Composition and Configuration Patterns in Multiple-View Visualizations

Supplementary Material

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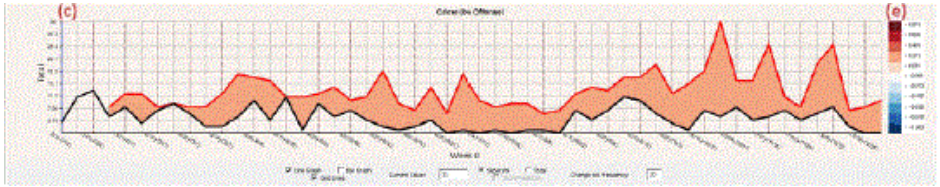
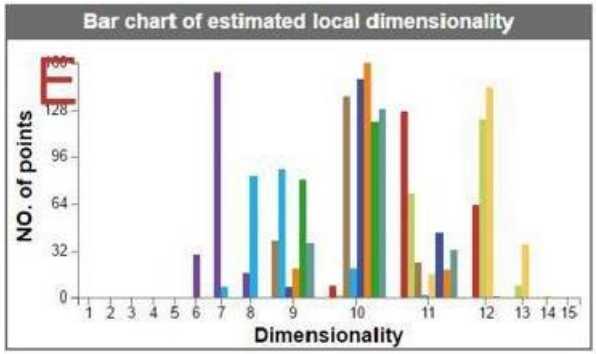
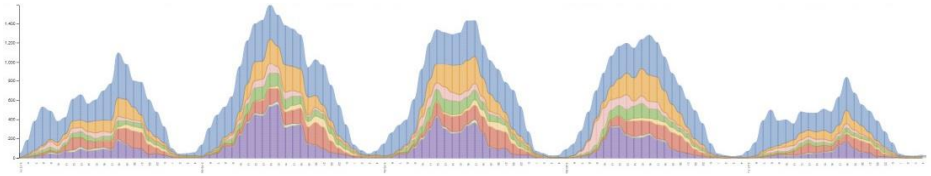
Table S1: Chart types, and their abbreviations, colors, and icon representations.

Chart Type (Abbr.)	Color	Icon
Area		
Bar		
Circle		
Diagram (Diag.)		
Distribution (Distri.)		
Tree and Network (Net.)		
Grid / Matrix (Grid)		

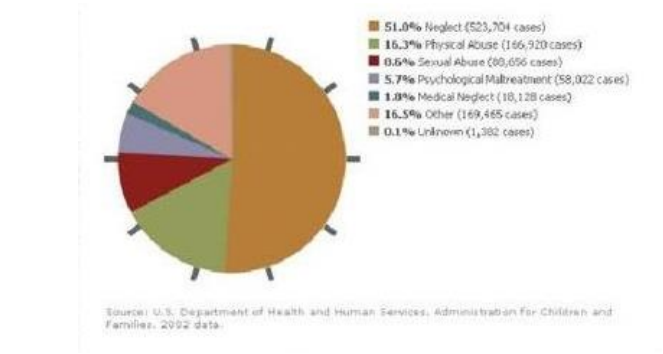
Chart Type (Abbr.)	Color	Icon
Line		
Map		
Point		
Table		
Text Based (Text)		
SciVis		
Panel		

Table S2: Examples of the 14 view types.

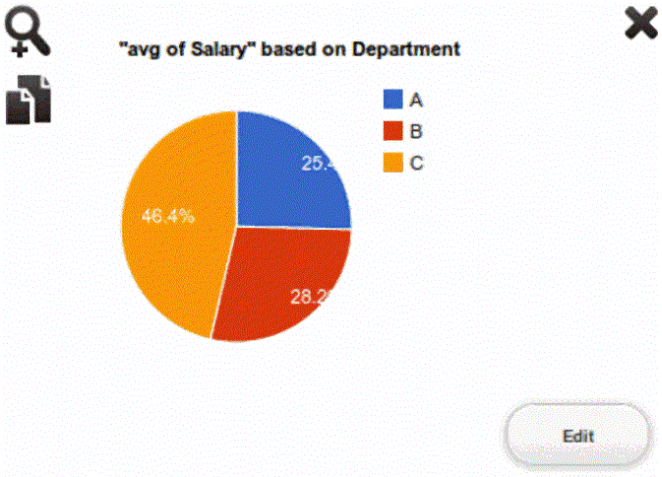
Area	Bar
(a)	(a)
	
(b)	(b)
	

Circle

(a)

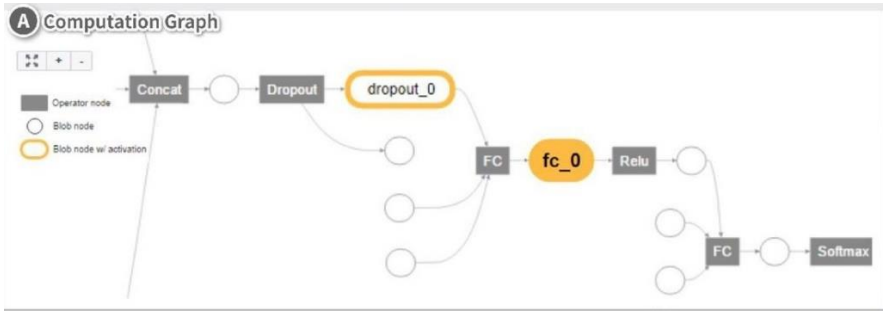


(b)

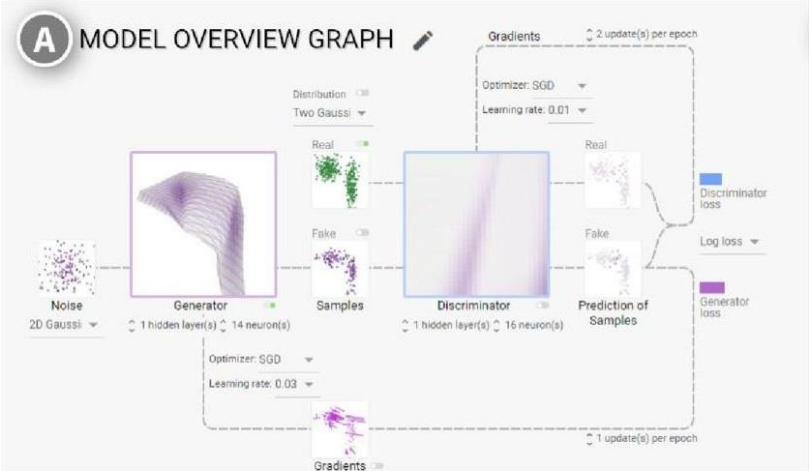


Diagram

(a)

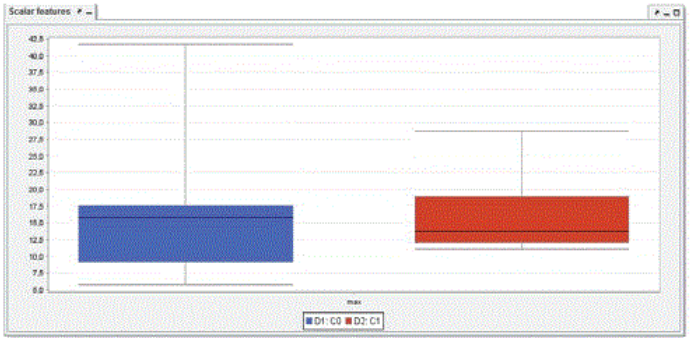


(b)

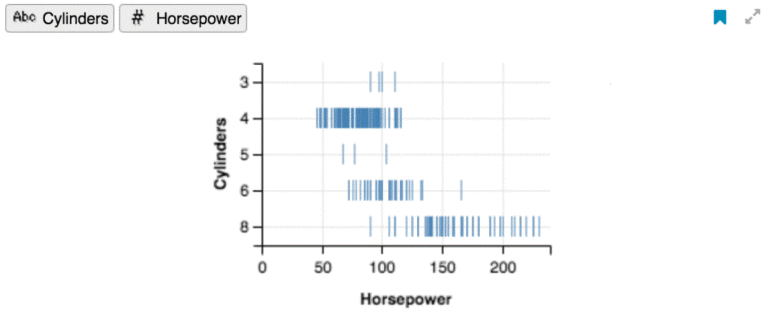


Distribution

(a)

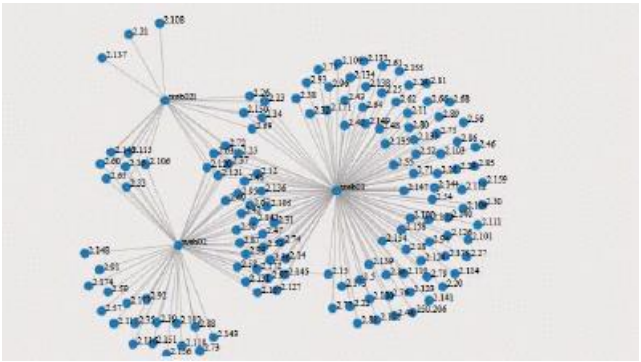


(b)



Tree and Network

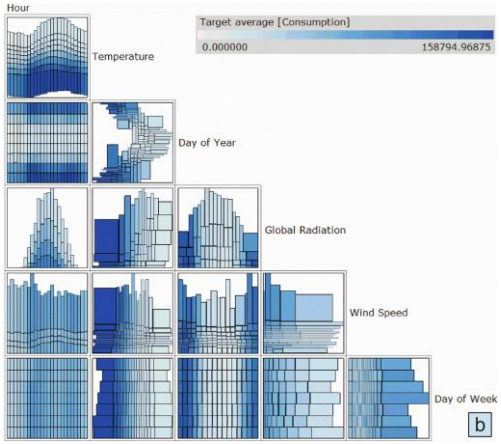
(a)



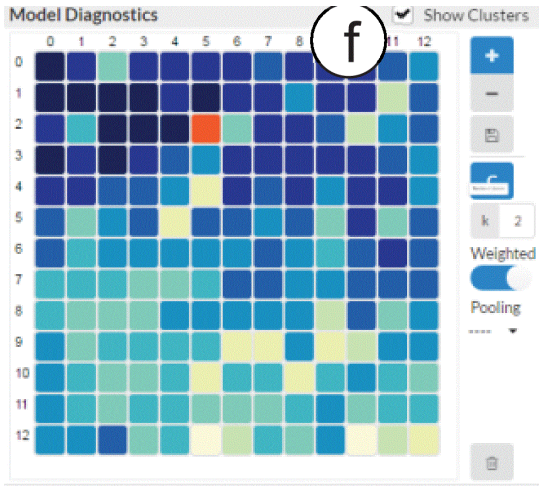
(b)

Grid / Matrix

(a)

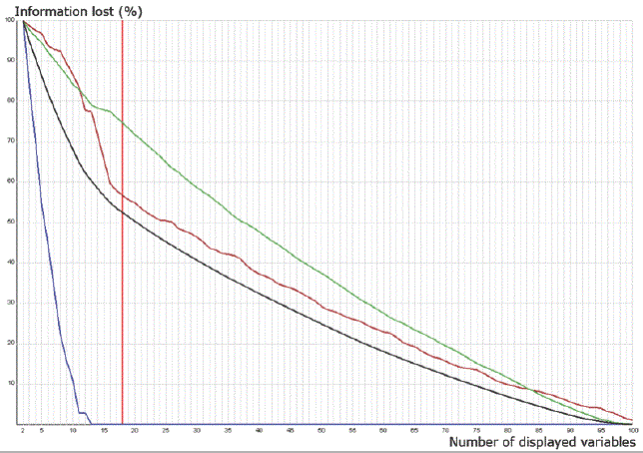


(b)

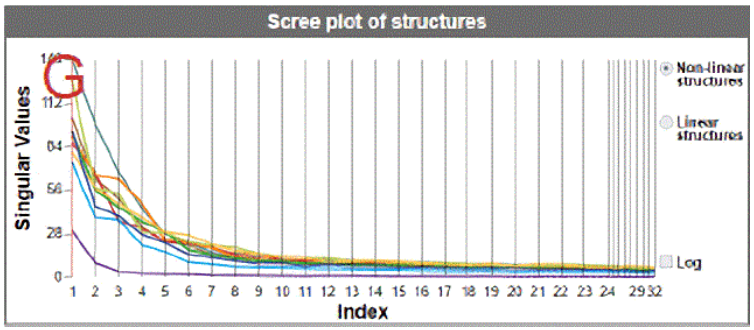


Line

(a)

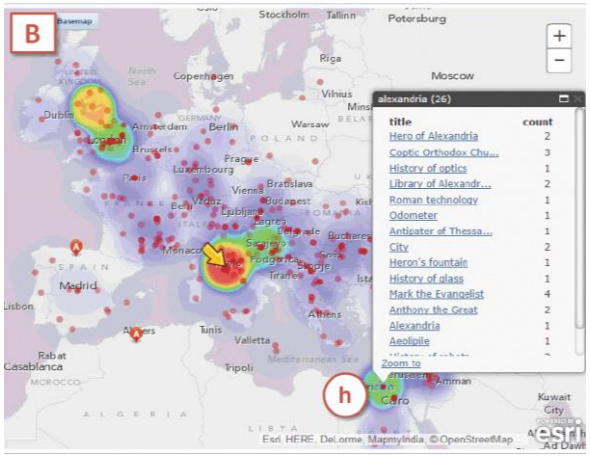


(b)

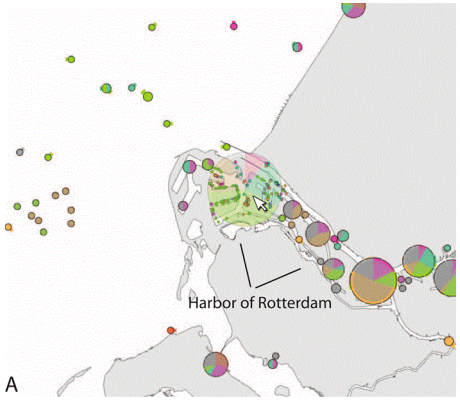


Map

(a)

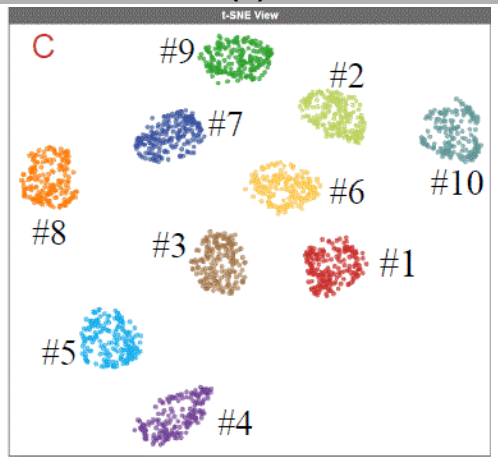


(b)

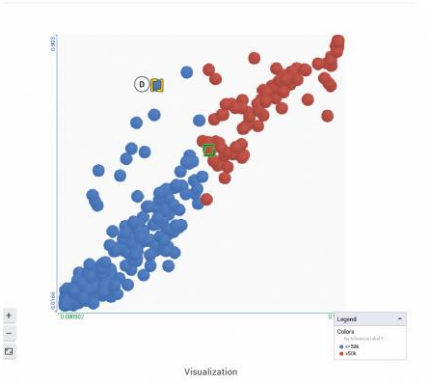


Point

(a)



(b)



Table

(a)

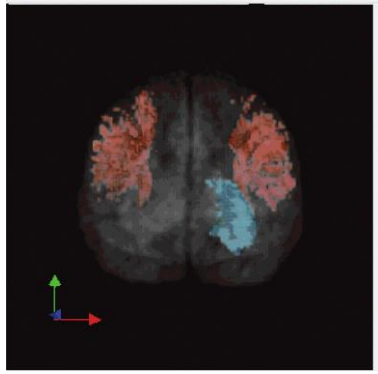
x-Axis	y-Axis	R²[1] ▼	R²[2]
Hour	Temperature	0.73	0.78
Day of Year	Temperature	0.67	0.67
Temperature	Global Radiation	0.65	0.66
Temperature	Wind Speed	0.62	0.62
Day of Week	Temperature	0.61	0.61
Hour	Day of Year	0.56	0.66
Day of Year	Global Radiation	0.54	0.58
Day of Week	Day of Year	0.53	0.58
Day of Year	Wind Speed	0.52	0.57
Hour	Global Radiation	0.28	0.28
Hour	Wind Speed	0.1	0.1
Global Radiation	Wind Speed	0.1	0.1
Day of Week	Global Radiation	0.08	0.08
Day of Week	Hour	0.07	0.[illegible]
Day of Week	Wind Speed	0.05	0

C

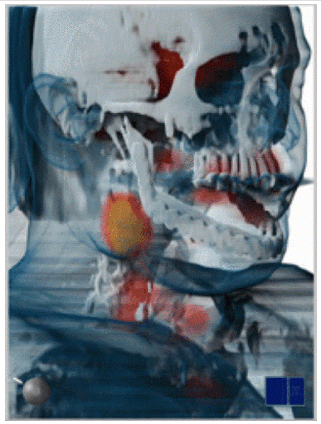
(b)

Scivis

(a)



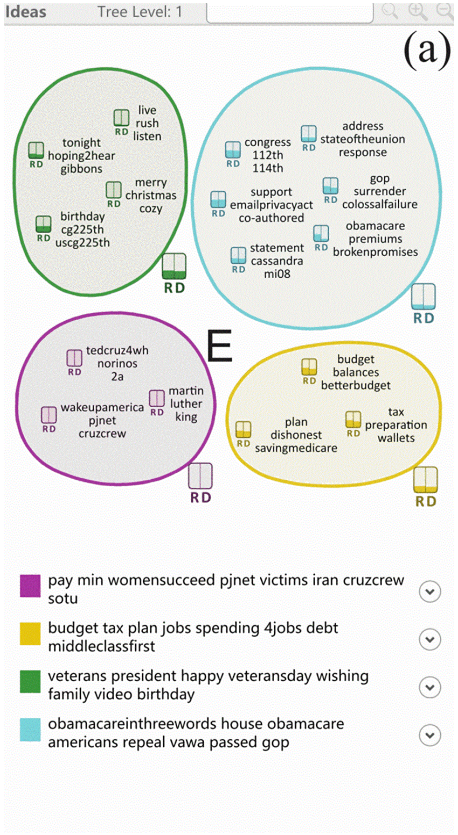
(b)



Text Based

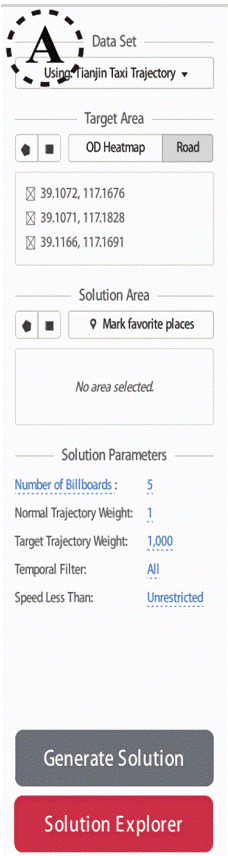
(a)

(b)



Panel

(a)



(b)

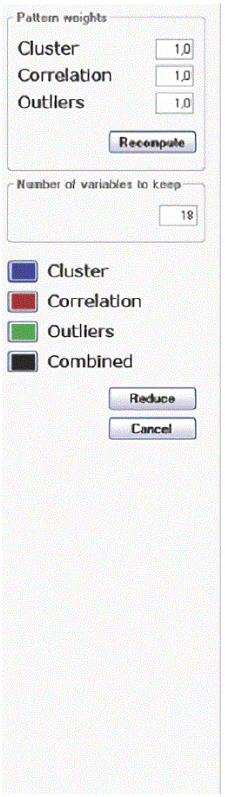
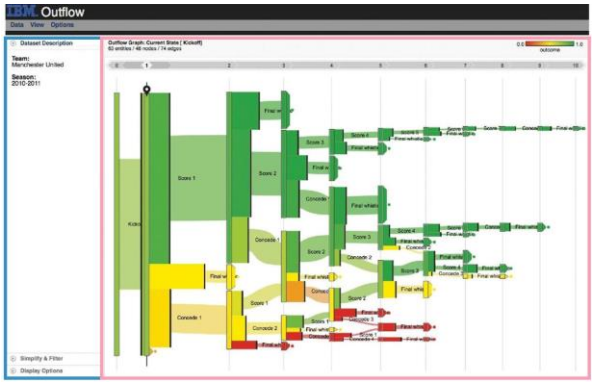


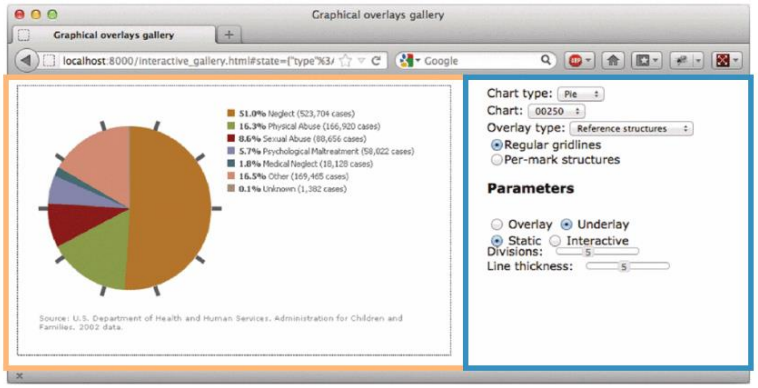
Table S3: Examples of view layouts.

2A

(a)

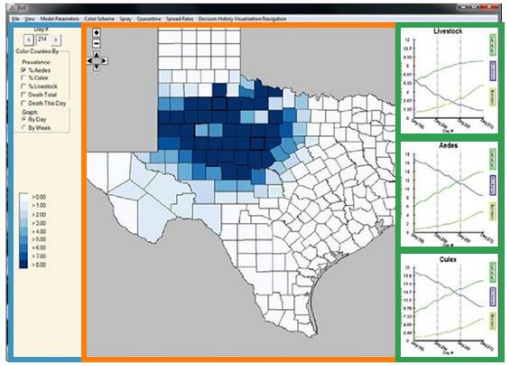


(b)

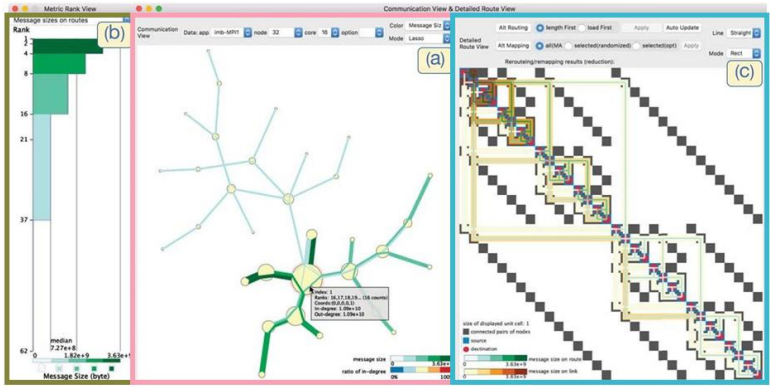


3C

(a)

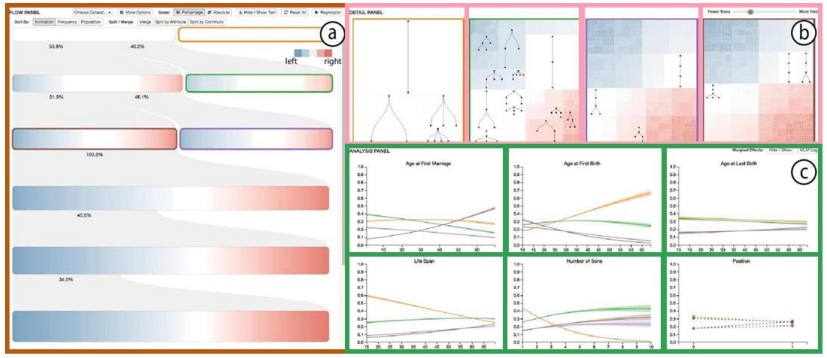


(b)



3A

(a)


a
left
right
b
c

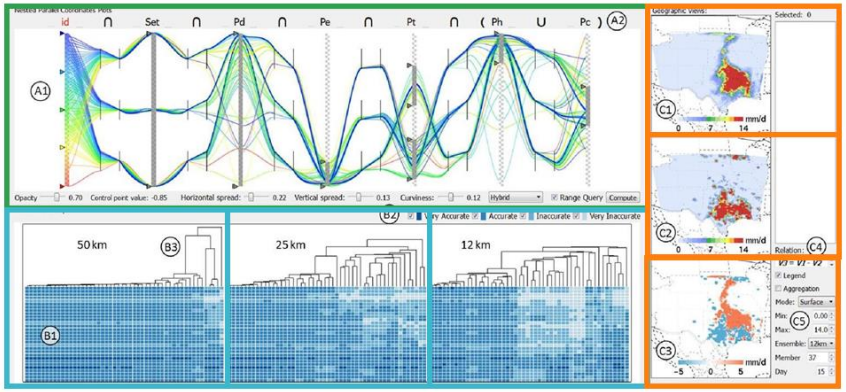
(b)

3B

(a)

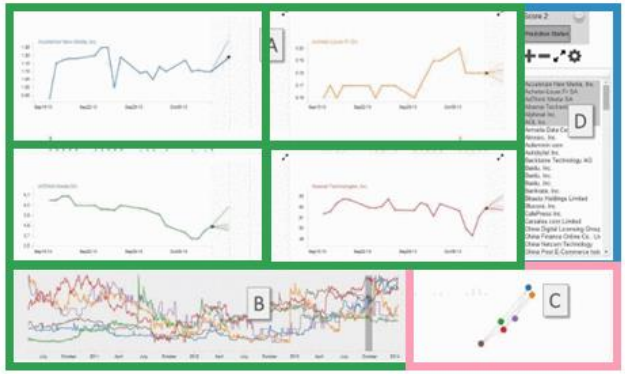

Visualization
Day By Meal
About
A
B
C
Basal and Bolus (u)
Insulin (u)
Carbohydrates (grams)

(b)


A1
A2
50 km
25 km
12 km
B1
B2
B3
C1
C2
C3
C4
C5
mm/d

4E

(a)


A
B
C
D

(b)

3F

(a)

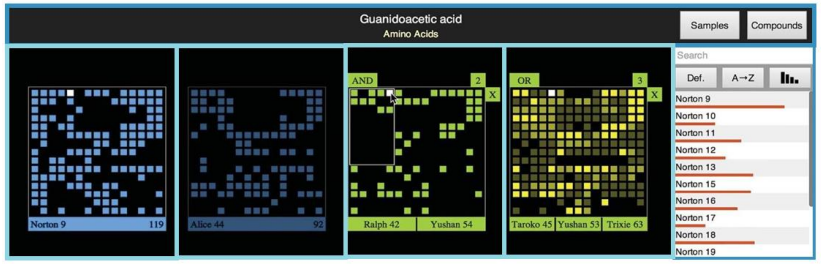

Load Data
Construct PER-Tree
Observe & Adjust
Examine Utility
Export Data
(b) Utility Preservation Degree Matrix
(c) Privacy Exposure Risk Tree
Legend
Records Number
Diversity
Distribution Similarity

(b)

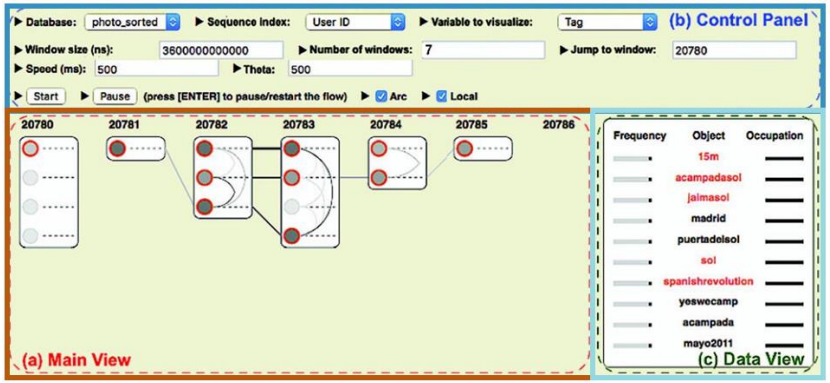

Cluster Mean Charge Index

3E

(a)

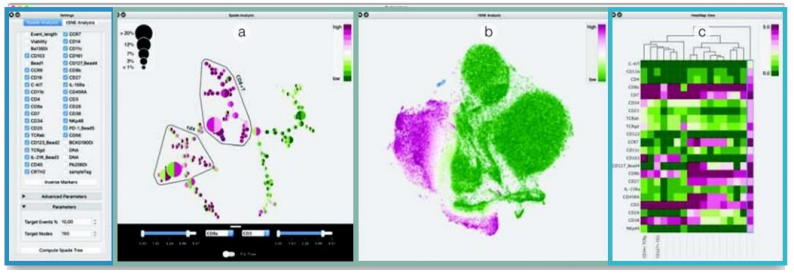

Guanidoacetic acid
Amino Acids
Samples
Compounds
Search
Def.
A→Z
AND
OR
Norton 9
Norton 10
Norton 11
Norton 12
Norton 13
Norton 15
Norton 16
Norton 17
Norton 18
Norton 19
Norton 9 119
Alice 44 92
Ralph 42
Yushan 54
Taroko 45
Yushan 53
Trixie 63

(b)

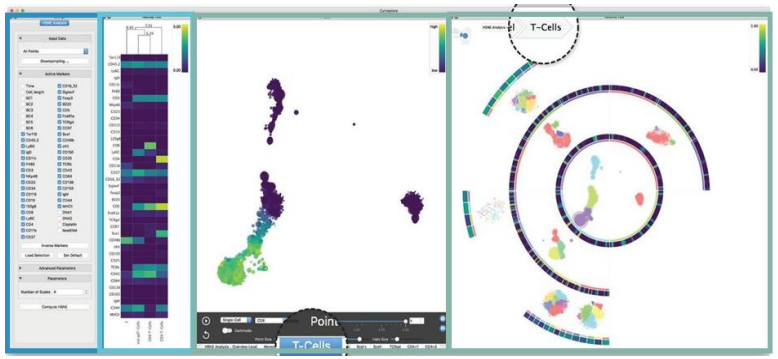

Database: photo_sorted
Sequence index: User ID
Variable to visualize: Tag
(b) Control Panel
Window size (ns): 3600000000000
Number of windows: 7
Jump to window: 20780
Speed (ms): 500
Theta: 500
Start
Pause
(press [ENTER] to pause/restart the flow)
Arc
Local
20780
20781
20782
20783
20784
20785
20786
Frequency
Object
Occupation
15m
acampadasol
jaimasol
madrid
puertadelsol
sol
spanishrevolution
yeswecamp
acampada
mayo2011
(a) Main View
(c) Data View

4H

(a)

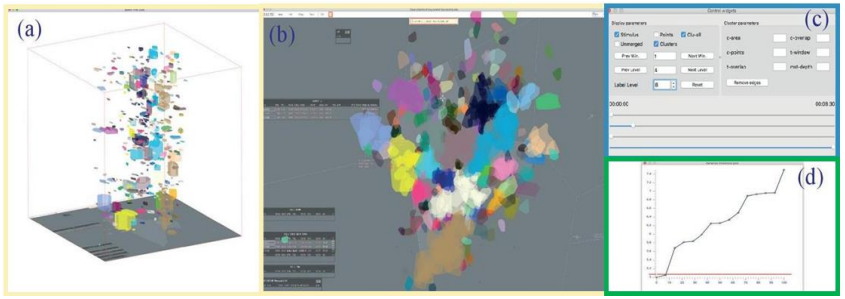

a
b
c

(b)

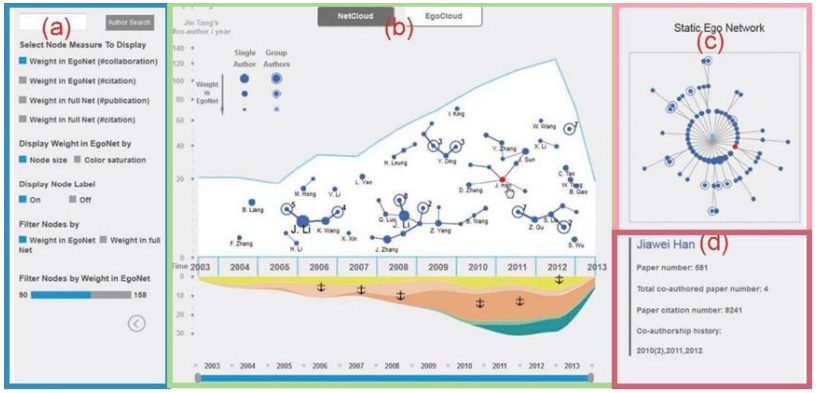

T-Cells

4C

(a)

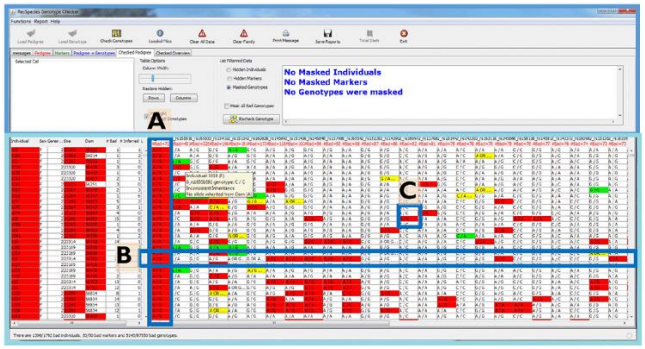

(a)
(b)
(c)
(d)

(b)

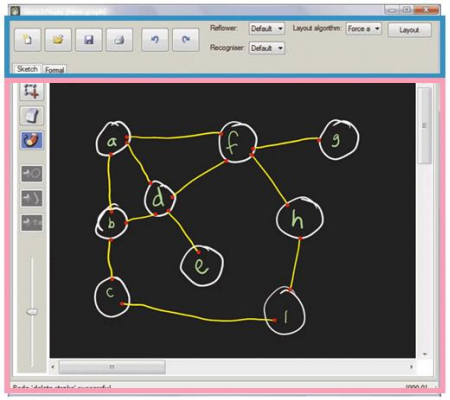

(a)
Author Search
Select Node Measure To Display
Weight in EgoNet (#collaboration)
Weight in EgoNet (#citation)
Weight in full Net (#publication)
Weight in full Net (#citation)
Display Weight in EgoNet by
Node size
Color saturation
Display Node Label
On
Off
Filter Nodes by
Weight in EgoNet
Weight in full Net
Filter Nodes by Weight in EgoNet
90
158
(b)
NetCloud
EgoCloud
Single Author
Group Authors
Weight in EgoNet
Time
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
(c)
Static Ego Network
(d)
Jiawei Han
Paper number: 681
Total co-authored paper number: 4
Paper citation number: 8241
Co-authorship history:
2010(2),2011,2012

2B

(a)

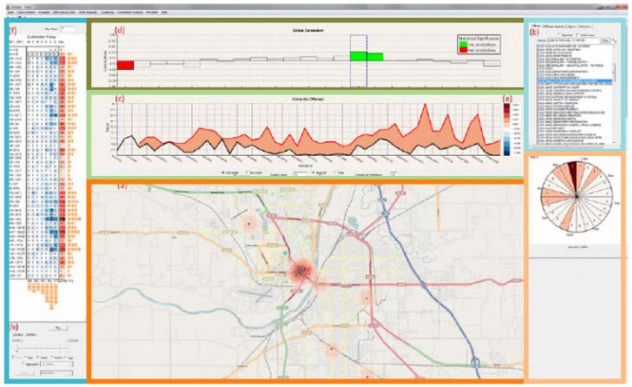

No Masked Individuals
No Masked Markers
No Genotypes were masked
A
B
C

(b)

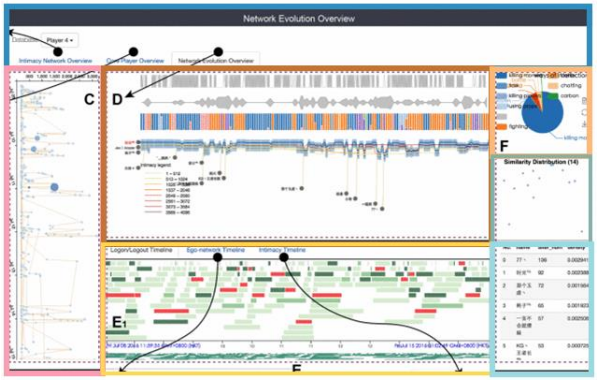

Reflower:
Default
Layout algorithm:
Force a
Layout
Recognizer:
Default
Sketch
Formal
a
b
c
d
e
f
g
h
i

Some other layouts

(a)



(b)



1	2	3	4	5	6	7
1. What is your overall impression of representing MVs using dot plot? (1: strongly disagree; 7: strongly agree)						
				xxxxx	xxxxxxxxxx	xxxxx
2. Do you think the concept of exploring MVs from multiple facets, like layouts, and number of views is helpful for understanding/designing MV? (1: strongly disagree; 7: strongly agree)						
				xxxxx	xxxxxxxxx	xxxxxx
3. How easy was it to find answers for questions using the interface? (1: strongly disagree; 7:strongly agree)						
			x	xxx	xxxxxxxx	xxxxxxxx
4. Are there any parts of the interface that should be improved?						
● Some colors are overused. ● More facets of information can be integrated, such as authors and research topics.						
5. Is there anything else you want to tell us?						
● Need to enhance understanding on MVs ● Good job!						

Table S4: Closing questionnaire of study 1 (Exploration mode). Each "x" stands for the answer of one of the participants. The lists for question 4 and 5 have been paraphrased and combined for brevity.

1	2	3	4	5	6	7
1. How easy to use is the basic mode (add/remove and adjust)? (1: not easy; 7: very easy)						
xx	xx	xx		x	xxxx	
2. How easy to use is the partial mode (add/remove and adjust + align)? (1: not easy; 7: every easy)						
			xxxx	xx	xx	xxx
3. How easy to use is the full mode (add/remove and adjust + align + recommend)? (1: not easy; 7:very easy)						
					xxxx	xxxxxxx
4. Do you think the concept of recommending MV designs based on similarity between user inputs and existing MVs is useful? (1: not useful; 7: very useful)						
				x	xxxx	xxxxxx
5. How intuitive is the interface? (1: very unintuitive; 7: very intuitive)						
				x	xxxxx	xxxxx
6. How useful is the tool in its current form to you? (1: not useful; 7: very useful)						
				xxx	xxx	xxxxx
7. Which features are missing that would make this tool more useful? (multiple choices)						
• Show views of real data (5x) • Categorize view types in more details (2x) • Add view directions (horizontal, vertical) (3x) • Flip/rotate layout (3x) • Export layout (6x)						
8. Imagine all missing features are implemented, how useful do you think this tool to the visualization community?						
					xxxx	xxxxxxx
9. Could you imagine this tool be useful for other applications like infographics and mobile APP design? (1: not useful; 7: very useful)						
				x	xxxxxxx	xxx

10. Is there anything else you want to tell us?
• Show mockup views of real data. • Consider view direction. • Export layout as a JSON file.

Table S5: Closing questionnaire of study 2 (Design mode). Each “x” stands for the answer of one of the participants. The lists for question 10 have been paraphrased and combined for brevity.