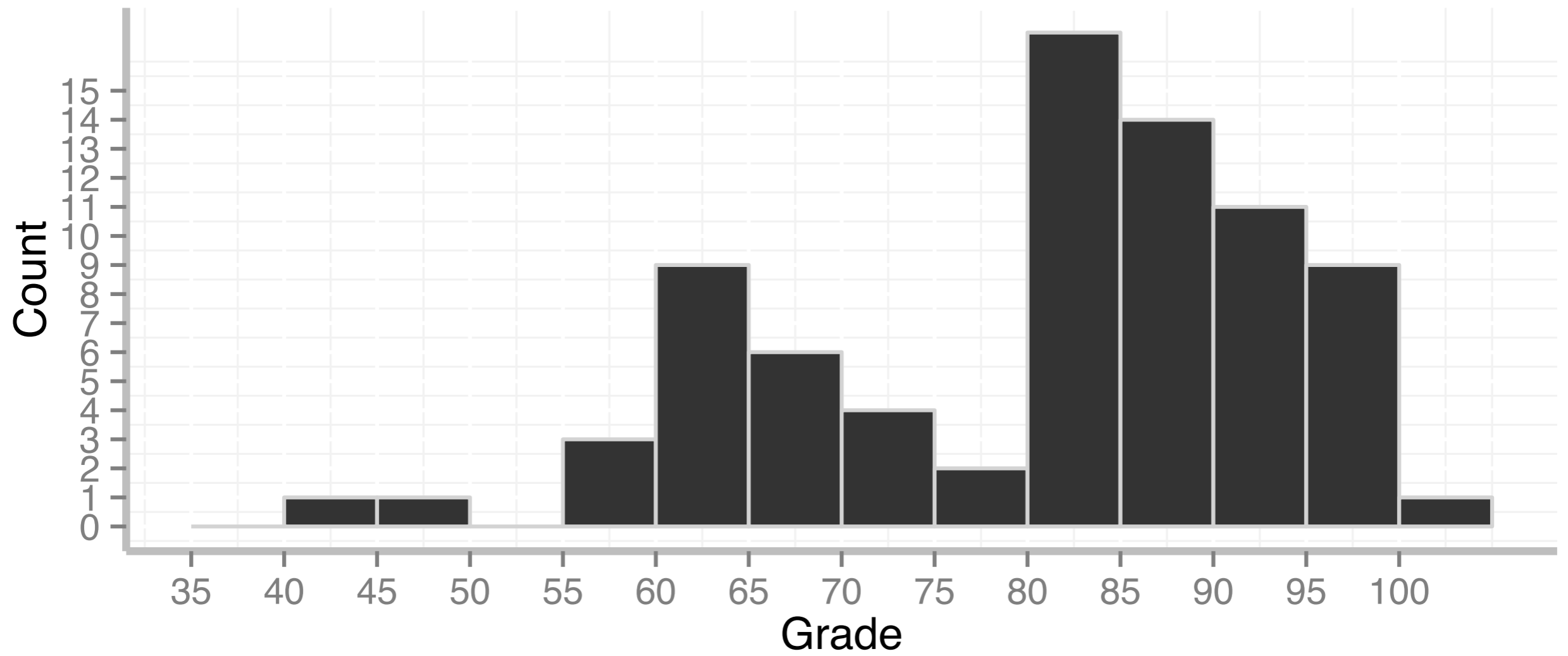


Multivariate visualization part II

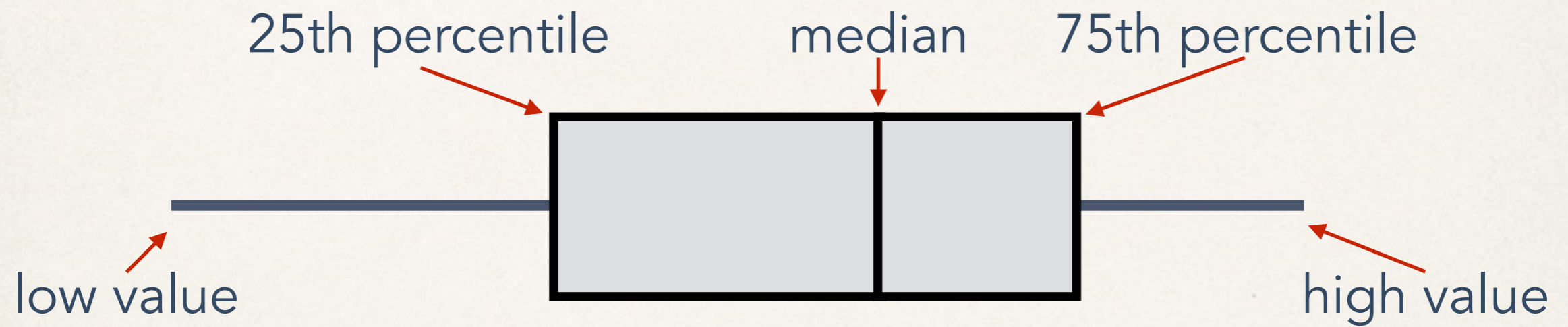
C. Andrews

2016-04-04

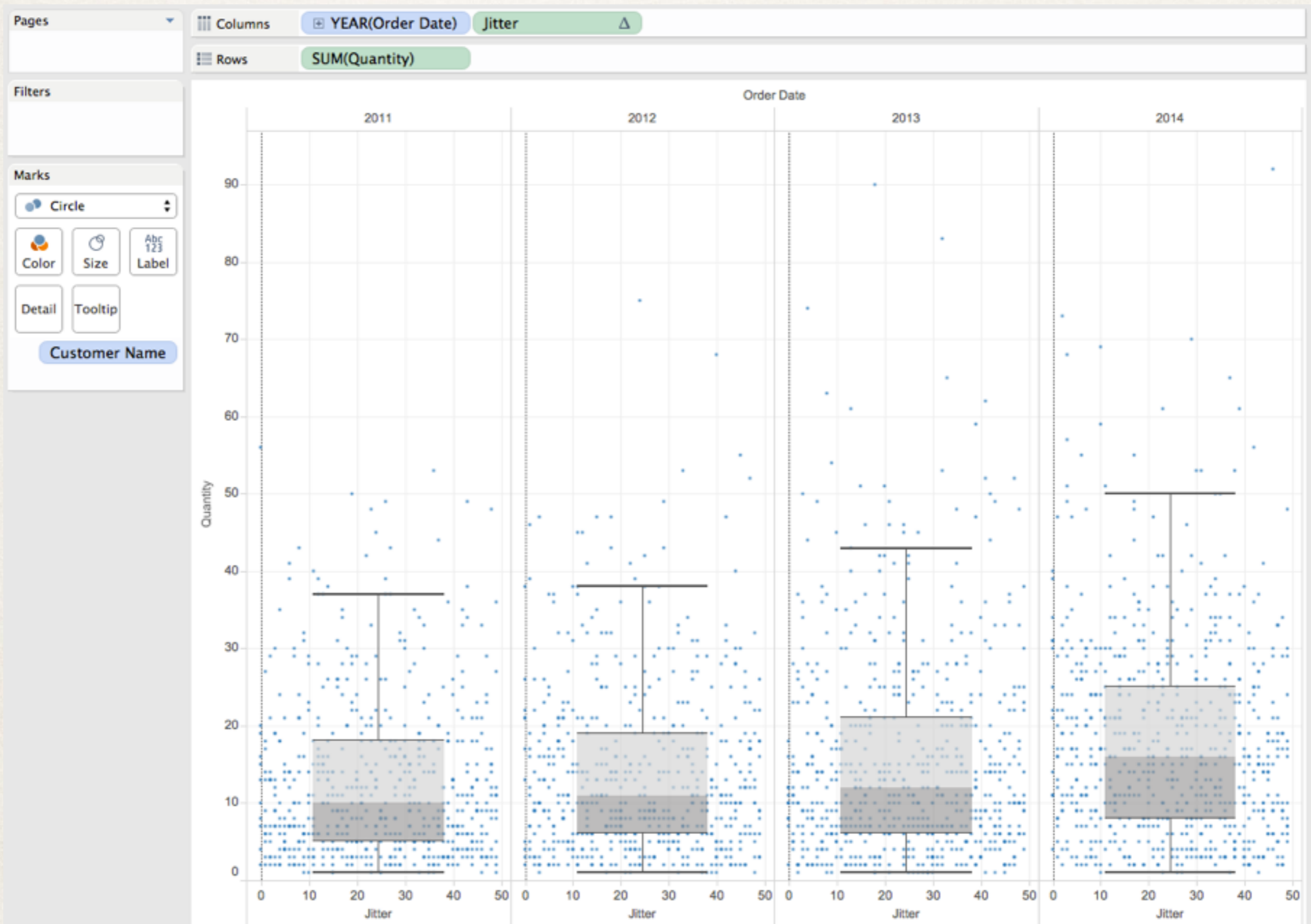
Review: Univariate



Review: Univariate



Review: Univariate +



Review: Univariate questions

Which is the biggest?

Which is the smallest?

What is the "center"?

What is the "shape" of the data?

What are the outliers?

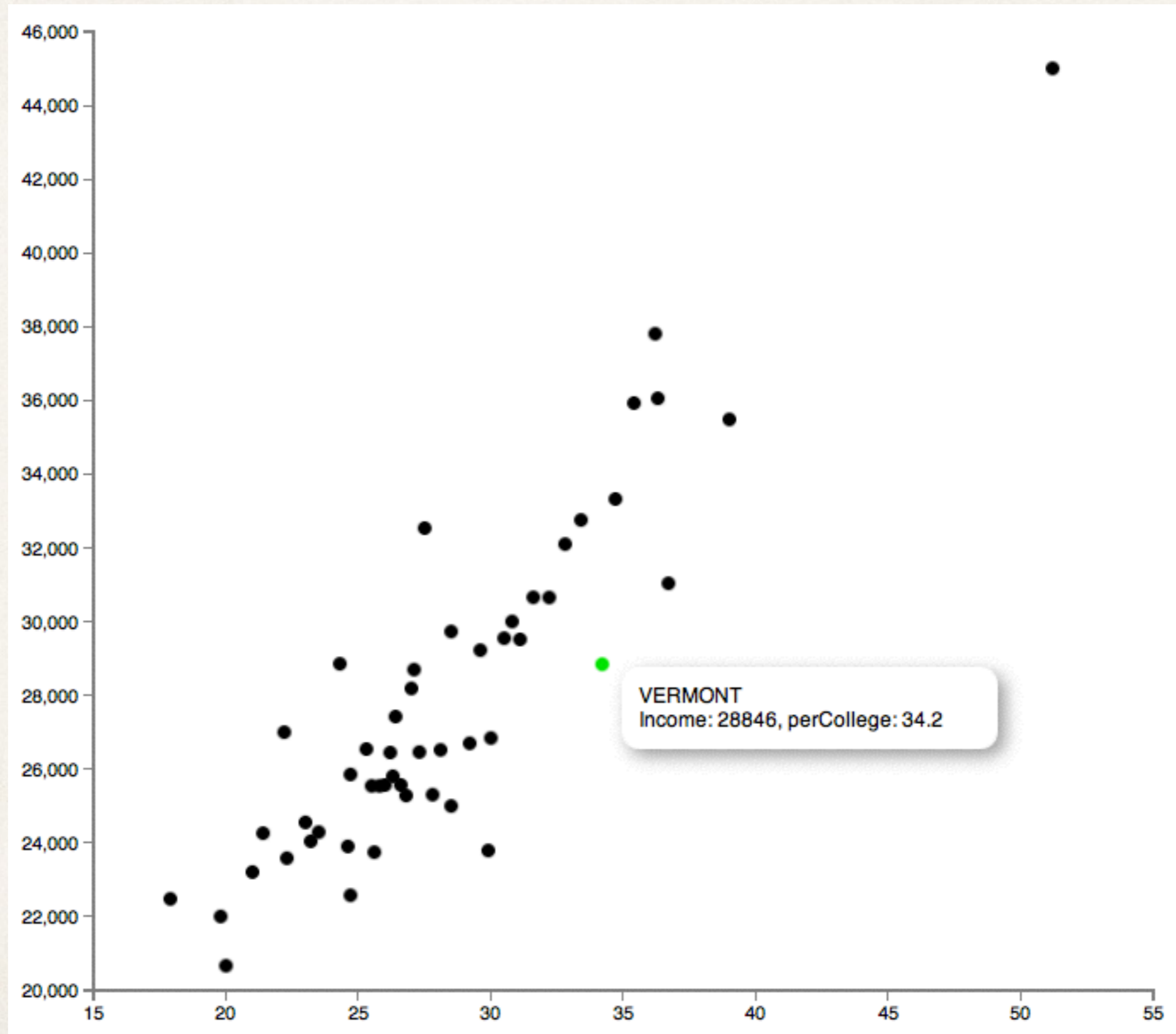
Review: Multivariate questions

Which items are most alike?

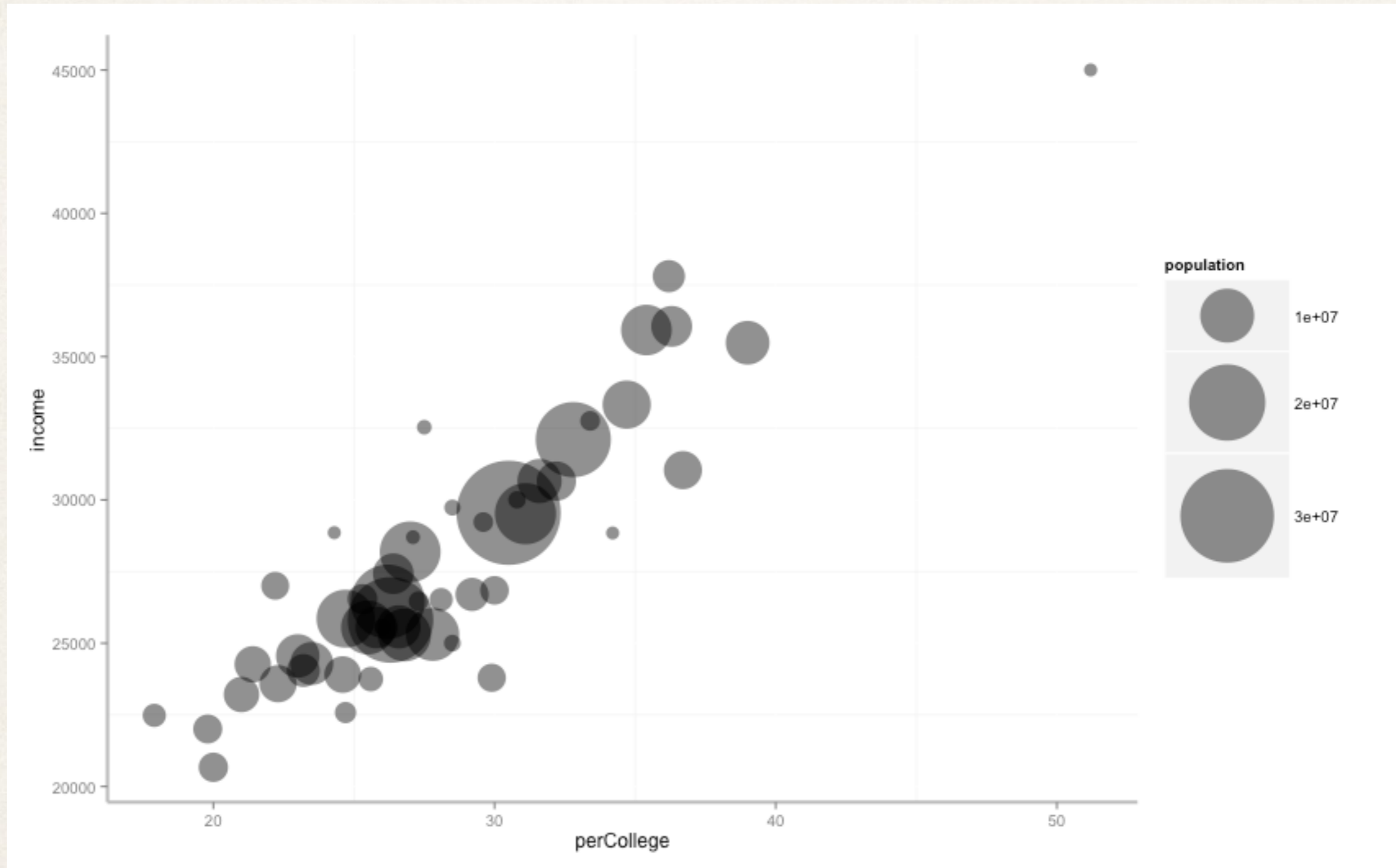
Which items are most exceptional?

How can these items be combined into logical groups based on similarity?

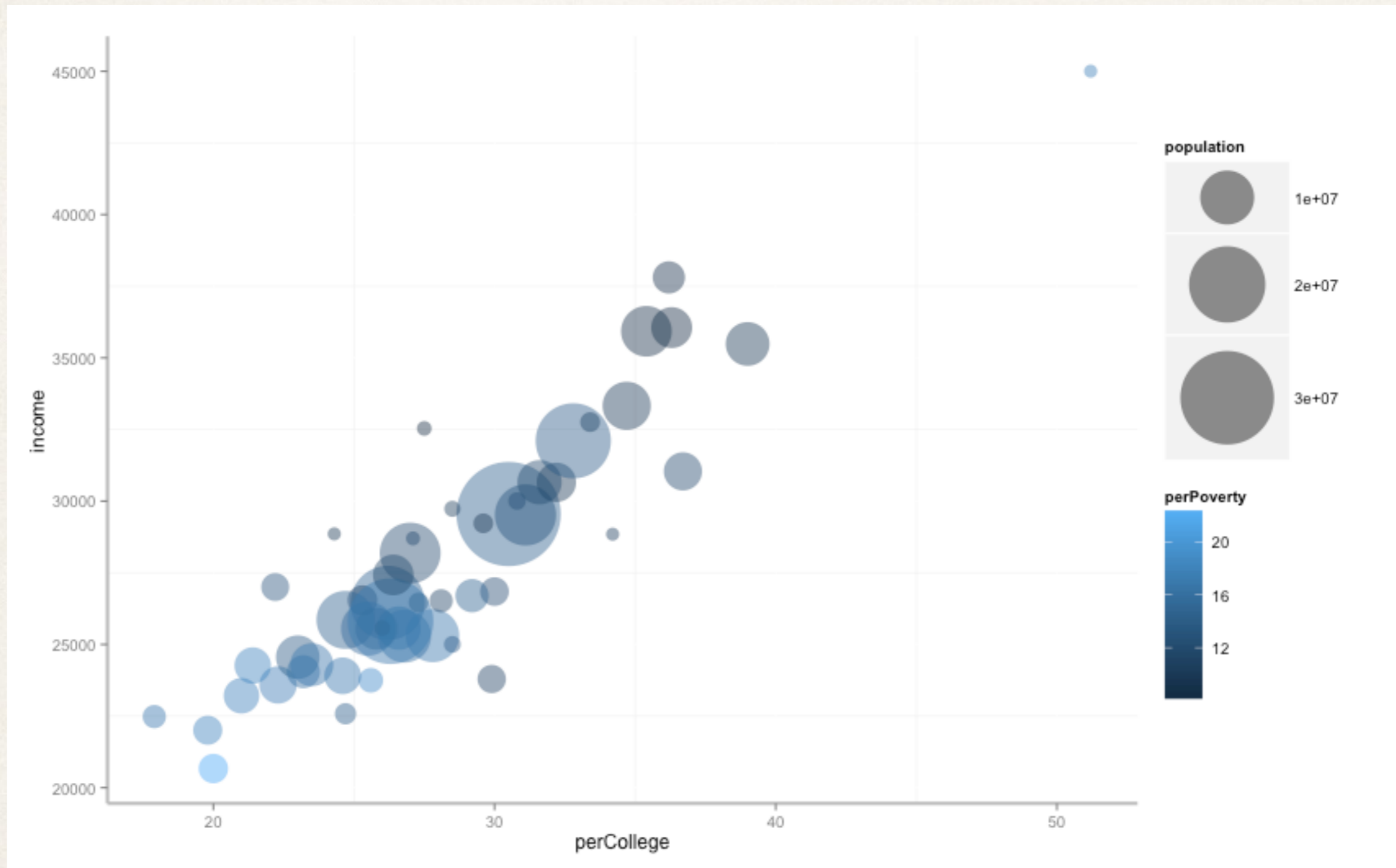
Review: Bivariate



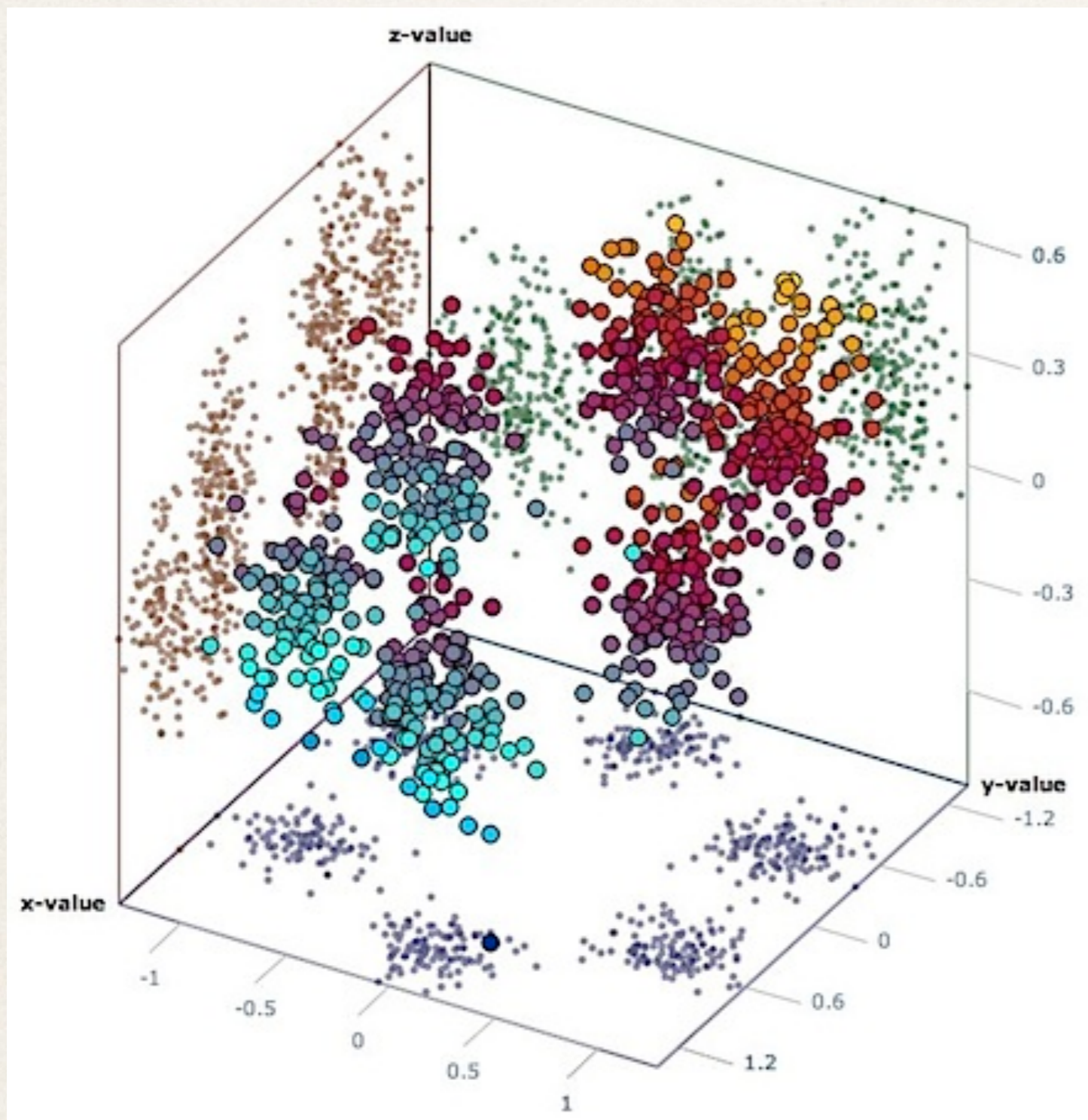
Review: Trivariate



Review: Hypervariate

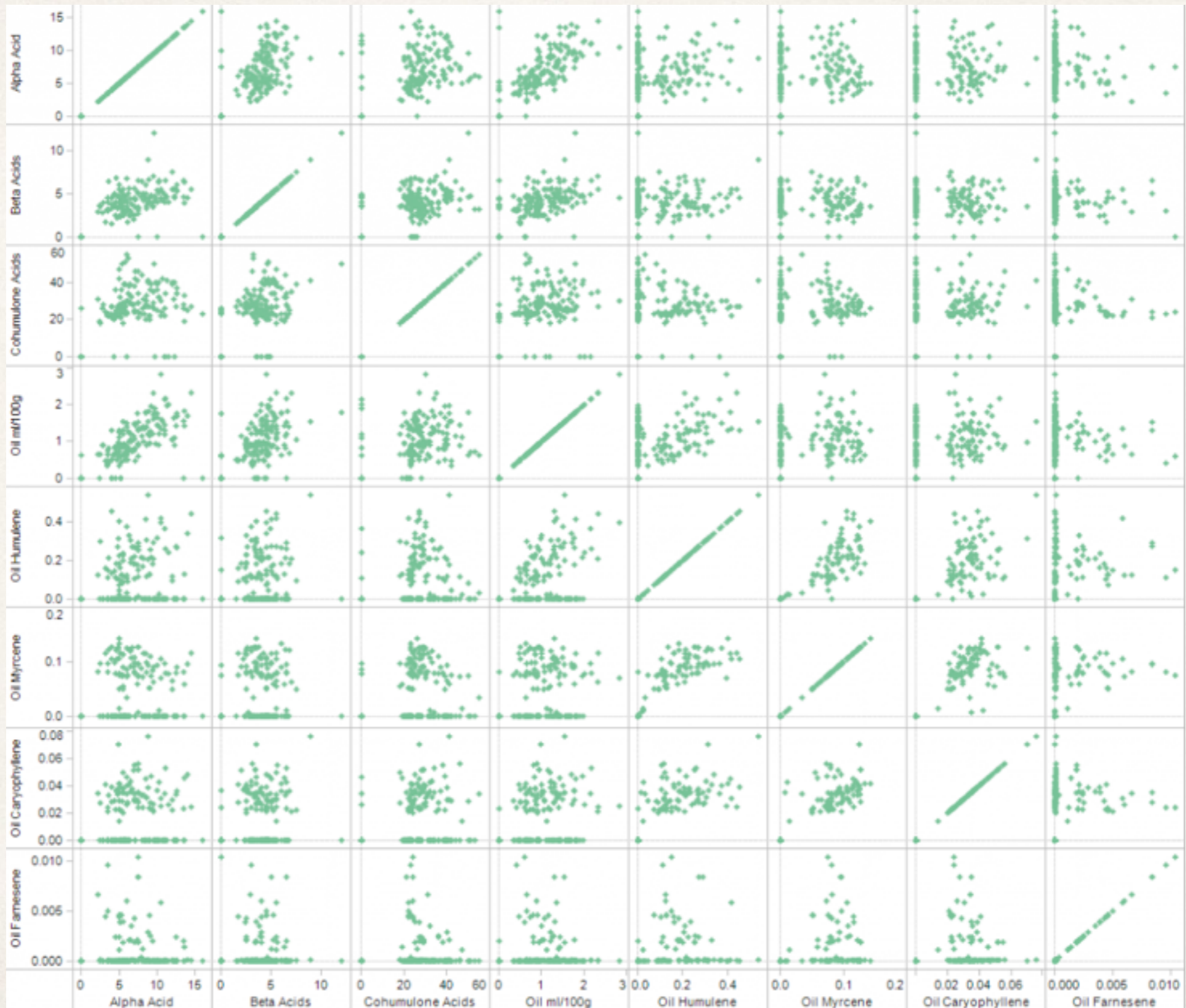


Review: MultiD Scatterplots



or just add another axis

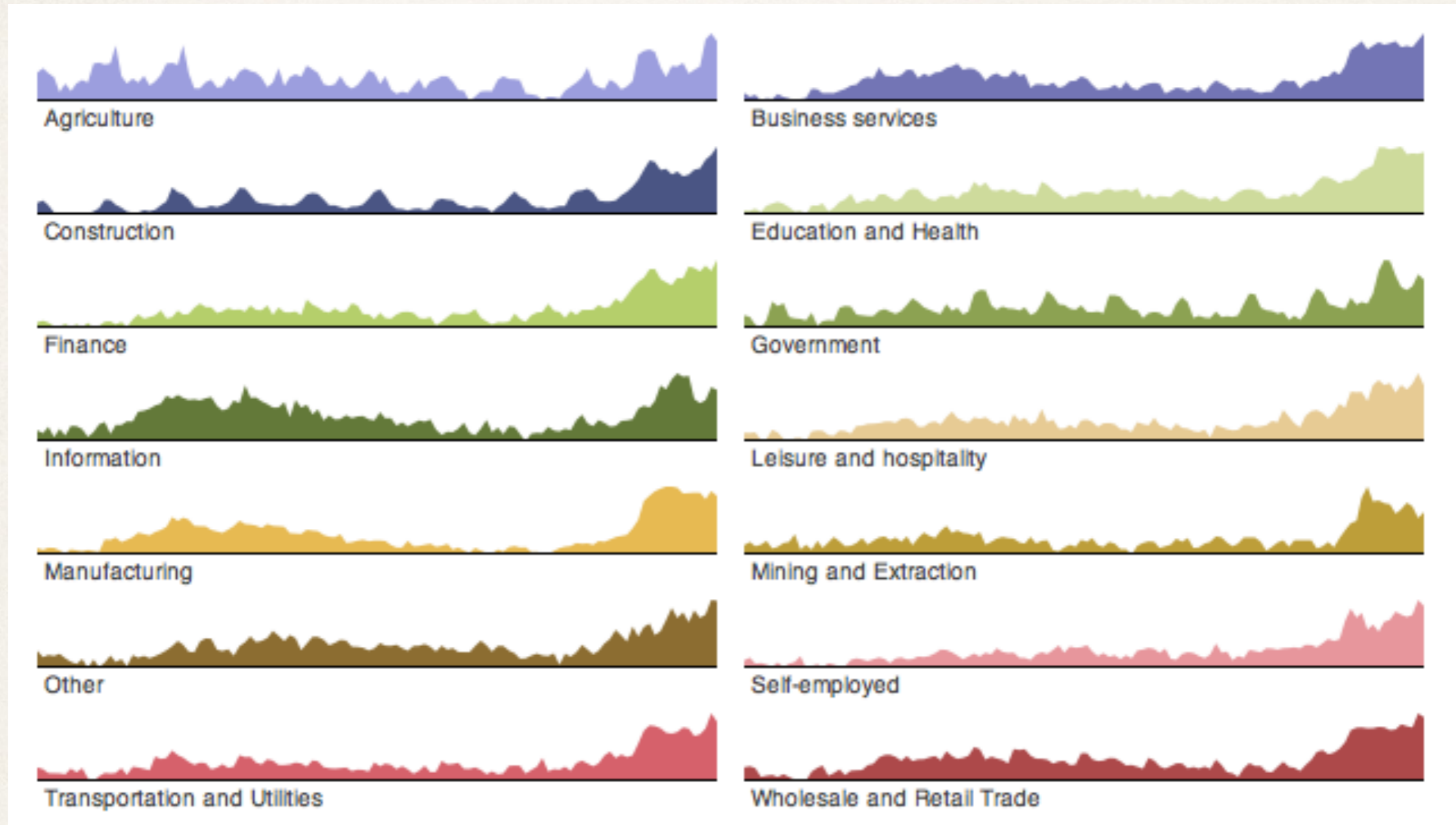
Review: Scatterplot matrix



Review: Trellis plot



Review: Small multiples



Review: Multidimensional scaling

Calculate the similarity of all pairs of records using some distance function

Create a map that maps each record into our 2 (or 3) dimensional space

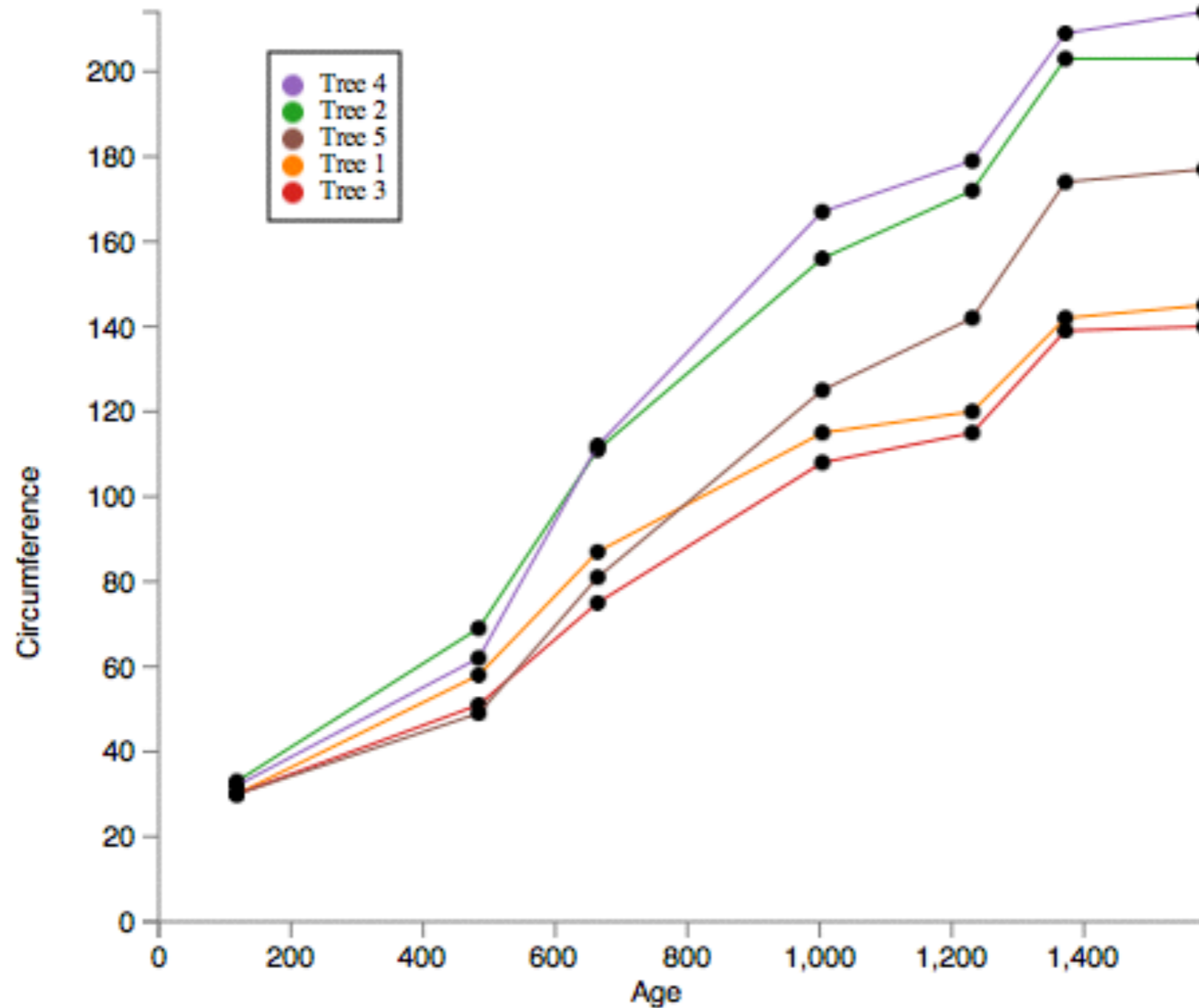
Calculate the similarity of all pairs of points

Compute the stress on the system as function of the difference between the similarity of the points and the similarity of the original records

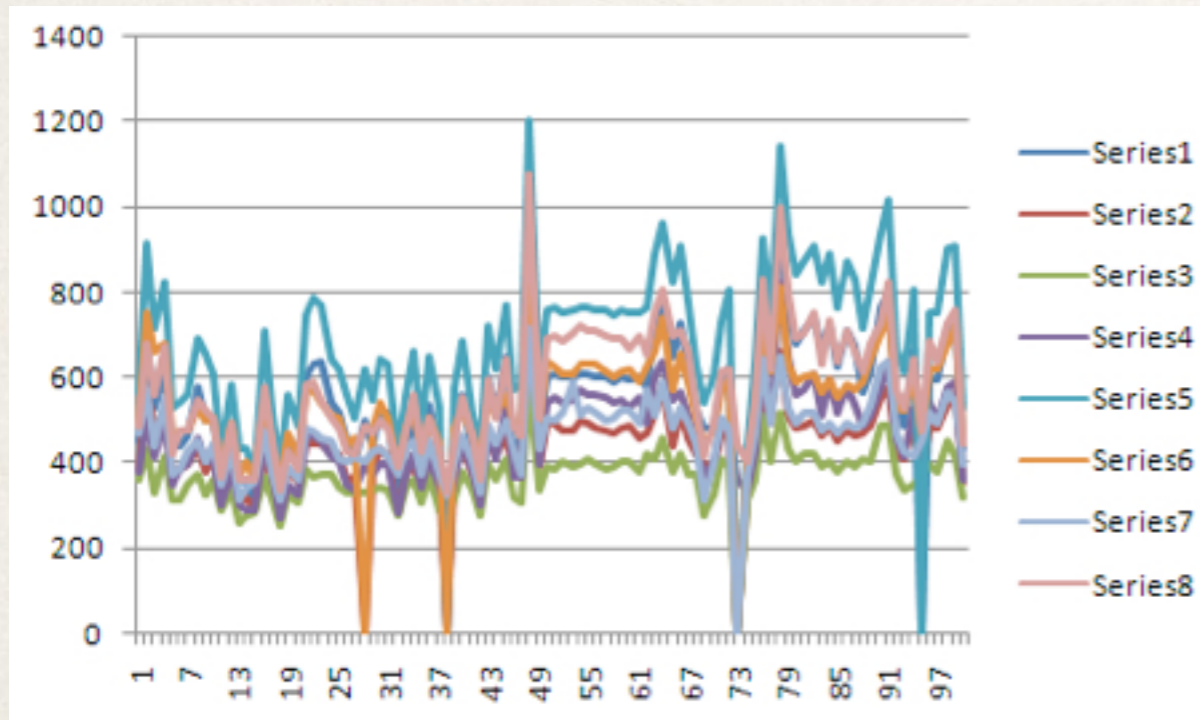
If the stress is above some threshold, move points to reduce stress and repeat

Line graphs

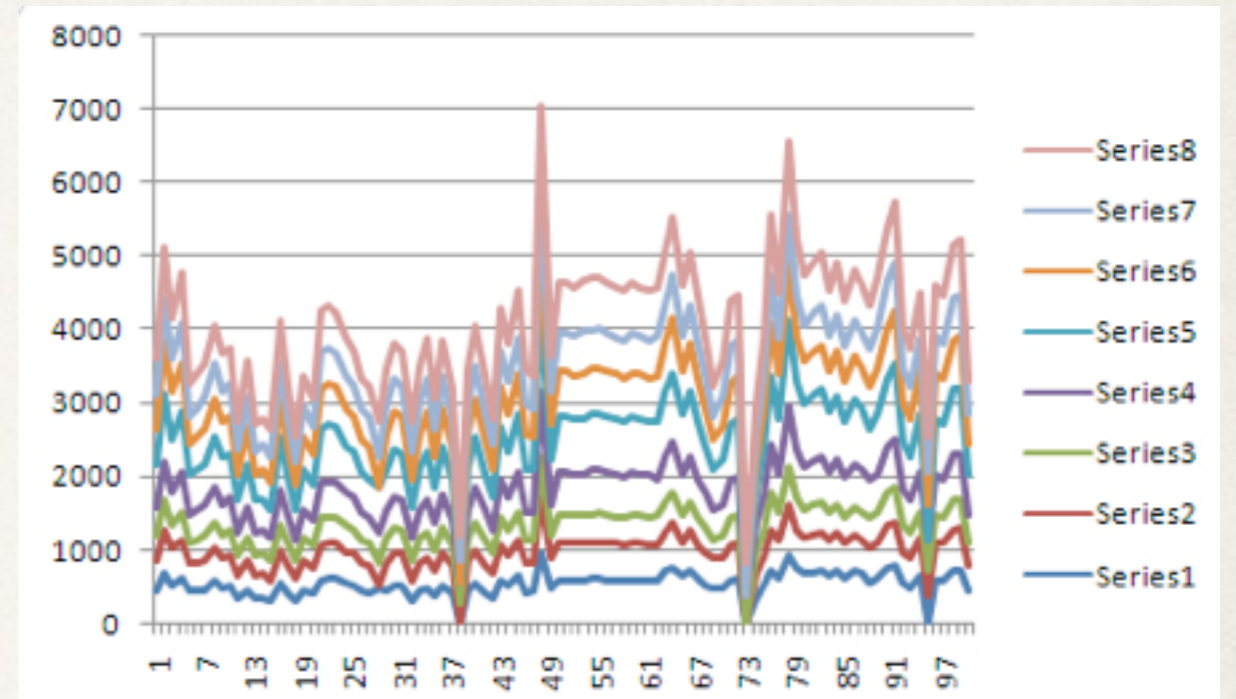
Orange Tree Growth



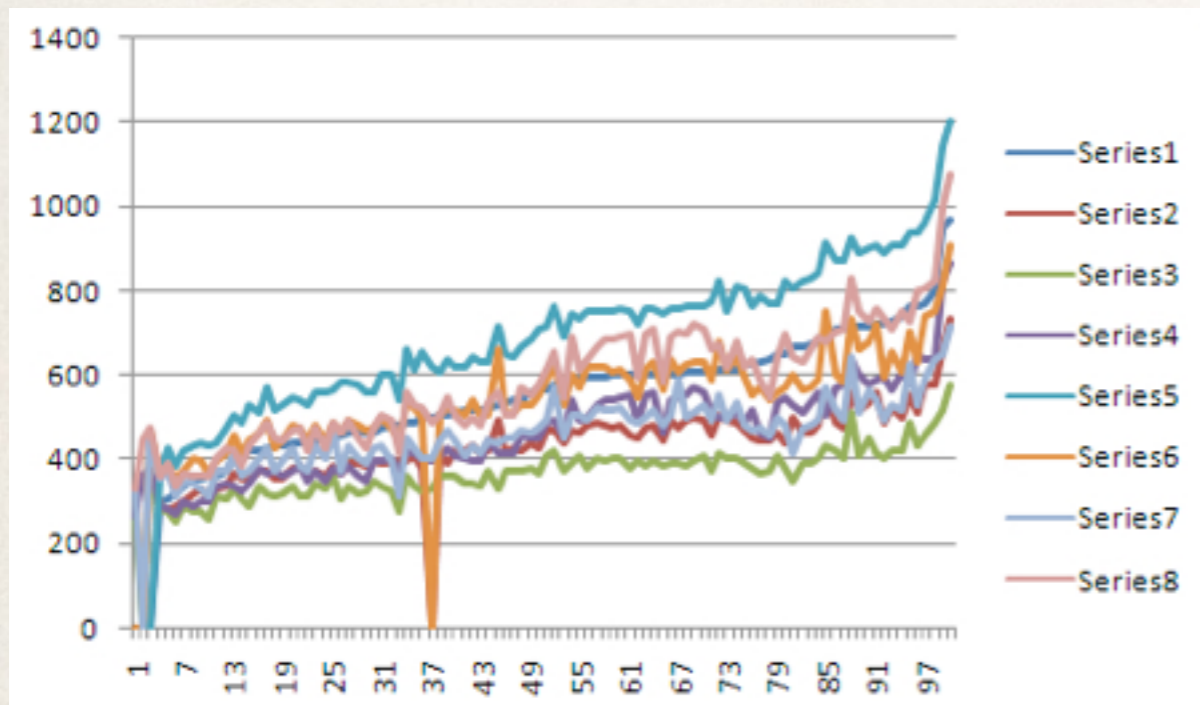
Line graphs



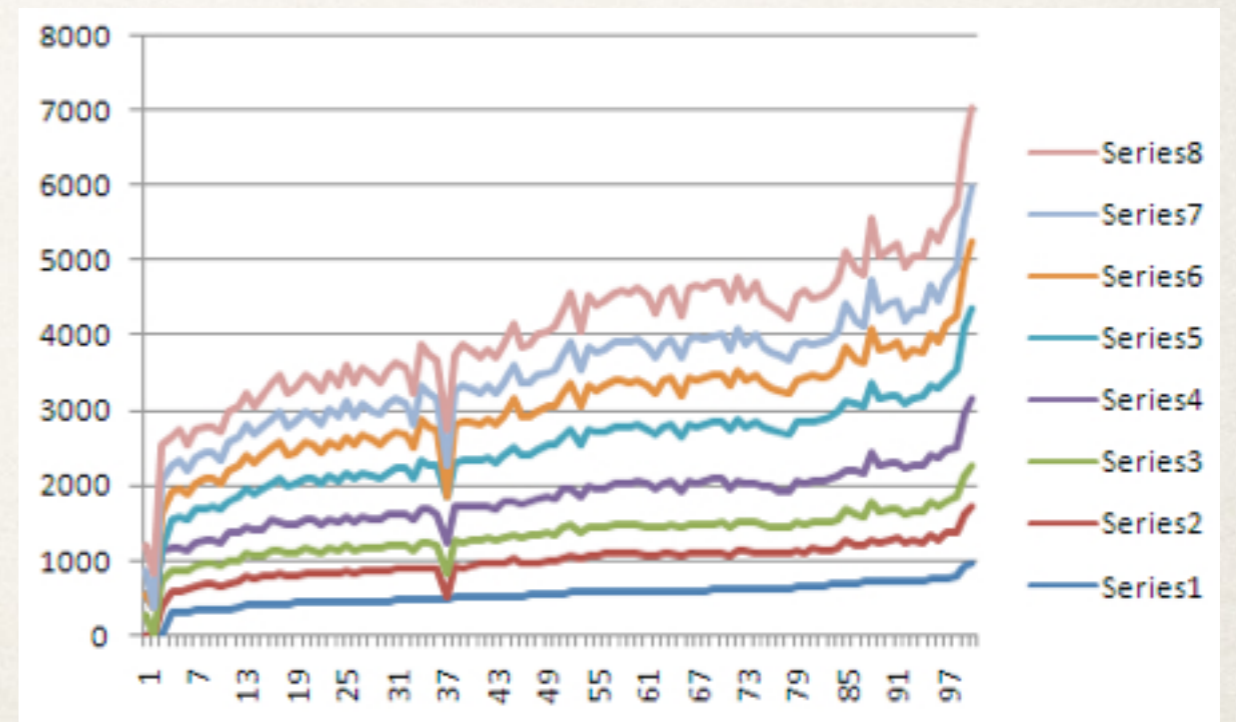
superimposed



stacked

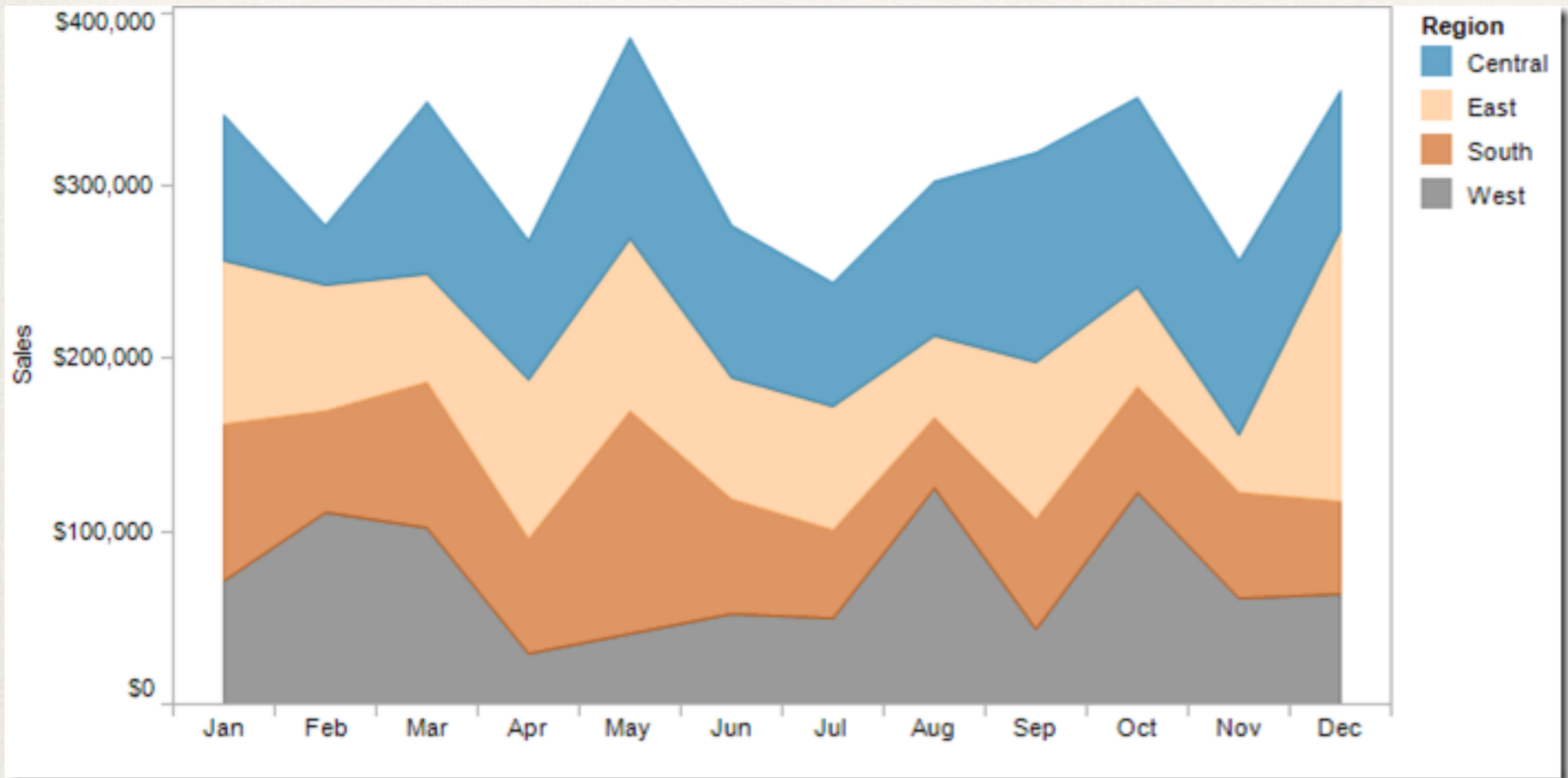


ordered superimposed

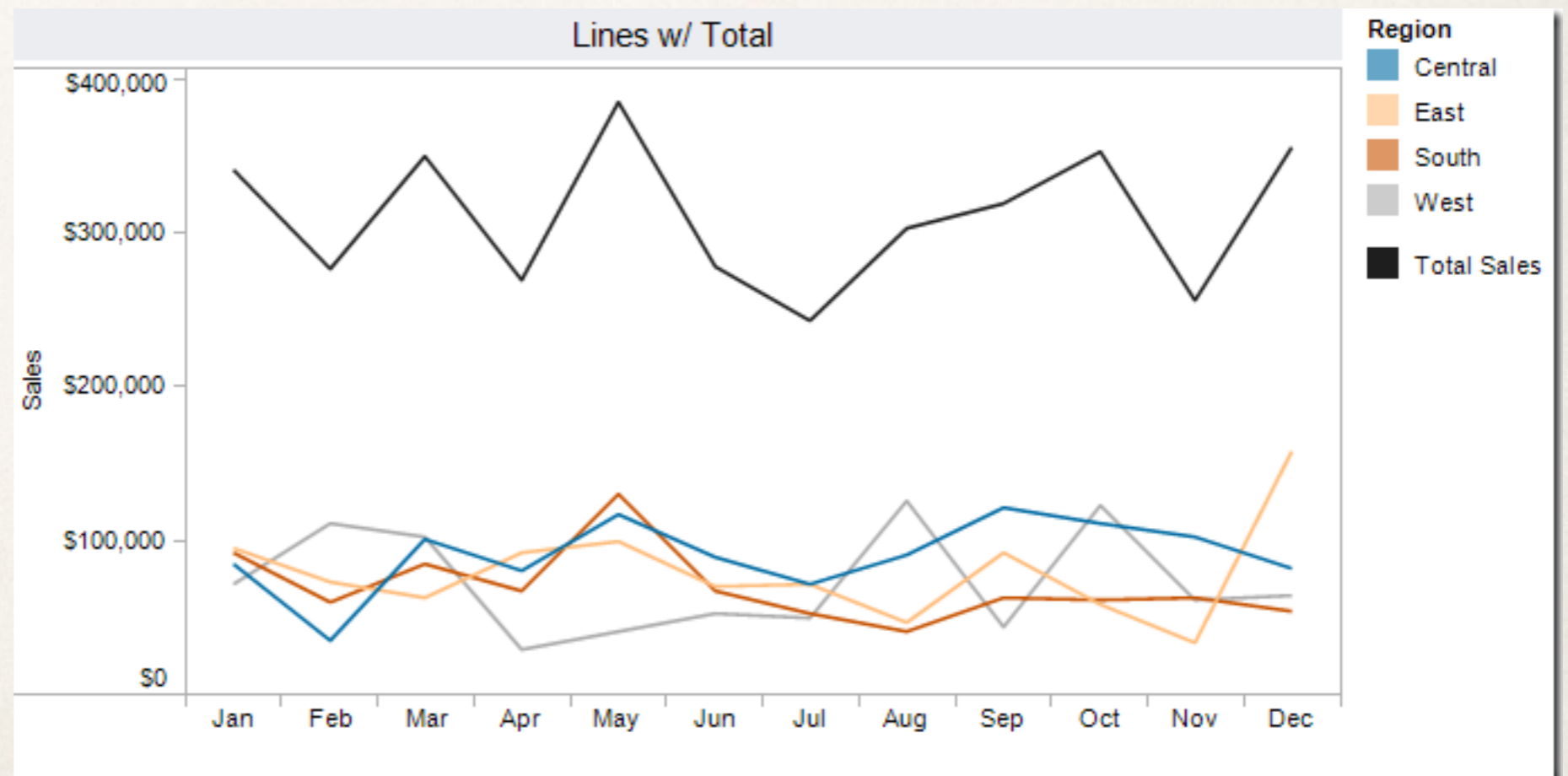
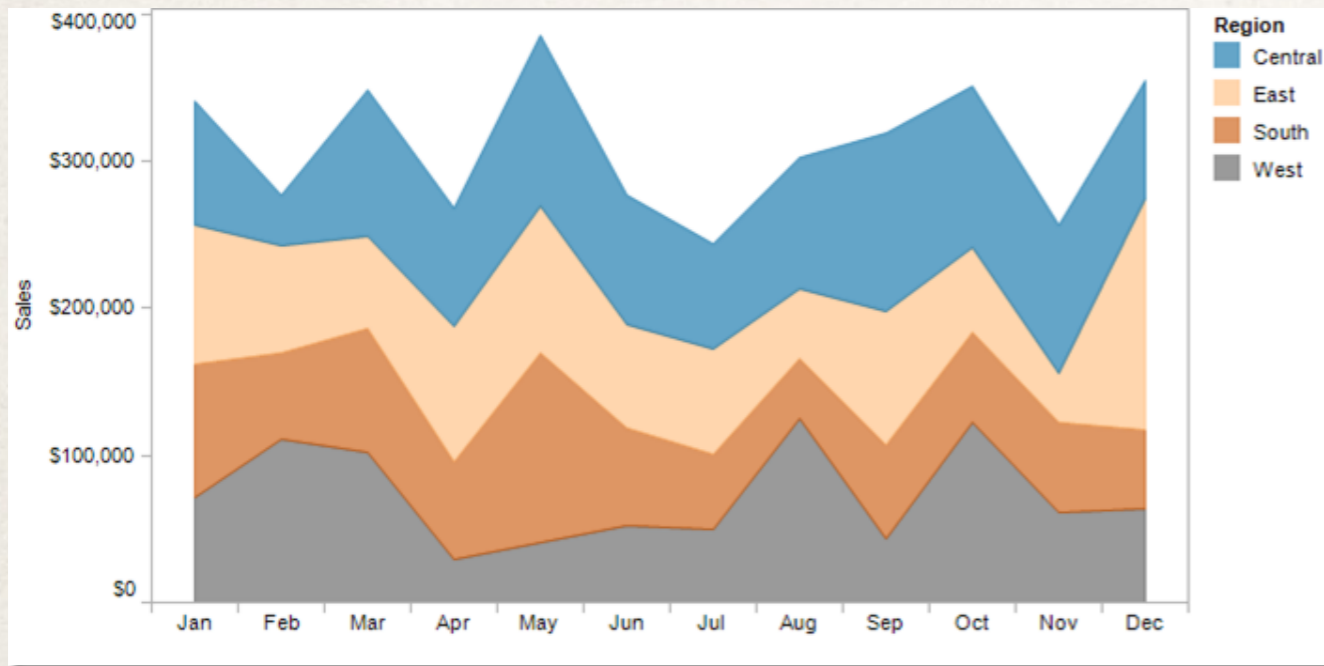


ordered stacked

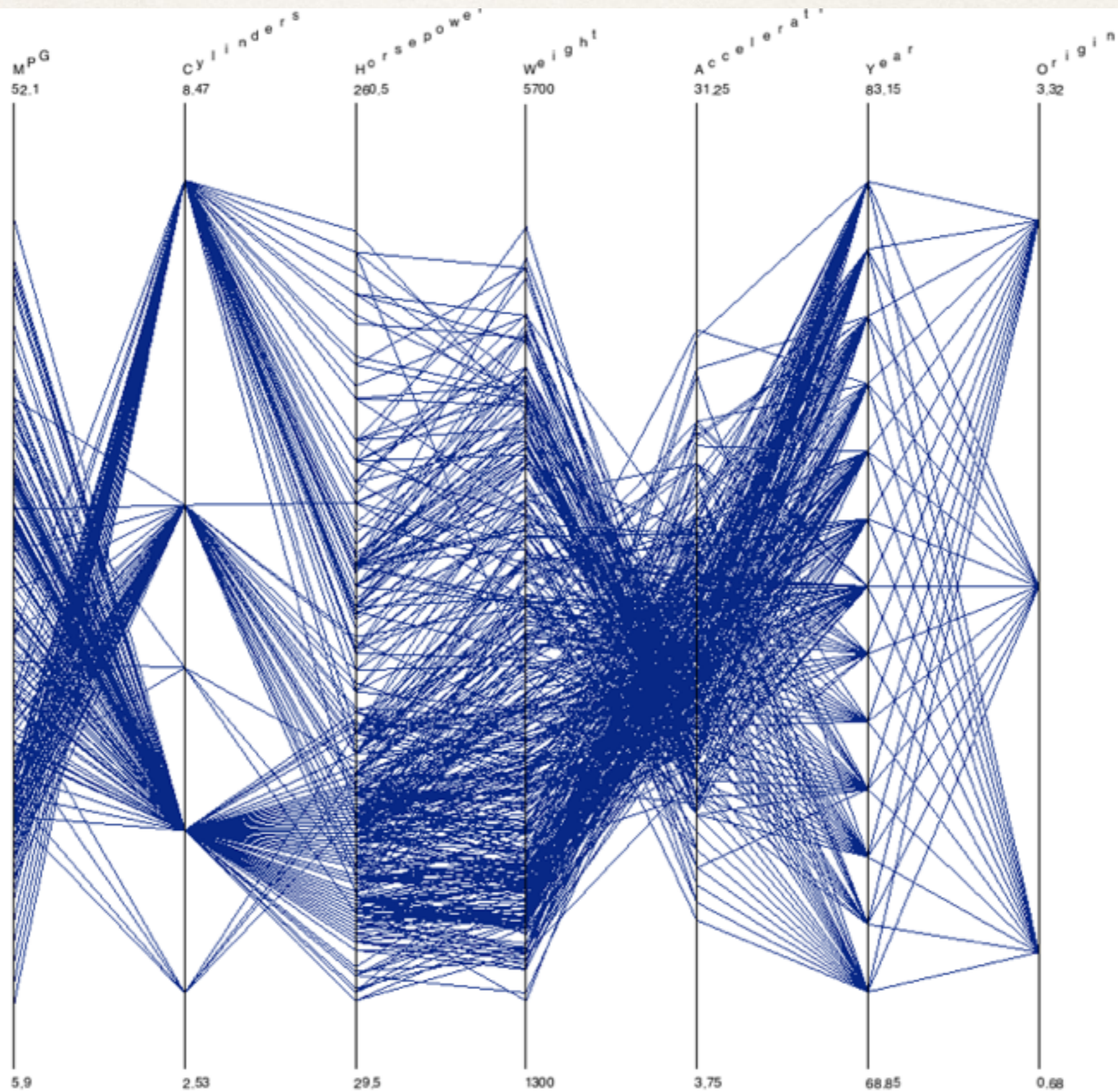
Stacked area chart



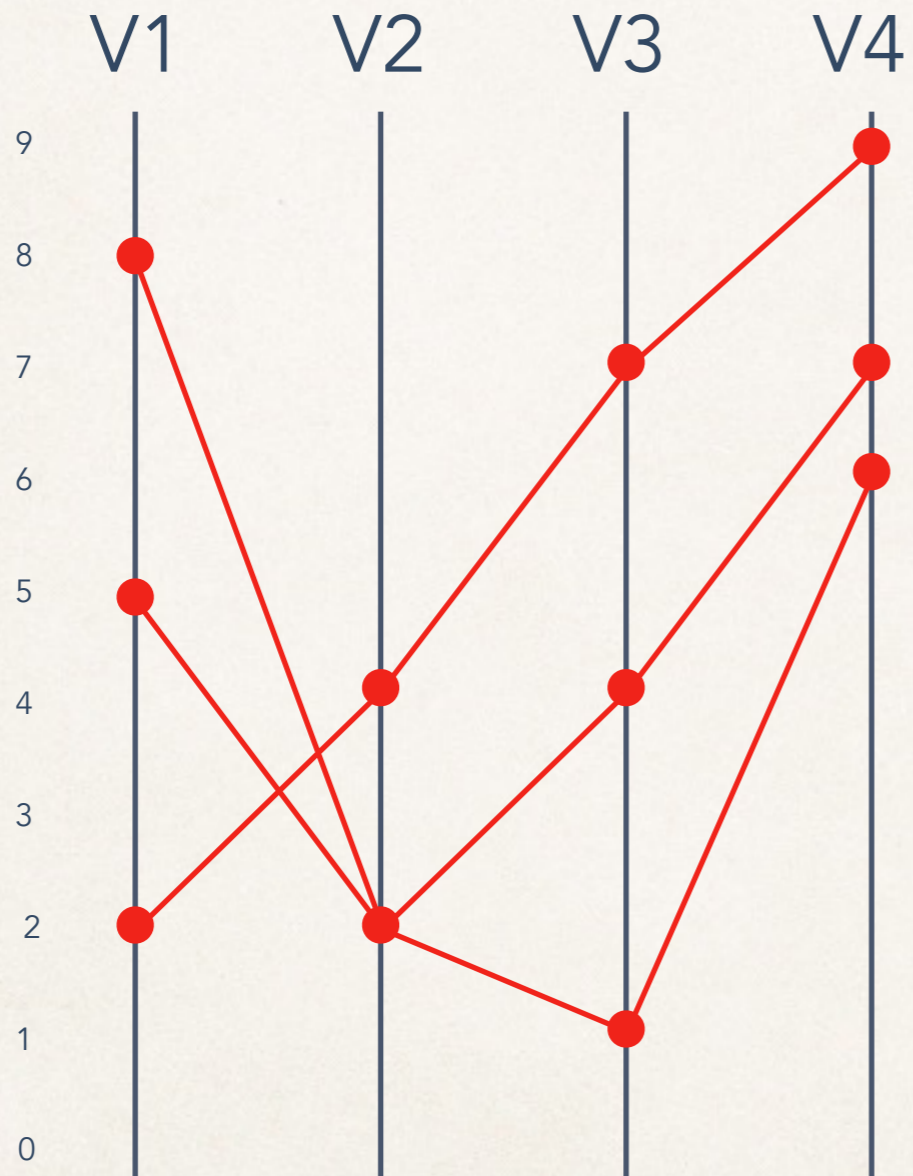
Stacked area chart



Parallel Coordinates

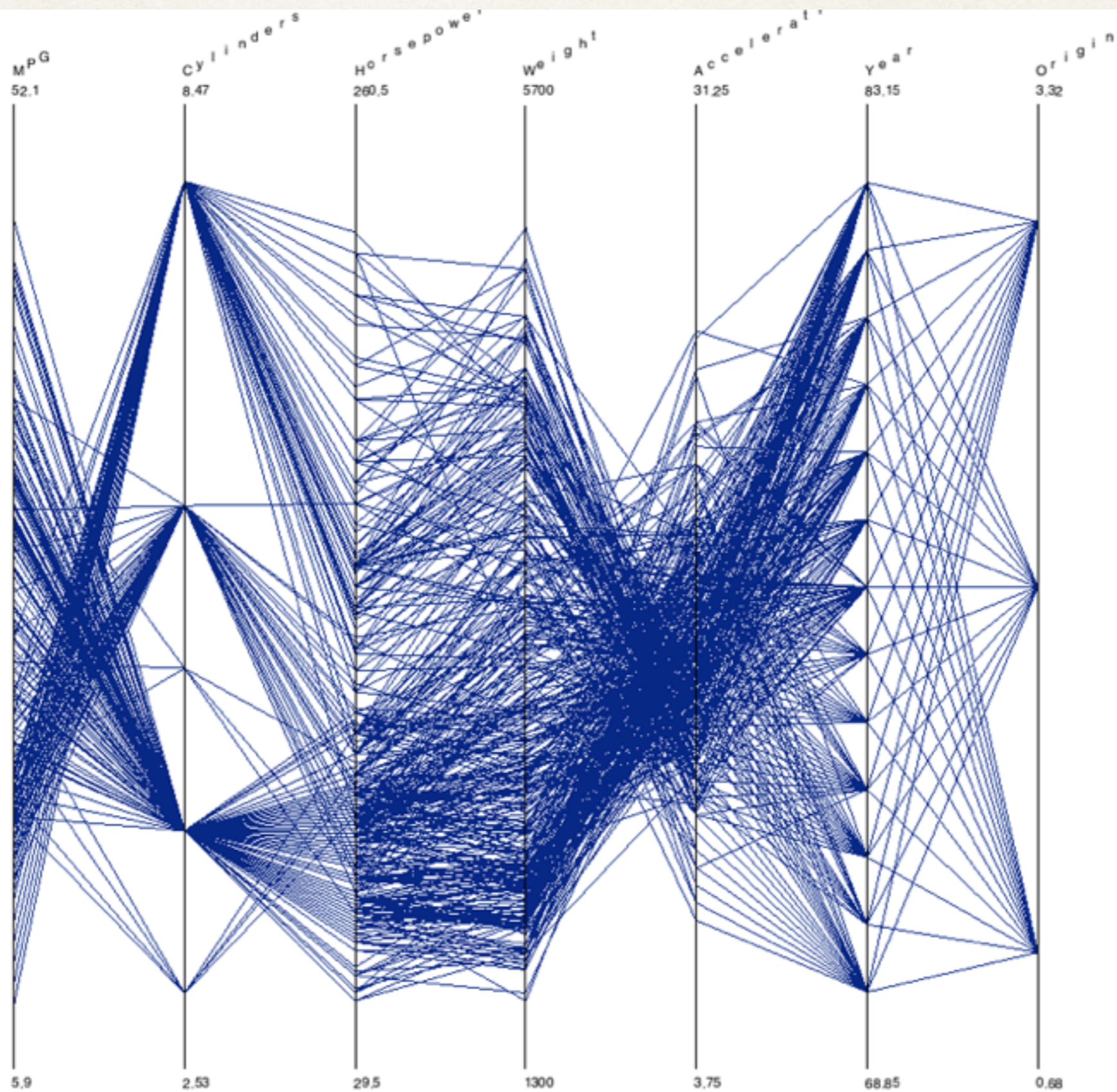


Parallel Coordinates

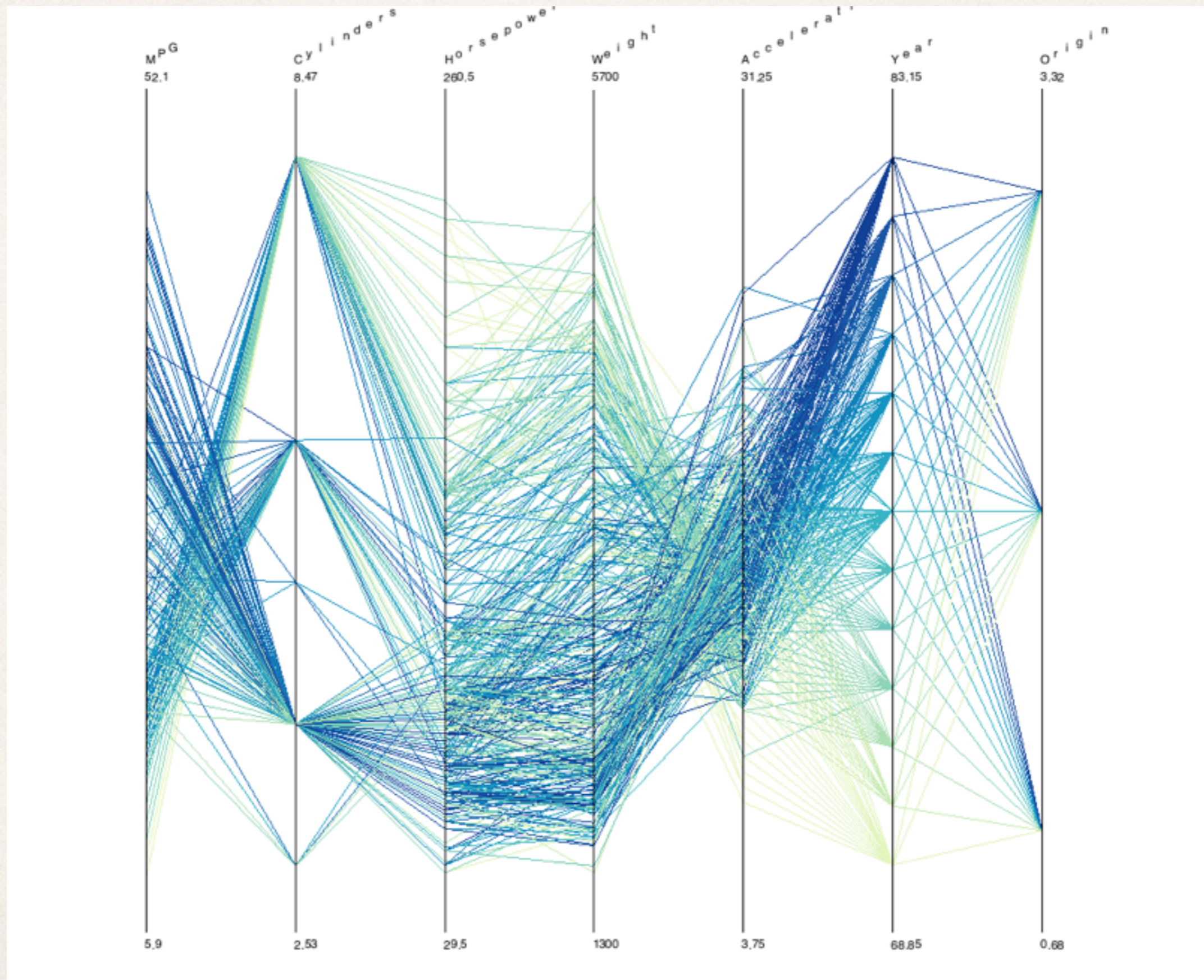


	V1	V2	V3	V4
D1	5	2	1	6
D2	2	4	7	9
D3	8	2	4	6

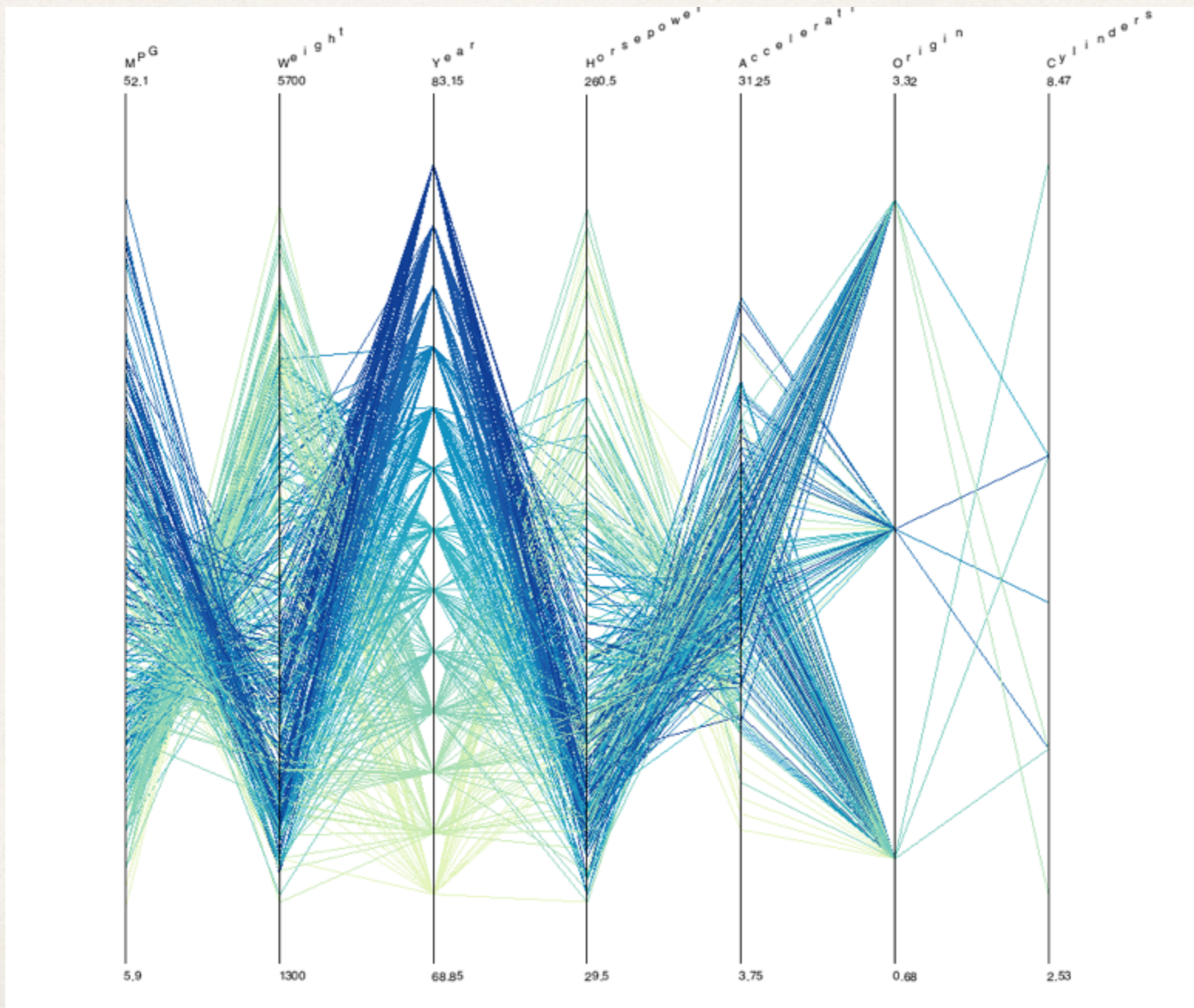
Parallel Coordinates



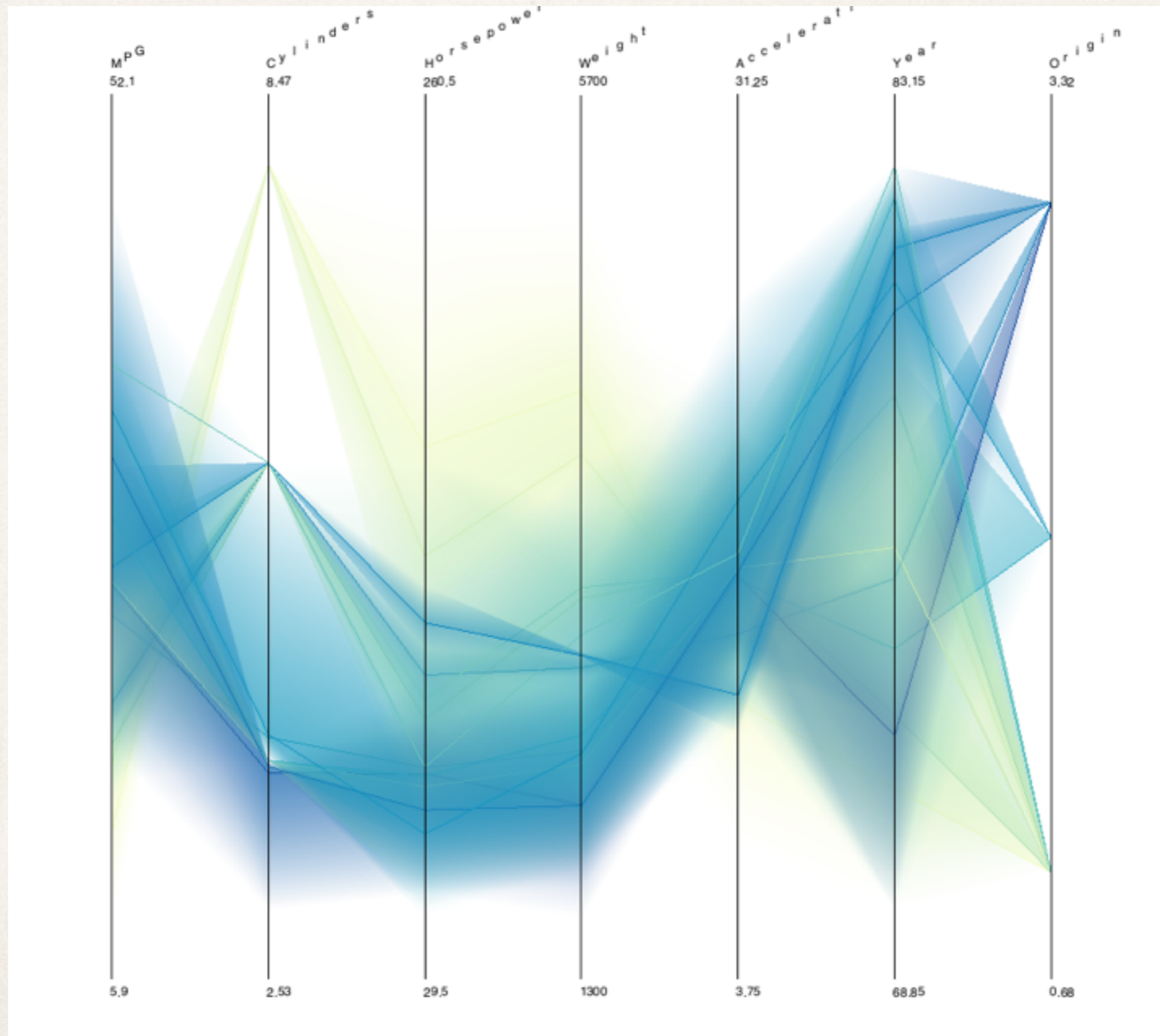
Parallel Coordinates



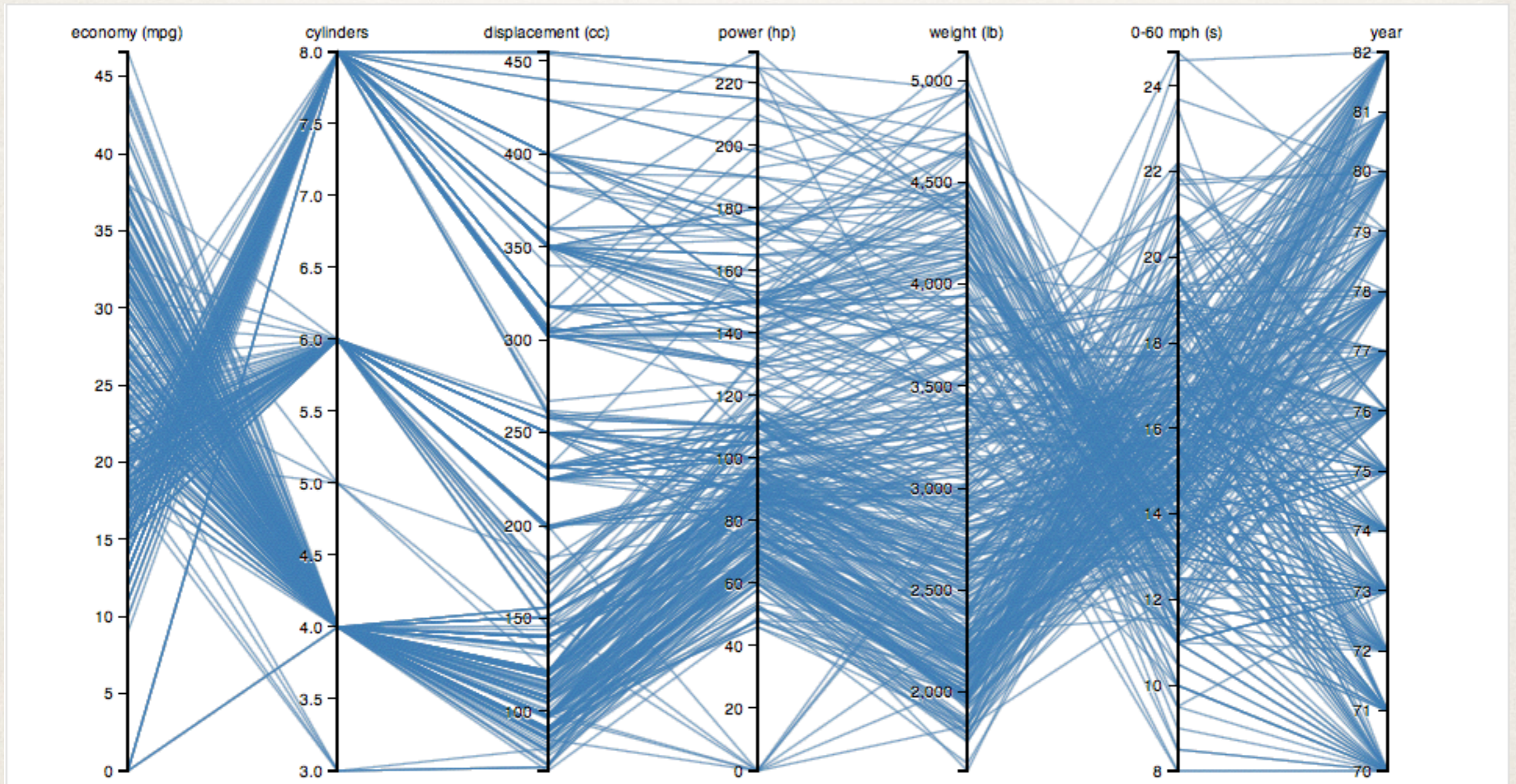
Parallel Coordinates



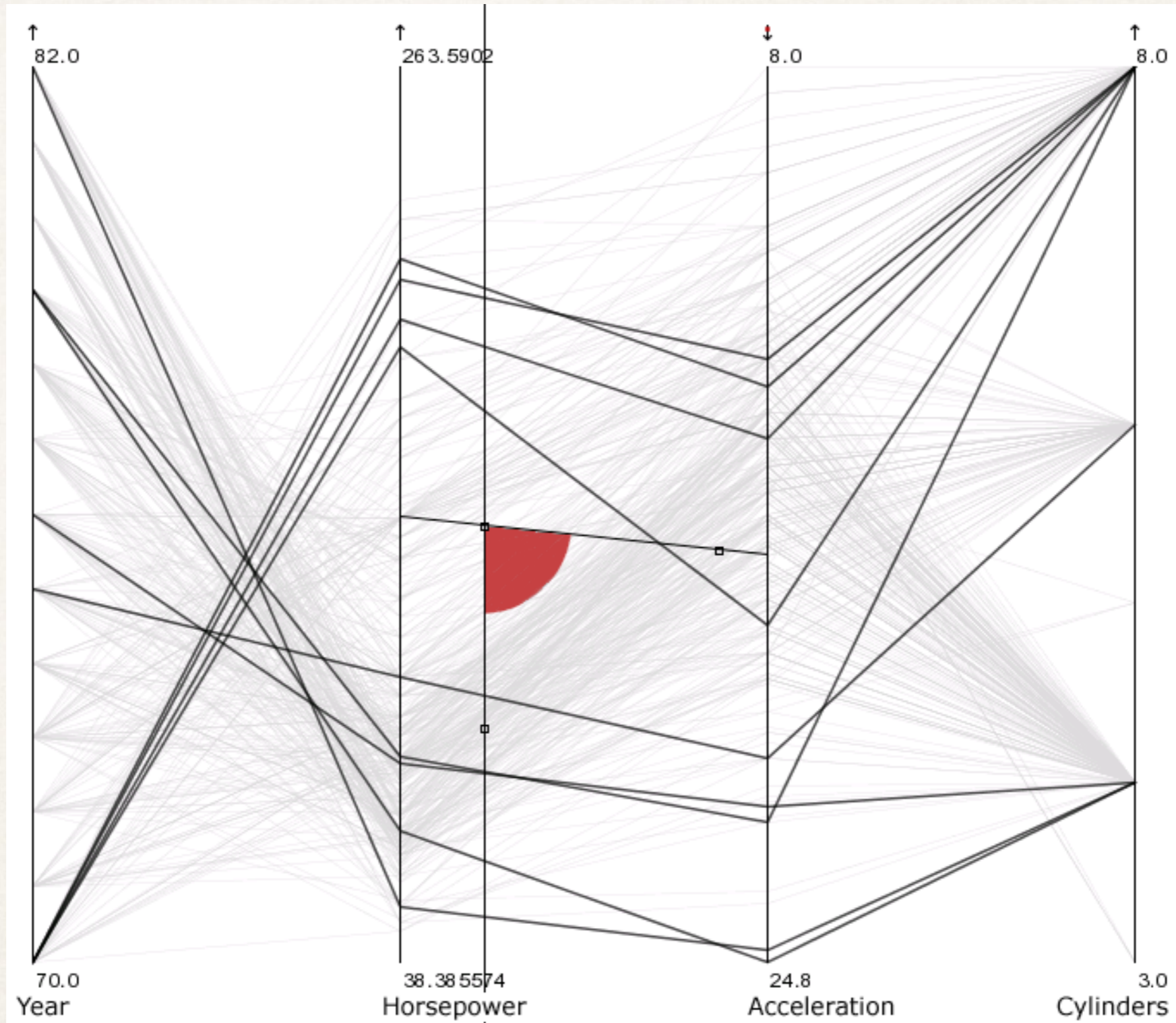
Clustering Parallel Coordinates



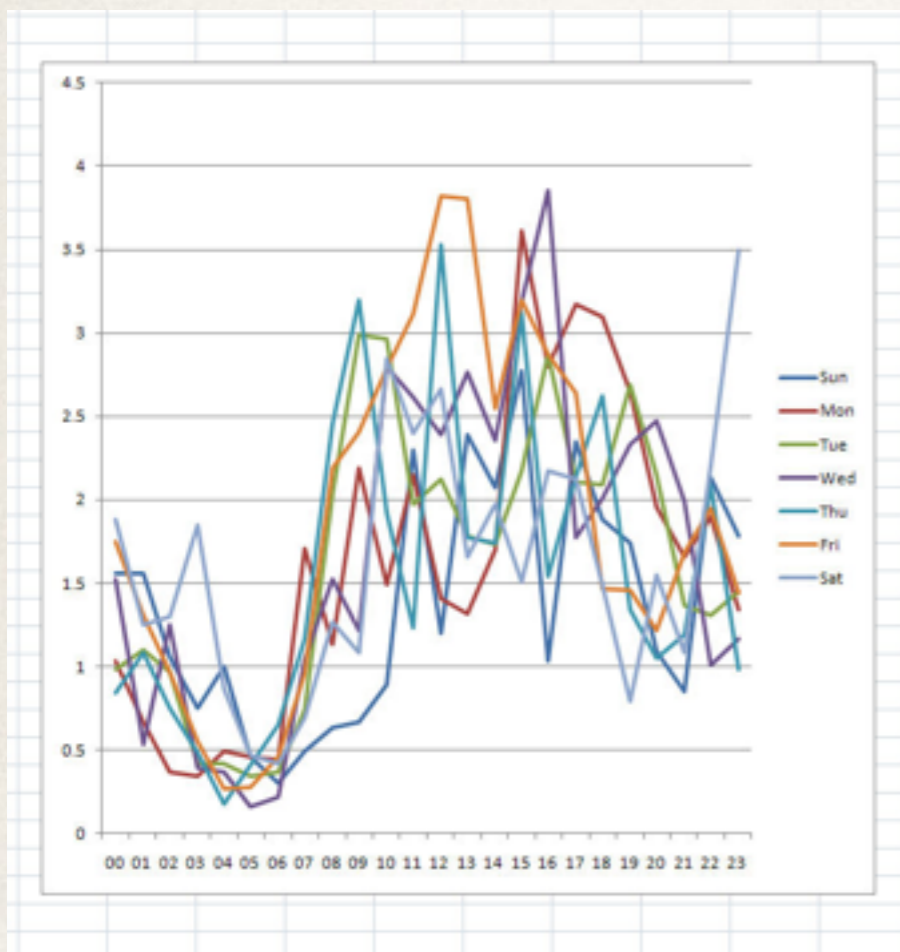
Parallel Coordinates in D3



Angular brushing



Heatmap



	C	D	E	F	G	H	I	J	K
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	2.59	0.66	0.68	1.35	1.35	2.03	1.6		
0100	1.39	0.7	0.95	1.22	1.08	1	2.12		
0200	2.87	0.59	1.02	1.22	0.57	1.08	3		
0300	0.99	0.25	0.5	0.48	0.5	0.99	1.7		
0400	1.06	0.42	0.17	0.56	0.24	0.3	0.48		
0500	0.32	0.23	0.39	0.22	0.47	0.47	0.44		
0600	0.42	0.41	0.57	0.6	0.64	0.5	0.49		
0700	0.38	1.29	0.77	0.86	1.42	1.14	1.22		
0800	0.53	1.05	1.77	1.56	1.32	1.58	1.67		
0900	0.62	2.04	2.97	1.45	2.96	1.92	2.32		
1000	1.37	2.09	3.67	1.87	2.52	1.47	2.29		
1100	0.98	3.27	1.6	3.32	2.89	2.09	1.27		
1200	1.81	3.41	2.66	2.7	3.24	2.84	1.35		
1300	2.38	1.79	2.15	1.91	1.64	1.43	2.49		
1400	2.31	2.69	3.19	2.98	2.85	3.69	1.17		
1500	1.44	1.46	1.44	3.46	1.55	3.55	2.35		
1600	1.18	2.61	3.74	3.21	2.76	1.98	1.84		
1700	1.52	3.45	1.4	1.99	1.79	3.33	2.1		
1800	2.09	2.53	1.64	1.37	3.15	3.1	1.21		
1900	2.67	1.2	1.44	2.04	2.58	1.16	2.34		
2000	1.5	2.31	2.58	1.89	2.76	1.96	1.75		
2100	0.81	1.7	1.97	1.76	0.99	3.16	1.92		
2200	1.24	1.91	1.97	1.48	2.22	2.93	1.63		
2300	1.69	1.55	1.74	1.29	2.01	1.97	3.87		

Linked views

File Edit Base Meta Grab Misc Help

Movies

Name	Rating	Num...	BoxOffice
Ocean's Eleven (2000)	7.5	6734	\$133M
Million Dollar Baby (20...	8.3	5720	\$100M
Chicago (2000)	7.4	5257	\$117M
Indestructible (2000)	7.1	5097	\$95M
Mystic River (2000)	8.0	5076	\$90M
Collateral (2000)	7.7	4760	\$100M
Royal Tenenbaums, Th...	7.5	4586	\$52M
High Fidelity (2000)	7.6	4074	\$77M
3 Grams (2000)	7.8	3974	\$16M
Equilibrium (2000)	7.7	3527	\$1M
Charlie's Angels (2000)	5.6	3477	\$125M
Perfect Storm, The (...)	6.1	3266	\$133M
Red Dragon (2000)	7.3	3200	\$93M
Anchorman: The Leg...	6.6	2993	\$94M

Cross Filtering

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<input type="checkbox"/> M.N	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/> M.R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> O.T	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/> P.R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Release Dates

Cycle Length	Cycle Phase	Call Size	Options
14	3	24	<input type="checkbox"/> Count Events <input type="checkbox"/> Outline Dates
(None)			<input type="checkbox"/> Fill Seasons <input type="checkbox"/> Outline Months

Attributes Relationship Graph

Genres

Key	Set
Action	215
Adult	1
Adventure	166
Animation	46
Comedy	466
Crime	179
Documentary	29
Drama	558
Family	13
Fantasy	110
Horror	90
Musical	21
Mystery	91
Romance	220

Roles

Key	Set
actor	7336
cinematographer	330
director	93

People

Key	Set
Bacon, Kevin	7
Beebe, Dion	1
Brett, Benjamin (I)	1
Eastwood, Clint	1
Fanning, Dakota	1
Fishburne, Laurence	1
Harden, Marcia Gay	1
Lane, Diane (I)	1
Linnay, Laura	1
Leigh, Jennifer Ja...	1
Linnay, Laura	1
Robbins, Tim (I)	1
Roehm Sr., David C.	1

Nodes

- Genre Names (G.N)
- Movie Names (M.N)
- Movie Dates (M.D)
- Movie Ratings (M.R)
- Oscar Types (O.T)
- People Names (P.N)
- People Roles (P.R)

Edges

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<input type="checkbox"/> M.D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> M.R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> O.T	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> P.N	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> P.R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facts

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<input type="checkbox"/> M.R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> O.T	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/> P.R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Graph Nodes: Wilson, Luke (I), Theron, Charlize, Fanning, Dakota, Lane, Diane (I), Hollors, Matt (2000), Trapped (2002), Linnay, Laura, Stern, Tom (II), Hardan, Marcia Gay, Fishburne, Laurence, My Dog Skip (2000), Bacon, Kevin, Mystic River (2003), Penn, Seth (I), Eastwood, Clint, Beabe, Dion, In the Cut (2003), Leigh, Jennifer Jason, Novocaine (2001), Woodman, The (2004), Pirez Grobet, Xaher, Robbins, Tim (I), Martin, Steve (I), Majors, Paul (I), Brett, Benjamin (I), Roehm Sr., David C.

Linked views

