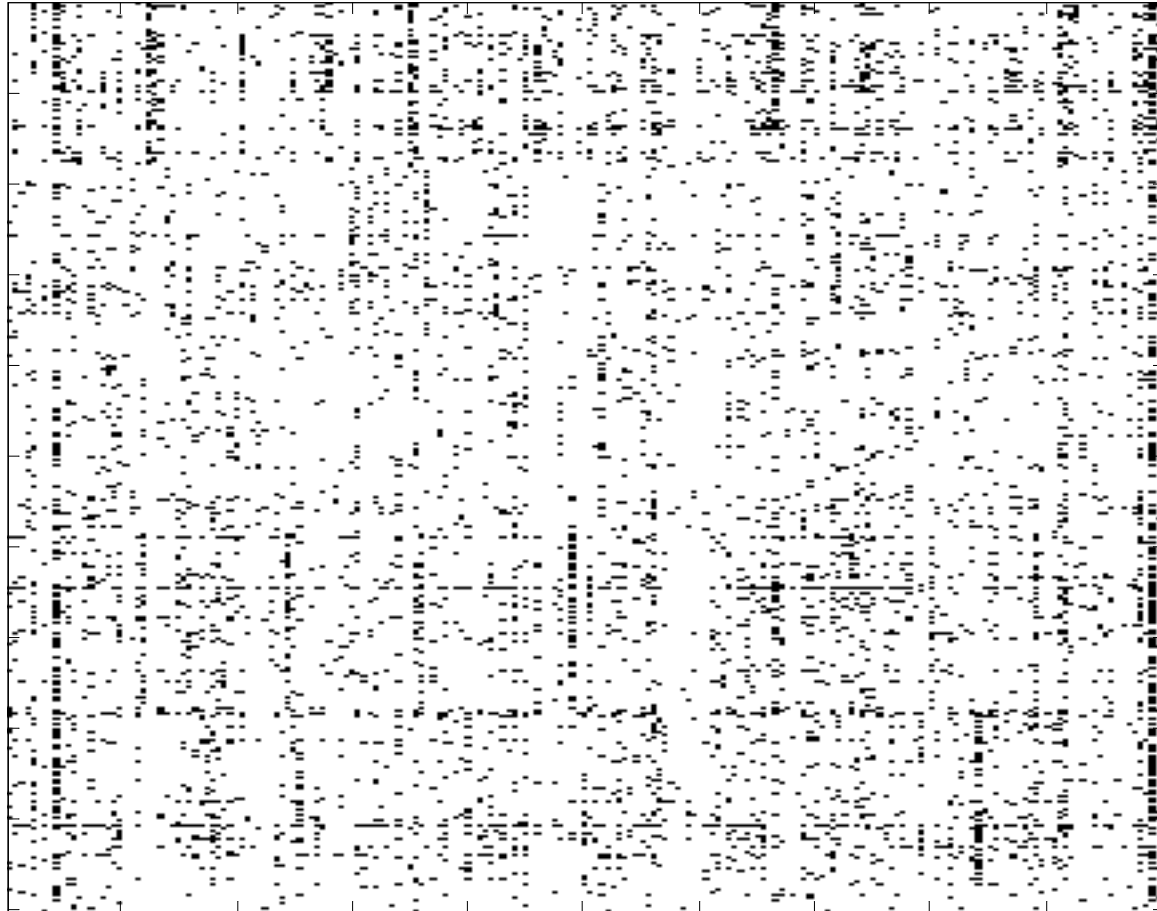
2.3	-1.5	...	-1.3
1.1	0.1	...	-0.1
...

- Rows = objects
- Columns = measurements on objects
- Both n and p can be very large in data mining

Types of Data: Text Data

Obama

Text
Documents



Word ID

Types of Data: Relational Data

128.200.39.17, -, 3/22/00, 20:55:07, W3SVC, SRVR1, 128.200.39.181, 0, 258, 111, 404, 3, GET, /spt/images/bk1.jpg, -,
128.200.39.17, -, 3/22/00, 20:55:36, W3SVC, SRVR1, 128.200.39.181, 1061, 382, 414, 200, 0, POST, /spt/main.html, -,
128.200.39.17, -, 3/22/00, 20:55:36, W3SVC, SRVR1, 128.200.39.181, 0, 258, 111, 404, 3, GET, /spt/images/bk1.jpg, -,
128.195.36.195, -, 3/22/00, 10:35:11, W3SVC, SRVR1, 128.200.39.181, 781, 363, 875, 200, 0, GET, /top.html, -,
128.195.36.195, -, 3/22/00, 10:35:16, W3SVC, SRVR1, 128.200.39.181, 5288, 524, 414, 200, 0, POST, /spt/main.html, -,
128.195.36.195, -, 3/22/00, 10:35:17, W3SVC, SRVR1, 128.200.39.181, 30, 280, 111, 404, 3, GET, /spt/images/bk1.jpg, -,
...

128.195.36.195, Doe, John, 12 Main St, 973-462-3421, Madison, NJ, **07932**
114.12.12.25, Trank, Jill, 11 Elm St, 998-555-5675, Chester, NJ, 07911
...

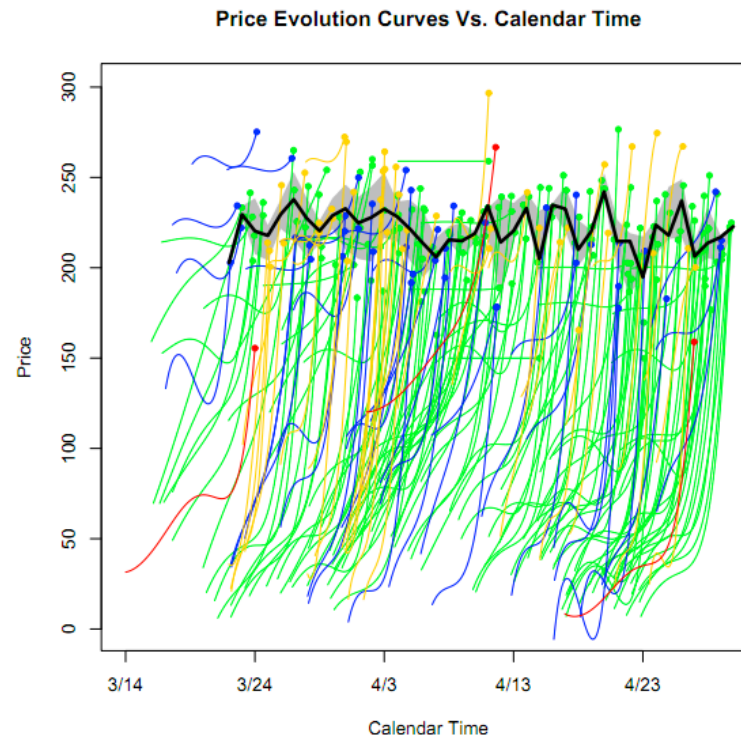
07911, Chester, NJ, 07954, 34000, , 40.65, -74.12
07932, Madison, NJ, 56000, 40.642, -74.132
...

- Most large data sets are stored in relational data sets
- Special data query language: SQL

Types of Data: Time Series Data



Types of Data: Time Series Data



Jank, Shmueli, et al (2005)

Fig. 10. Rug Plot displaying the price evolution (y-axis) of 217 online auctions over calendar time (x-axis) during a 3-month period. The colored lines show the price path of each auction with color indicating auction length (yellow = 3-day; blue=5-day; green = 7-day; red = 10-day). The dot at the end of each line indicates the final price of the auction. The black line represents the average of the daily closing price, and the gray band is the inter-quartile range.

Types of Data: Transactional Data

Date stamped events (logs):

128.195.36.195, -, 3/22/00, 10:35:11, W3SVC, SRVR1, 128.200.39.181, 781, 363, 875, 200, 0, GET, /top.html, -,
128.195.36.195, -, 3/22/00, 10:35:16, W3SVC, SRVR1, 128.200.39.181, 5288, 524, 414, 200, 0, POST, /spt/main.html, -,
128.195.36.195, -, 3/22/00, 10:35:17, W3SVC, SRVR1, 128.200.39.181, 30, 280, 111, 404, 3, GET, /spt/images/bk1.jpg, -,
128.195.36.101, -, 3/22/00, 16:18:50, W3SVC, SRVR1, 128.200.39.181, 60, 425, 72, 304, 0, GET, /top.html, -,
128.195.36.101, -, 3/22/00, 16:18:58, W3SVC, SRVR1, 128.200.39.181, 8322, 527, 414, 200, 0, POST, /spt/main.html, -,
128.195.36.101, -, 3/22/00, 16:18:59, W3SVC, SRVR1, 128.200.39.181, 0, 280, 111, 404, 3, GET, /spt/images/bk1.jpg, -,
128.200.39.17, -, 3/22/00, 20:54:37, W3SVC, SRVR1, 128.200.39.181, 140, 199, 875, 200, 0, GET, /top.html, -,
128.200.39.17, -, 3/22/00, 20:54:55, W3SVC, SRVR1, 128.200.39.181, 17766, 365, 414, 200, 0, POST, /spt/main.html, -,
128.200.39.17, -, 3/22/00, 20:54:55, W3SVC, SRVR1, 128.200.39.181, 0, 258, 111, 404, 3, GET, /spt/images/bk1.jpg, -,
128.200.39.17, -, 3/22/00, 20:55:07, W3SVC, SRVR1, 128.200.39.181, 0, 258, 111, 404, 3, GET, /spt/images/bk1.jpg, -,
128.200.39.17, -, 3/22/00, 20:55:36, W3SVC, SRVR1, 128.200.39.181, 1061, 382, 414, 200, 0, POST, /spt/main.html, -,
128.200.39.17, -, 3/22/00, 20:55:36, W3SVC, SRVR1, 128.200.39.181, 0, 258, 111, 404, 3, GET, /spt/images/bk1.jpg, -,
128.200.39.17, -, 3/22/00, 20:55:39, W3SVC, SRVR1, 128.200.39.181, 0, 258, 111, 404, 3, GET, /spt/images/bk1.jpg, -,
128.200.39.17, -, 3/22/00, 20:56:03, W3SVC, SRVR1, 128.200.39.181, 1081, 382, 414, 200, 0, POST, /spt/main.html, -,
128.200.39.17, -, 3/22/00, 20:56:04, W3SVC, SRVR1, 128.200.39.181, 0, 258, 111, 404, 3, GET, /spt/images/bk1.jpg, -,
128.200.39.17, -, 3/22/00, 20:56:33, W3SVC, SRVR1, 128.200.39.181, 0, 262, 72, 304, 0, GET, /top.html, -,
128.200.39.17, -, 3/22/00, 20:56:52, W3SVC, SRVR1, 128.200.39.181, 19598, 382, 414, 200, 0, POST, /spt/main.html, -,

Can be represented as a time series:

User 1	2	3	2	2	3	3	3	1	1	1	3	1	3	3	3
User 2	3	3	3	1	1	1									
User 3	7	7	7	7	7	7	7	7							
User 4	1	5	1	1	1	5	1	5	1	1	1	1	1	1	
User 5	5	1	1	5											
...															

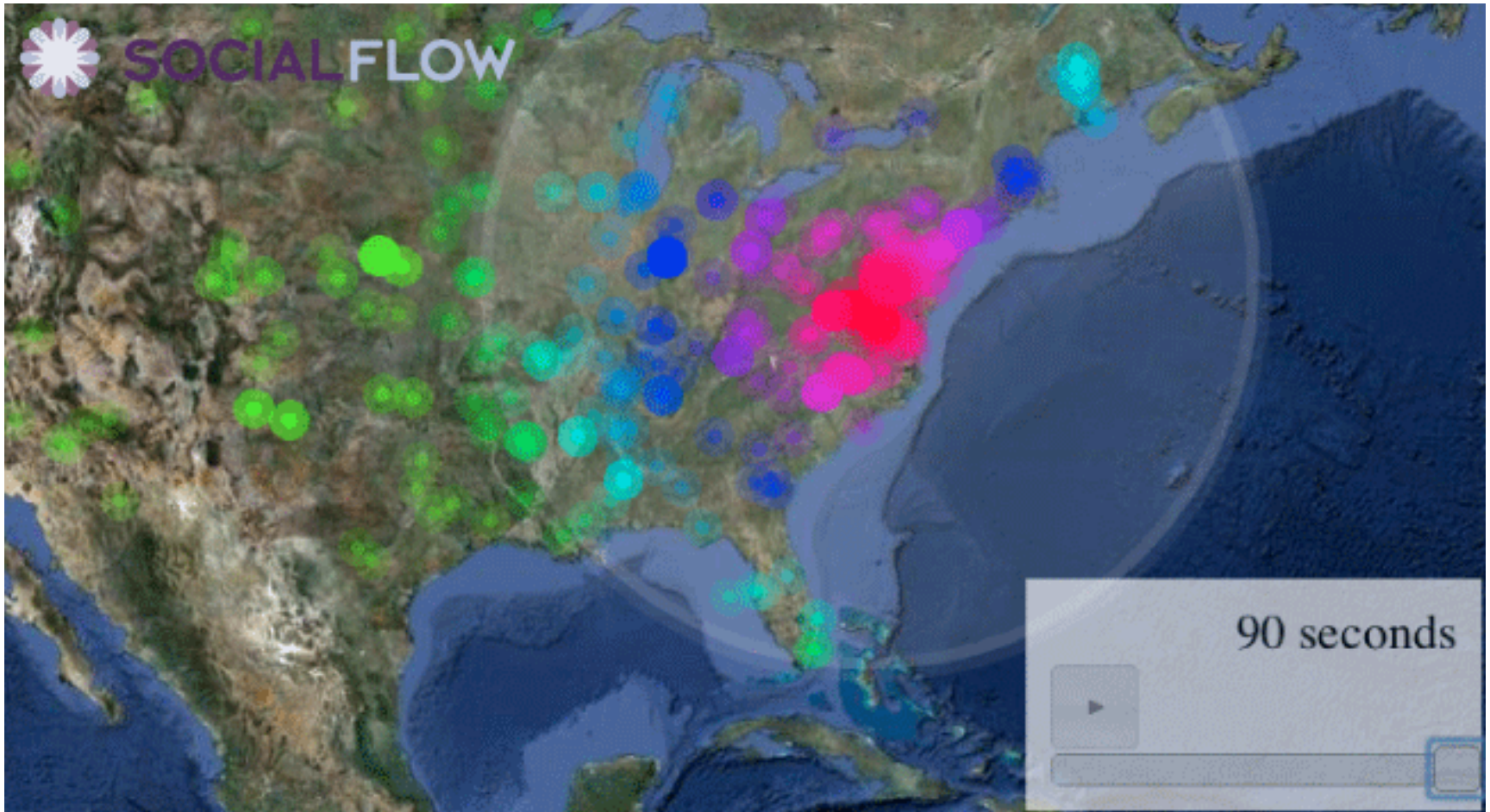
Types of Data: Spatio-Temporal Data



@b_mc817

Glendaaaaa

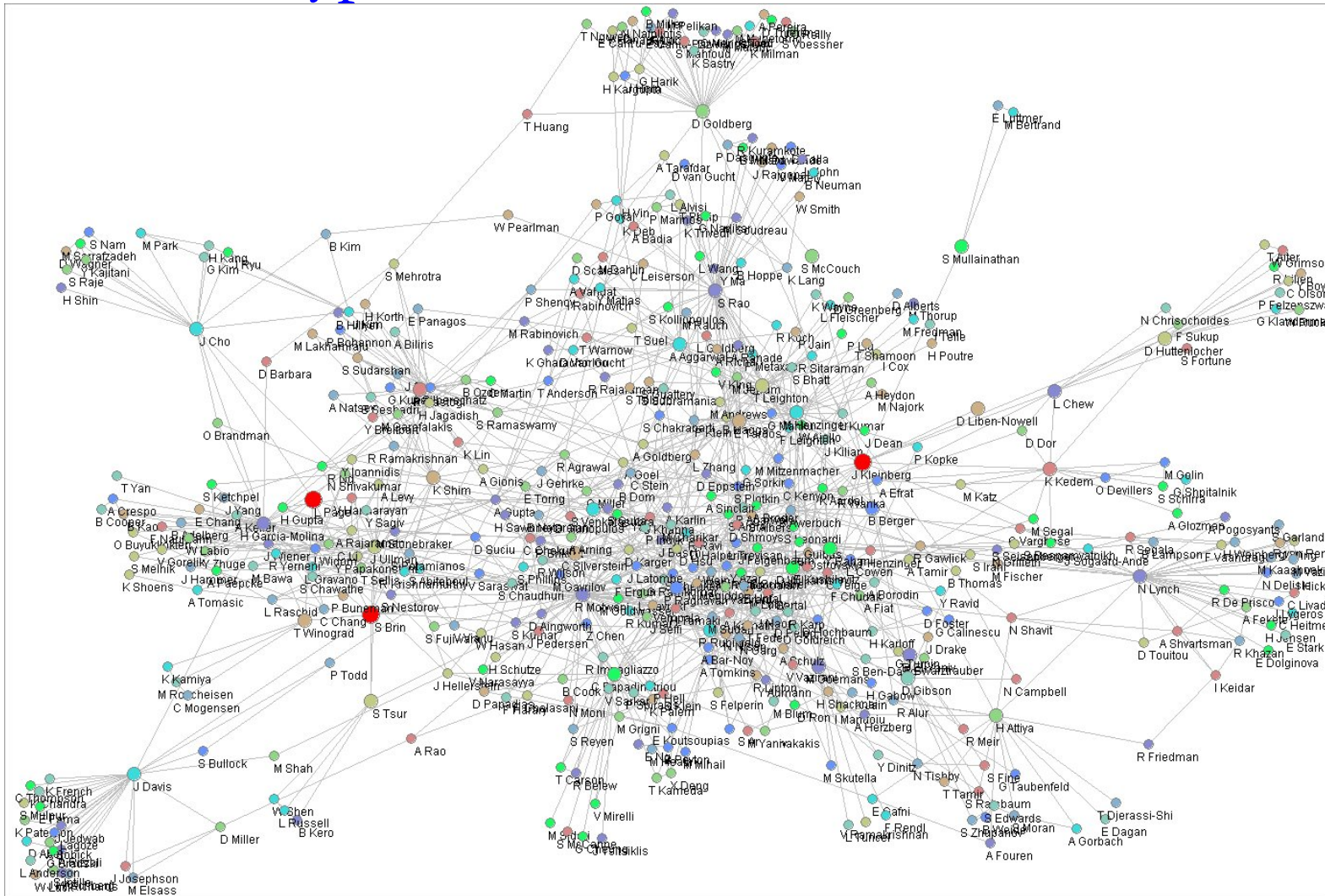
Omg earthquake!!!



Types of Data: Image Data



Types of Data: Network Data



Algorithms for estimating relative importance in networks
S. White and P. Smyth, *ACM SIGKDD*, 2003.