

interacting with information



max van kleek

Open Data Institute – Short Course on Open Data – 10 April 2013

part 2 outline

part 2 outline

why add interactivity?

tasks:

what do people want to do with the data?

why action in inter-action?

why add interactivity?

tasks:

what do people **want** to do with the data?

why action in inter-action?

interaction primitives

search - focus - filter - select - pivot - manipulate

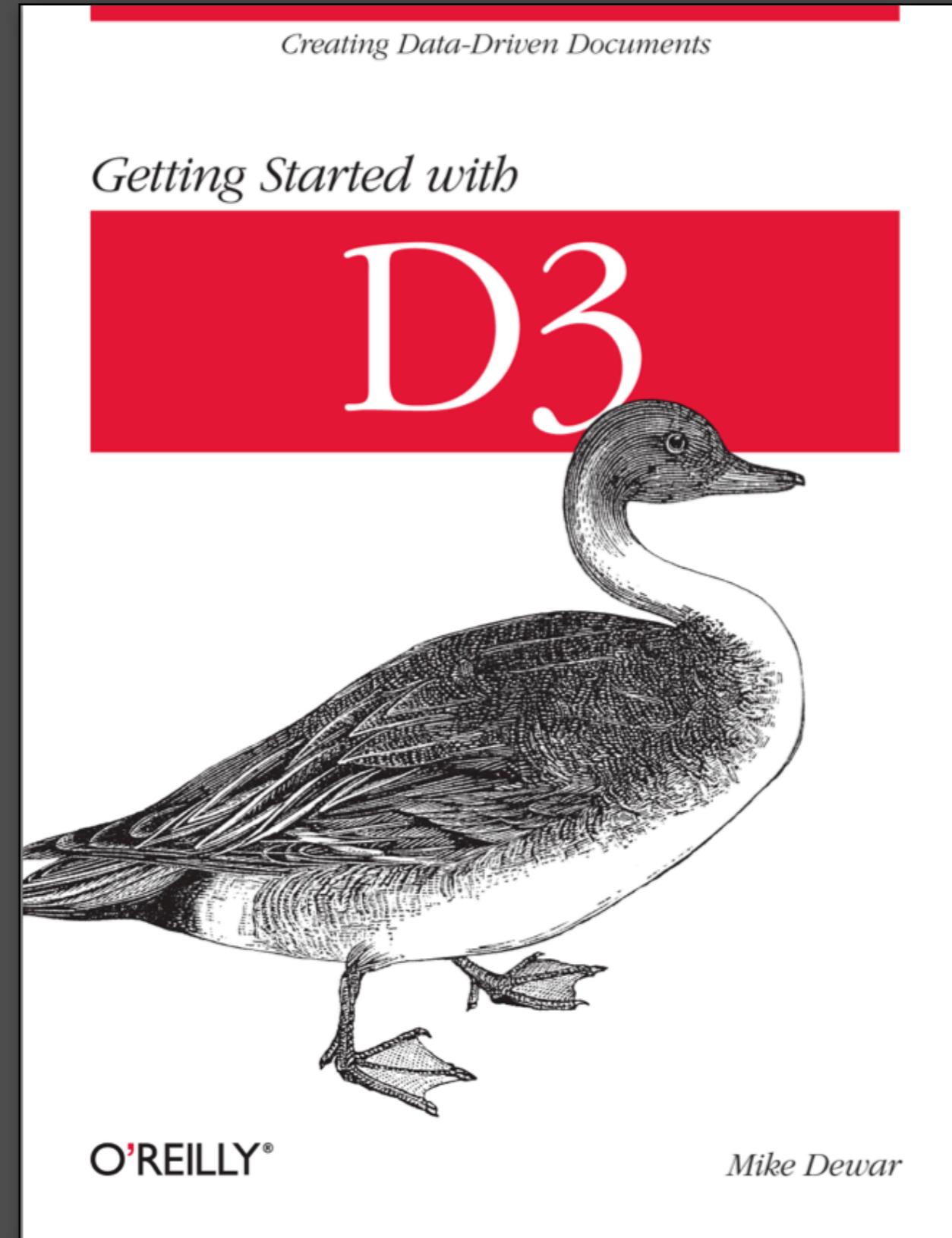
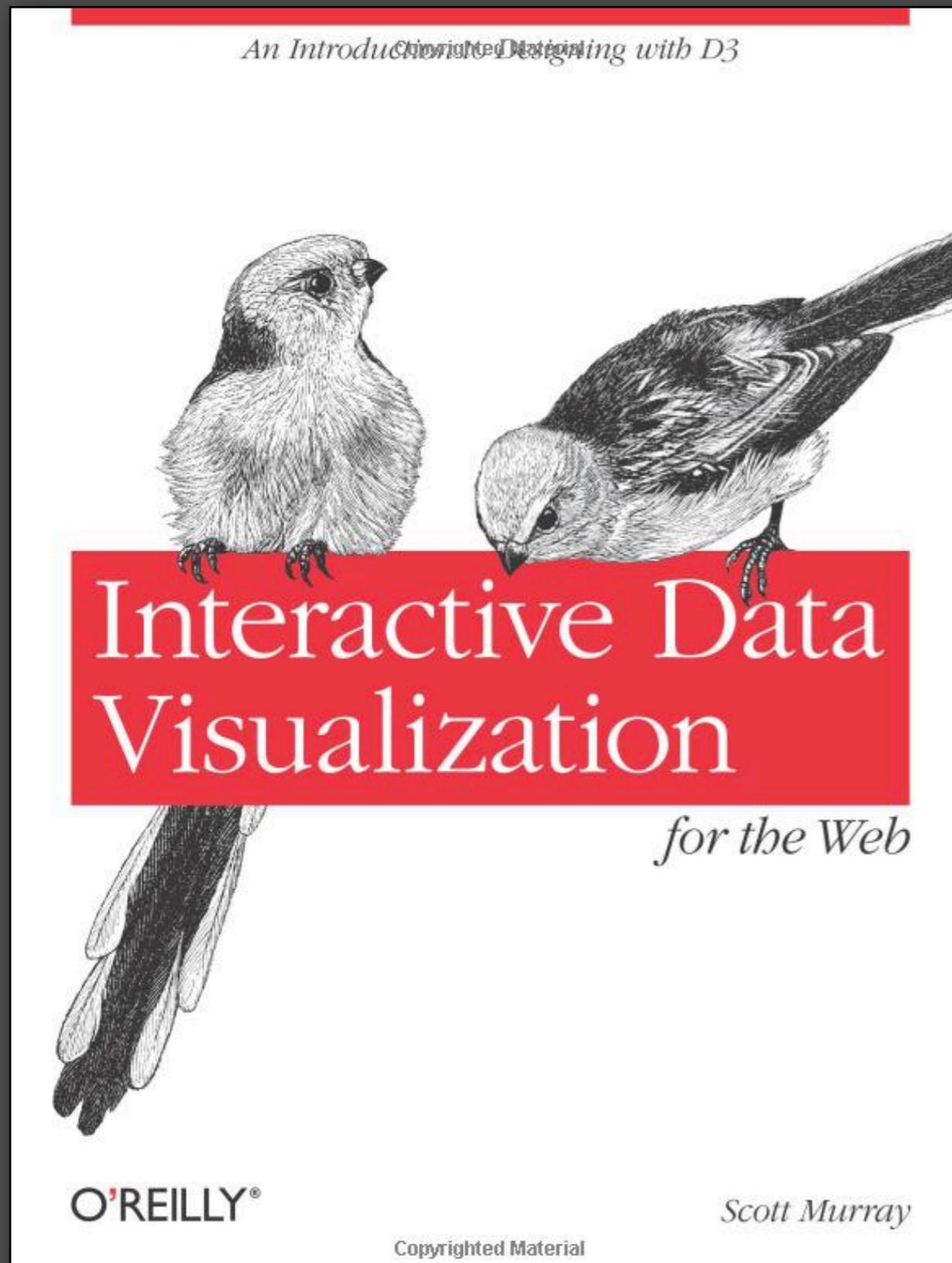
focus on multidimensional data

recommended texts

learning D3 + SVG

recommended texts

learning D3 + SVG



why add interactivity?

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finding/refinding – to help people find a specific thing

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discovery : to find something they don't know exists or cannot characterise precisely

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discovery : to find something they don't know exists or cannot characterise precisely

sensemaking : to understand elements & relationships among them

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finding/refinding - to help people find a specific thing

discovery : to find something they don't know exists or cannot characterise precisely

sensemaking : to understand elements & relationships among them

to make it personal or fun

what's tom cruise's task?



finding/searching

sensemaking

fun

discovery

what's tom cruise's task?



sensemaking

why add interactivity?

instead of static infographics?

why add interactivity?

instead of static infographics?

too much data

too high dimensional

too many relations



multidimensional data



information landscapes (muriel cooper, 1994)

interaction primitives

searching



data visualisation|



data visualisation

data visualisation **tools**

data visualisation **software**

data visualisation **techniques**

[Data visualization - Wikipedia, the free encyclopedia](#)

en.wikipedia.org/wiki/Data_visualization

Data **visualization** is the study of the visual representation of data, meaning "information that has been abstracted in some schematic form, including attributes or ...

[Overview](#) - [Data visualization scope](#) - [Related fields](#) - [Data visualization software](#)

[Infographics & Data Visualization | Visual.ly](#)

visual.ly/

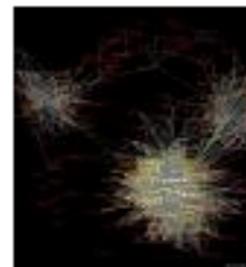
Like infographics and **data visualization**? Visual.ly is the world's largest community of infographics and **data visualization**. Come explore, share, and create.

[data-visualisation | Technology | The Guardian](#)

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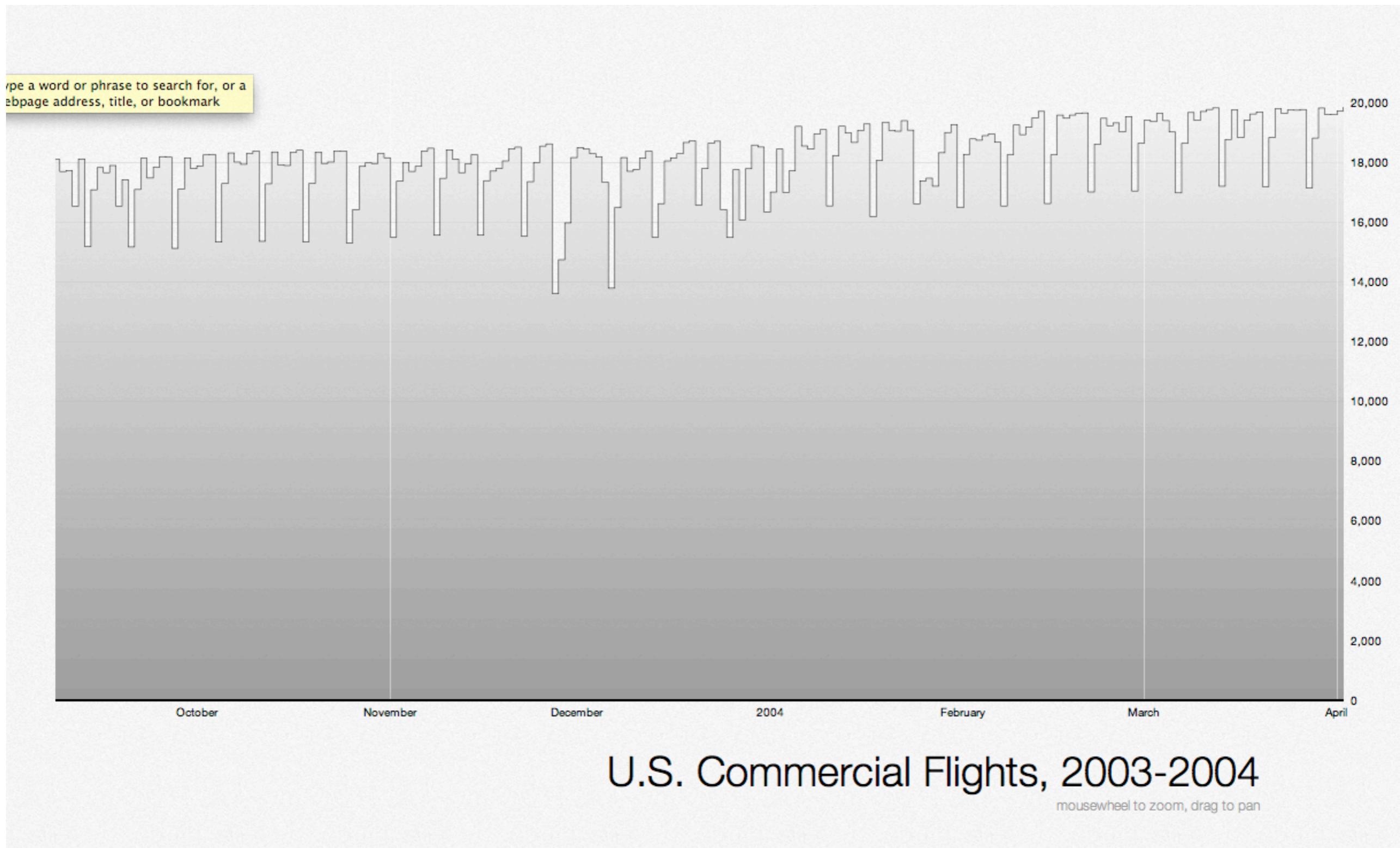
Latest news and comment on **data-visualisation** from guardian.co.uk.

[Images for data visualisation](#) - Report images

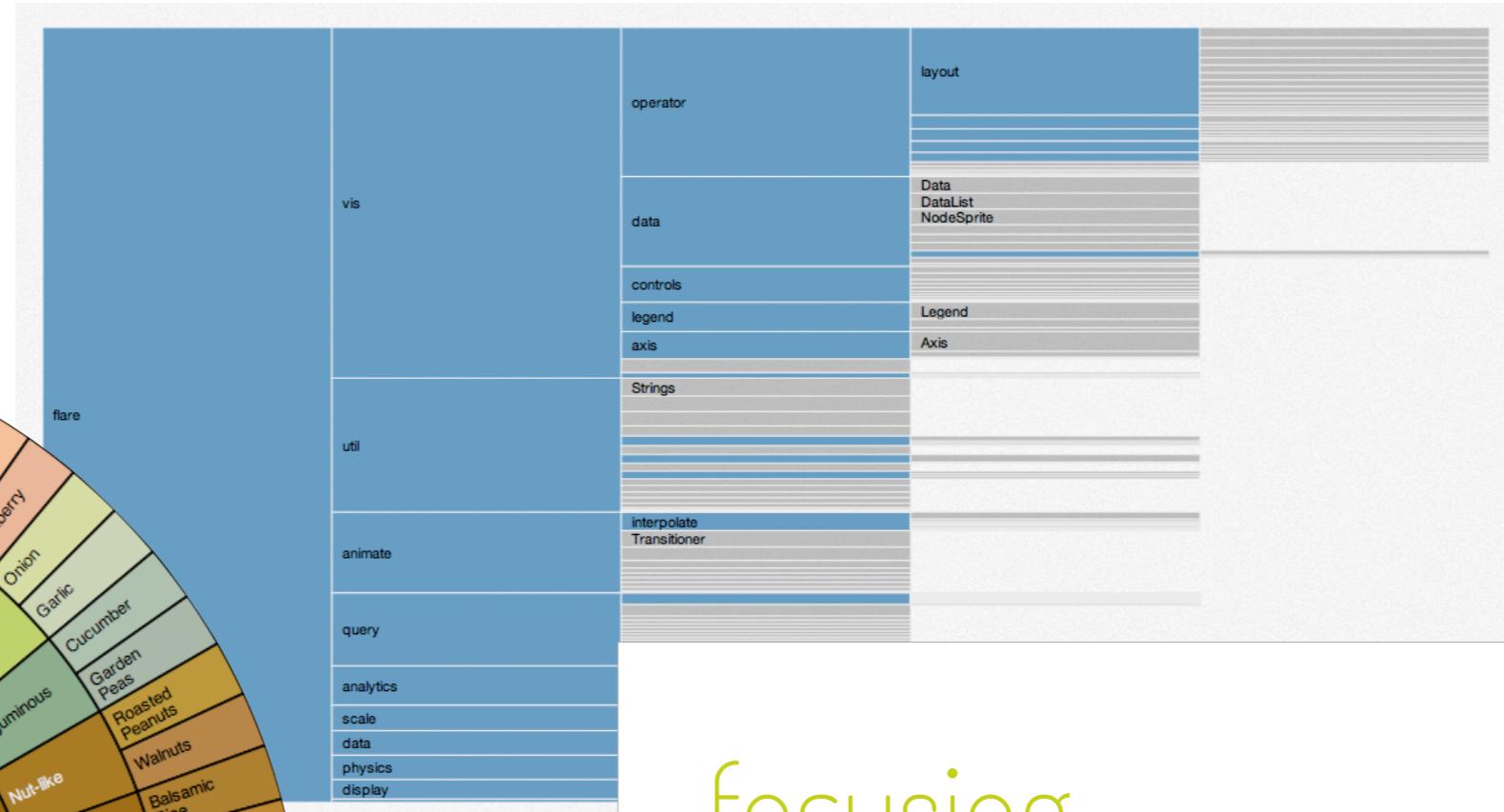
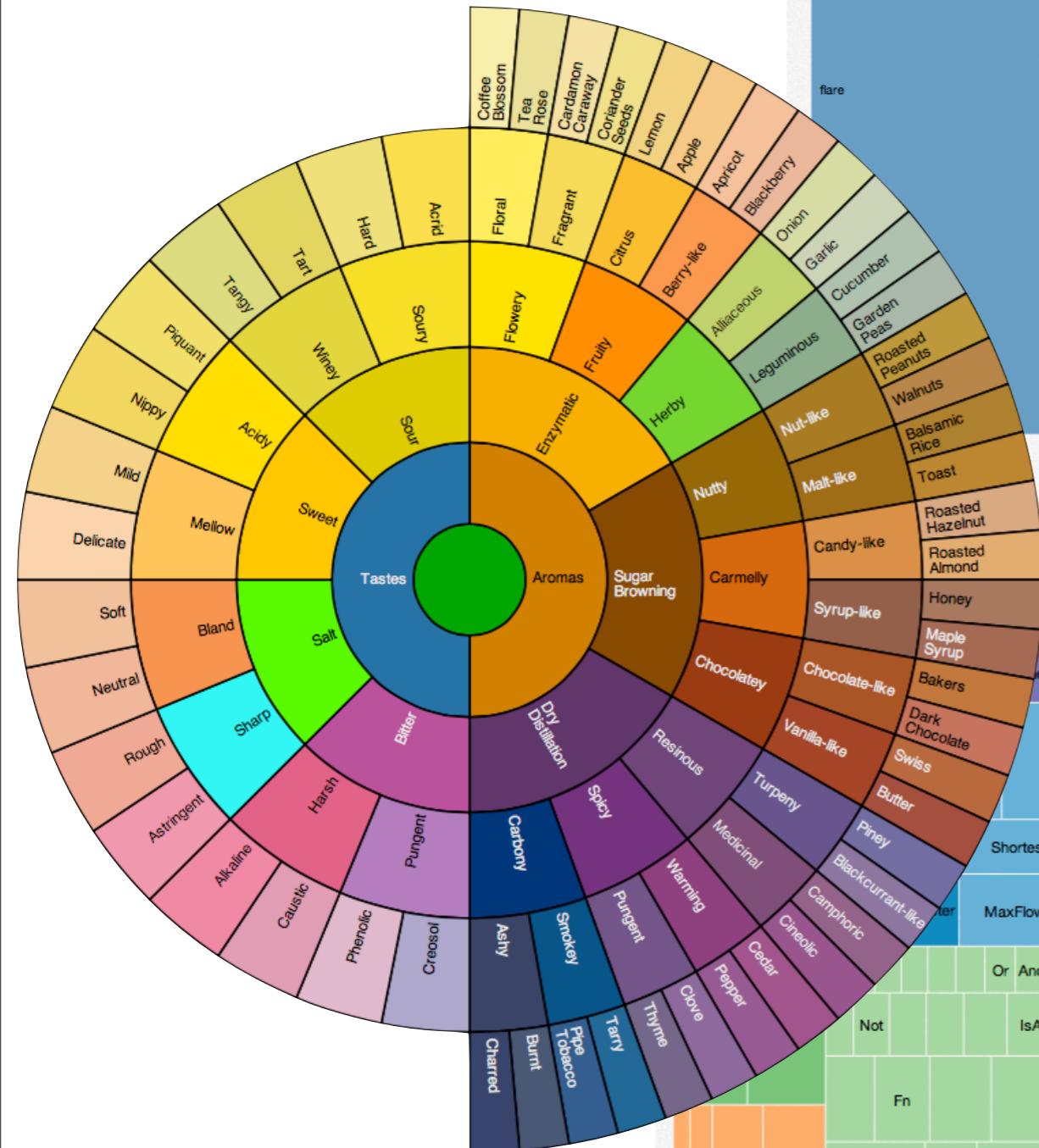


searching

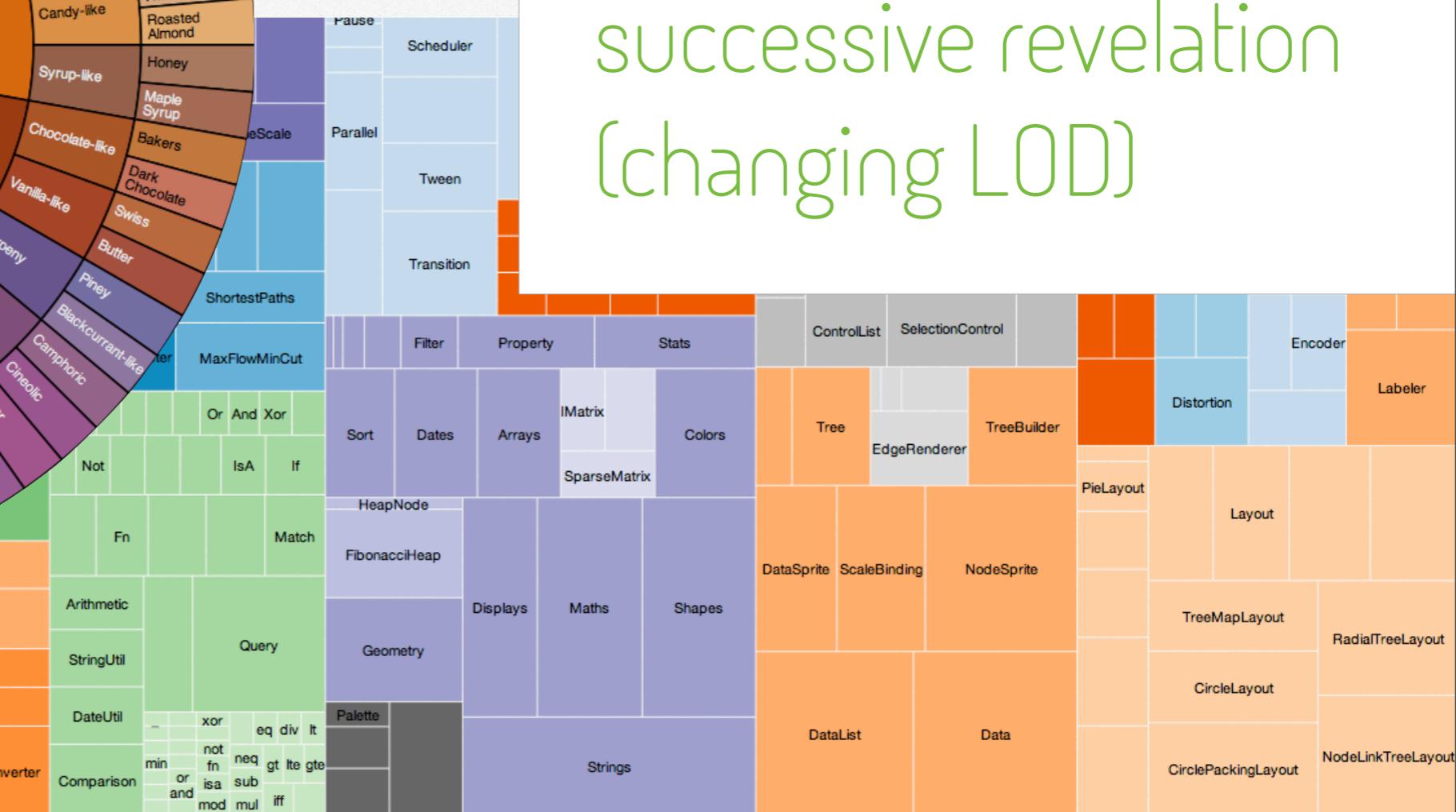
visual orienteering



searching



focusing successive revelation (changing LOD)



filtering

faceted filtering

finding things in a large dataset
understanding dimensions

Google refine iris dataset Permalink

Facet / Filter Undo / Redo 0

Refresh Reset All Remove All

Sepal length change reset

4.30 — 7.92

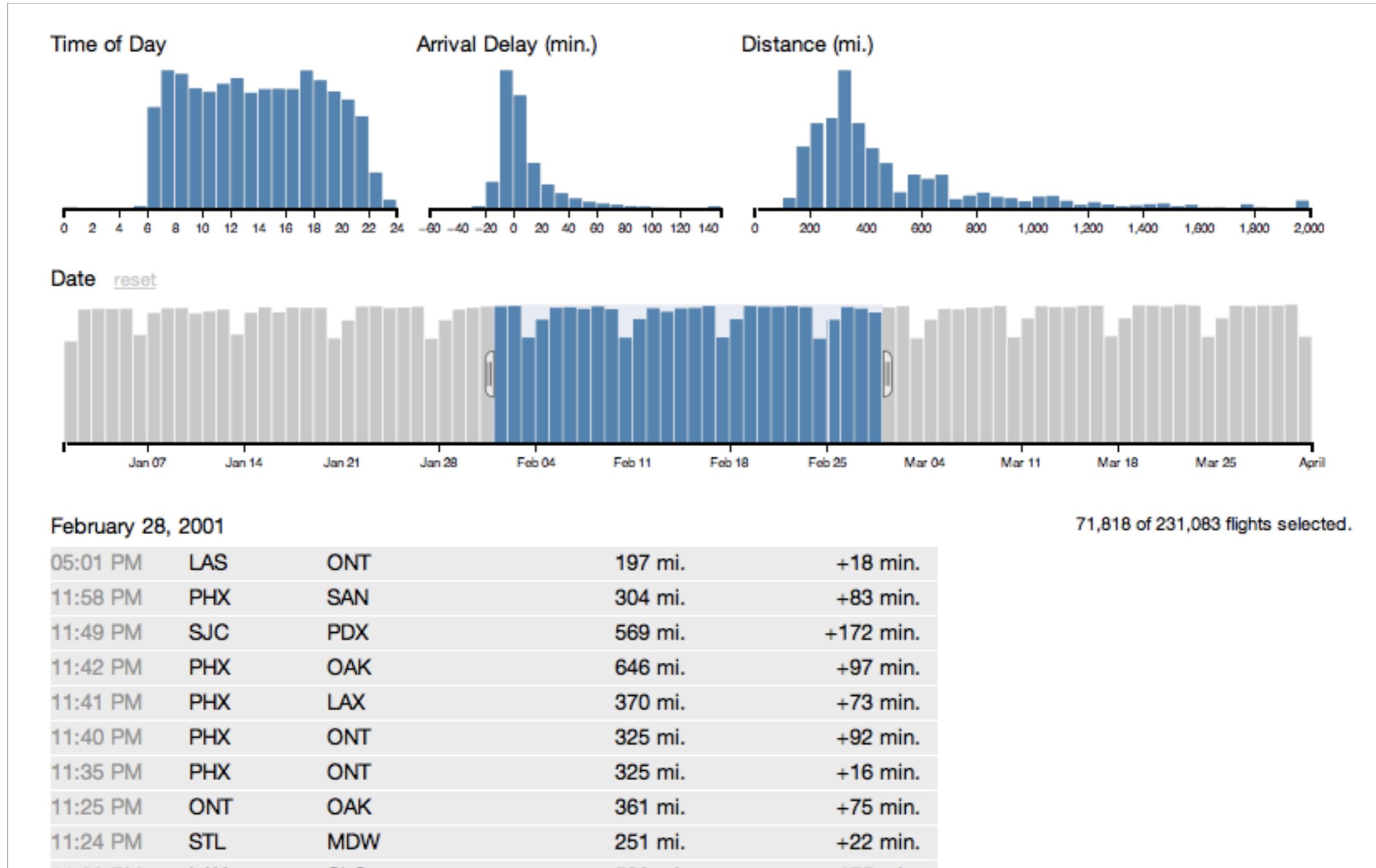
150 rows

Show as: rows records Show: 5 10 25 50 rows « first < previous 1 - 50 next > last »

	All	Sepal length	Sepal width	Petal length	Petal width	Species
1.	5.1	3.5	1.4	0.2	I. setosa	
2.	4.9	3	1.4	0.2	I. setosa	
3.	4.7	3.2	1.3	0.2	I. setosa	
4.	4.6	3.1	1.5	0.2	I. setosa	
5.	5	3.6	1.4	0.2	I. setosa	
6.	5.4	3.9	1.7	0.4	I. setosa	
7.	4.6	3.4	1.4	0.3	I. setosa	
8.	5	3.4	1.5	0.2	I. setosa	
9.	4.4	2.9	1.4	0.2	I. setosa	
10.	4.9	3.1	1.5	0.1	I. setosa	
11.	5.4	3.7	1.5	0.2	I. setosa	
12.	4.8	3.4	1.6	0.2	I. setosa	
13.	4.8	3	1.4	0.1	I. setosa	
14.	4.3	3	1.1	0.1	I. setosa	
15.	5.8	4	1.2	0.2	I. setosa	
16.	5.7	4.4	1.5	0.4	I. setosa	
17.	5.4	3.9	1.3	0.4	I. setosa	
18.	5.1	3.5	1.4	0.3	I. setosa	
19.	5.7	3.8	1.7	0.3	I. setosa	
20.	5.1	3.8	1.5	0.3	I. setosa	
21.	5.4	3.4	1.7	0.2	I. setosa	
22.	5.1	3.7	1.5	0.4	I. setosa	
23.	4.6	3.6	1	0.2	I. setosa	

filtering

faceted filtering
sensemaking thru filtering



selection

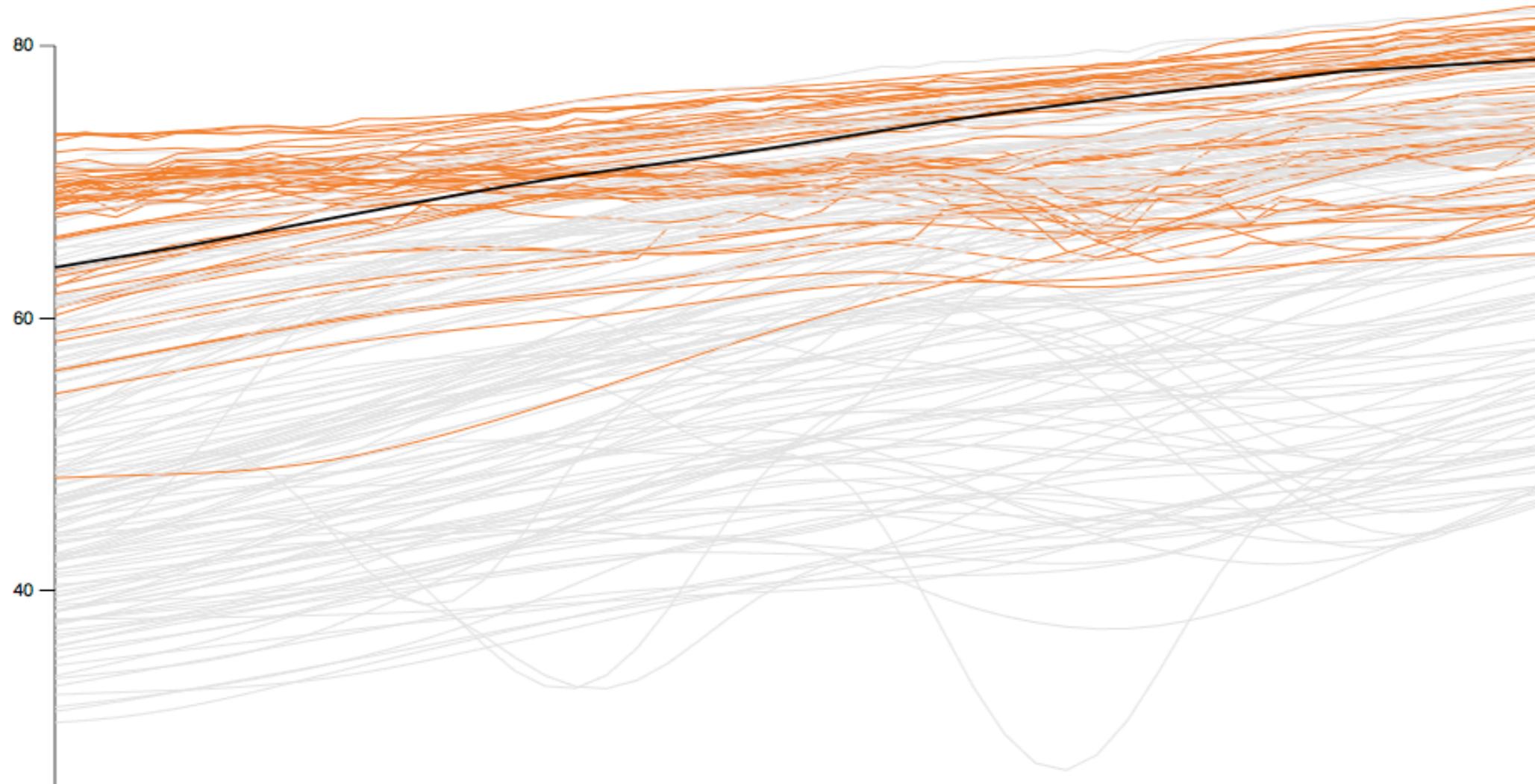
Life Expectancy

People are living longer around the world, some more so than others. Select a region (as defined by World Bank) below to compare, or roll over to the graph to highlight countries. [Read more...](#)

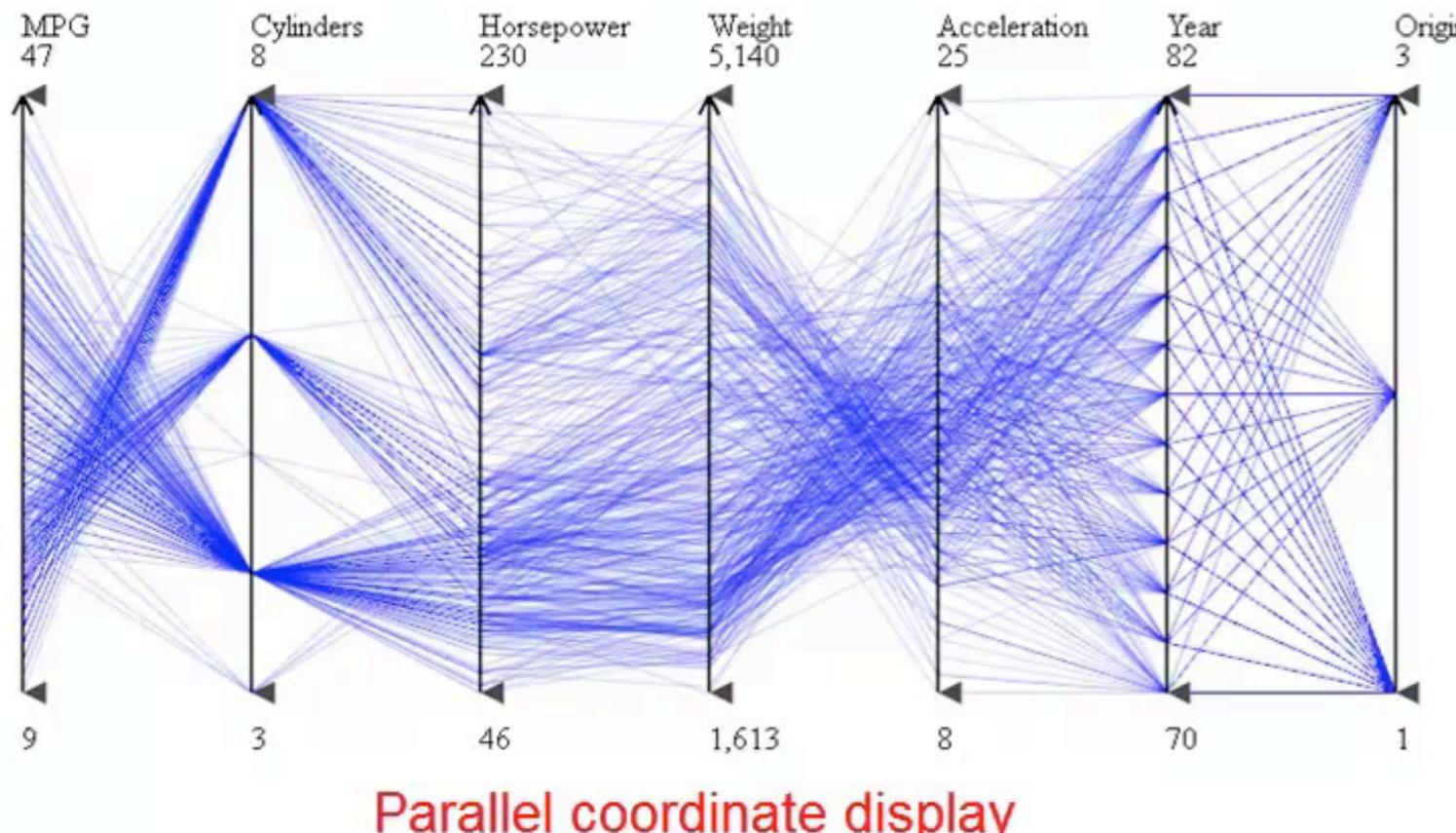
[East Asia and Pacific](#) [South Asia](#) [Europe and Central Asia](#) [Middle East and North Africa](#) [Sub-Saharan Africa](#) [Latin America and Caribbean](#) [North America](#)

VIRGIN ISLANDS (U.S.)

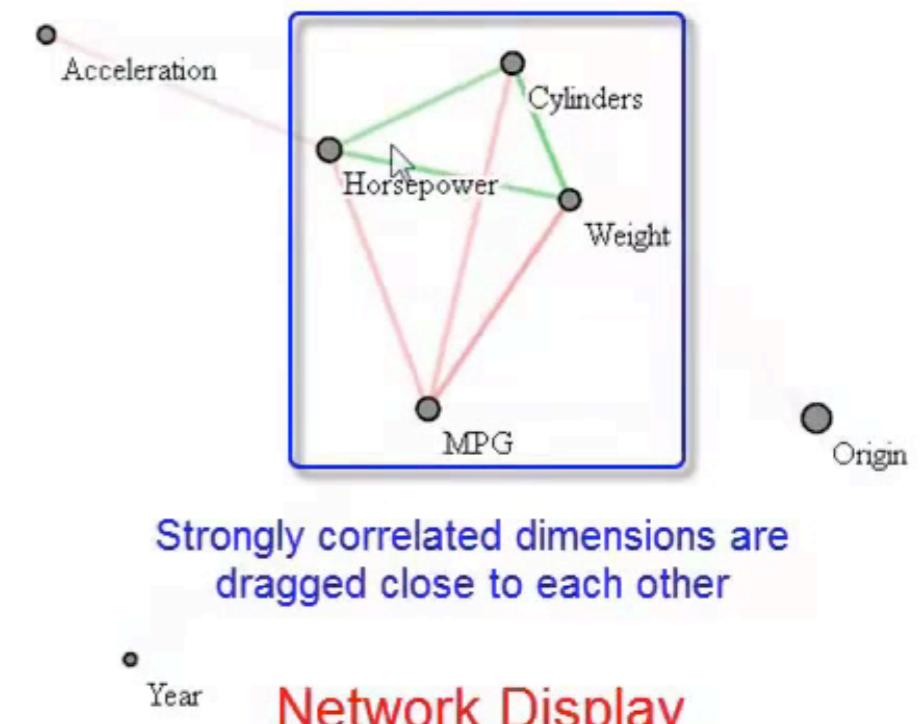
On average: a life expectancy of 64 years in 1960 and 79 years in 2009, an increase of 24 percent.



selection in multiple dimensions simultaneously



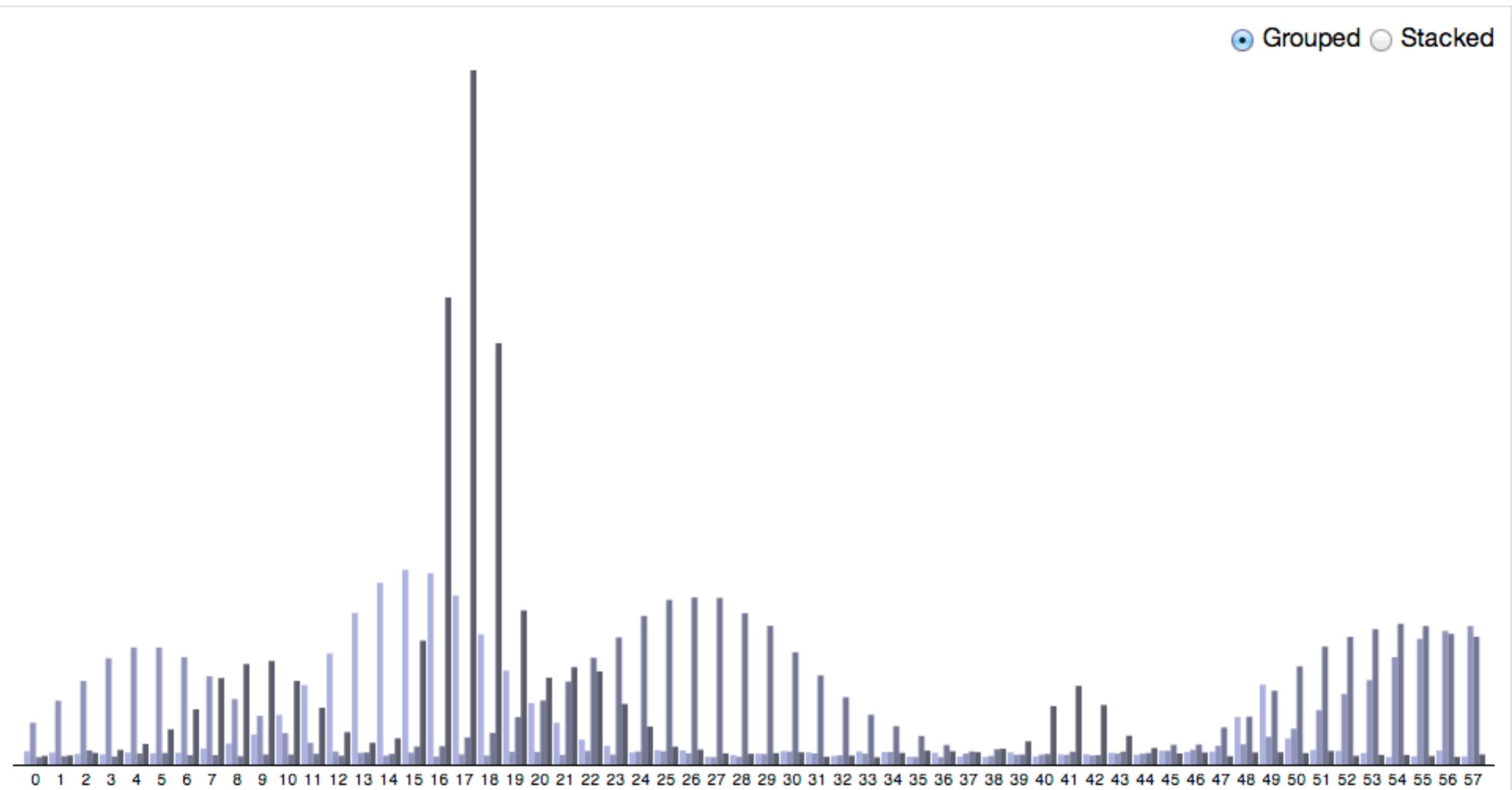
Layout vertices by correlation strength.



coordinated views – brushing

transitioning (pivoting)

between multiple views / representations /
dimensions /relations



manipulate – create

Bug #987 (OPEN)
Bubbles using FlowDocument have unnecessary border padding

Reported: 5/12/2009 9:04:00 AM by Andrew Bragdon
Last Modified: 5/24/2009 8:58:00 PM
[View full history](#)
Assigned To: Joshua Kaplan
QA Contact: jk2@cs.brown.edu

Description
+++ This bug was initially created as a clone of [bug #455852](#)+++

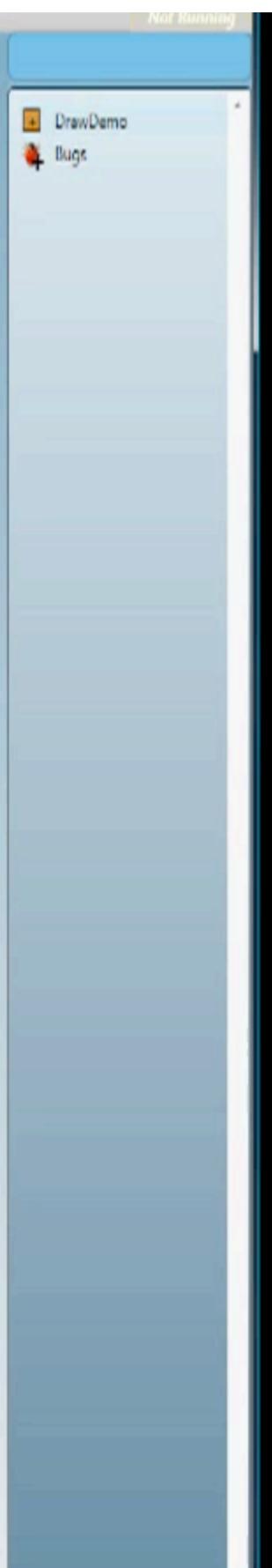
Mozilla/5.0 (X11; U; Linux i686; en-US; rv:1.9.1b2pre) Gecko/20090918020356 Minefield/3.1b2pre

Closing the last tab of a window now closes the window instead of blanking the last tab. This was caused by [bug #399870](#). I know it was intentional, but I'm filing this bug for people who don't like the new behaviour.

This was the original summary of [bug #455852](#) before it was merged

Ideas

- It might not be creating the object at the right time
- the backend temp file might be corrupted
- _mp may not be done initializing



manipulate – create

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codebubbles™

Menu Setup Code

```
DrawDemo>MainPanel>
public MainPanel(JFrame mainFrame){
    this.setLayout(new BorderLayout());
    this.createPropertyButtons();
    JButton featureButton=SpecialFeatureButton.getInstance(this);
    JButton randomShapes= this.createRandomShapeButton();
    String[] messages = this.generateStatisticsMessages();
    this.handleStatisticsGUI(messages);
    JMenuBar menuBar=this.createMenuBar();
    ShapeButton[] shapeButtons = this.createShapeButtons();
    JPanel shapePanel = this.makeShapeButtonPanel(shapeButtons);
    this.createPassWordHandler();
    JPanel moreFunctionsPanel=new JPanel(new GridLayout(0,1));
    JLabel moreFunctionsLabel=new JLabel("More Functions", SwingConstants.CENTER);
    moreFunctionsPanel.add(moreFunctionsLabel);
    moreFunctionsPanel.add(randomShapes);
    moreFunctionsPanel.add(_deleteShape);
    moreFunctionsPanel.add(_statusButton);
    moreFunctionsPanel.add(_loadImage);
    return menuBar;
}
```

```
DrawDemo>MainPanel>
public void createPropertyButtons(){
    _deleteShape.deleteButton.getInstance(
        this);
    _deleteShape.setExecutable(false);
}
```

```
DrawDemo>MainPanel>
public JMenuBar createMenuBar(){
    JMenuBar menuBar=new JMenuBar();
    JMenu menu1= new JMenu("Image/TextInput");
    JMenu menu2= new JMenu("Ordering Features");
    JMenu menu3= new JMenu("Extra Features");
    JMenu menu4= new JMenu("Grid Features");
    menuBar.add(menu1);
    menuBar.add(menu2);
    menuBar.add(menu3);
    menuBar.add(menu4);
    this.createMenuItem(menu1);
    this.createMenuItem(menu2);
    this.createMenuItem(menu3);
    this.createMenuItem(menu4);
    return menuBar;
}
```

```
DrawDemo>DeleteButton>
public static JButton getInstance(MainPanel mp){
    JButton button = new JButton();
    button.setVanel(mp);
    button.setText("Delete Active Shape");
    return button;
}
```

```
DrawDemo>MainPanel>
private void createMenuItem(JMenuItem m){
    JMenuItem load = LoadMenuItem.getInstance(
        this);
    JMenuItem textInput = TextMenuItem.getInstance();
    m.add(load);
    m.addSeparator();
    m.add(textInput);
    logMenuUp("menu");
}
```

```
DrawDemo>LoadMenuItem>
public static JMenuItem getInstance(MainPanel mp){
    LoadMenuItem but=new LoadMenuItem();
    but.enableFunctionality(mp);
    but.setText("Load Image");
    return but;
}
```

```
DrawDemo>MainPanel>
private static final long serialVersionUID =
    1L;
private ShapeButton _line0;
private JButton statButton;
private JButton _deleteShape;
private JButton _statusButton;
```

manipulate – create – visualise

Universities from The Complete University Guide

Universities from Times Higher Education

Universities from UCAS

Universities from Unistats

other

Cambridge ⇄ University of Cambridge
↳ University of Cambridge ⇄ Cambridge

London School of Economics ⇄
↳ London School of Economics ⇄
↳ London School of Economics ⇄
↳ London School of Economics

instances

- Cambridge / University of Cambridge
 - academic_services_spend average_cost_to_student average_fee degree_completion entry_standards facilities_spend good_honours graduate_prospects green_score league_table_ranking maximum_fee minimum_fee overall_score research_assessment student_satisfaction student_staff_ratio citations industry_income international_outlook research teaching world_ranking male_female_ratio num_undergrads lat long average_ucas job_percent students_satisfied
- London School of Economics
 - academic_services_spend average_cost_to_student average_fee degree_completion entry_standards facilities_spend good_honours graduate_prospects green_score league_table_ranking maximum_fee minimum_fee overall_score research_assessment student_satisfaction student_staff_ratio citations industry_income international_outlook research teaching world_ranking male_female_ratio num_undergrads lat long average_ucas job_percent students_satisfied
- Durham University
 - academic_services_spend average_cost_to_student average_fee degree_completion

Map

Chart

13.6
University of St Andrews

University	Student-Staff Ratio
University of St Andrews	13.6
University College London / University College London (University of London) / University College London	10.1
Oxford / Oxford University	11.1
University of Exeter	11.80
University of Bristol	11.80
University of Warwick	10.10
University of Nottingham	11.10
University of Bath	13.60
University of Liverpool	15.30

manipulate – create – visualise

Universities from The Complete University Guide

Universities from Times Higher Education

Universities from UCAS

Universities from Unistats

other

Cambridge ↲ University of Cambridge ↲ University of Cambridge ↲ Cambridge

London School of Economics ↲ London School of Economics ↲ London School of Economics ↲ London School of Economics

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- Durham University
 - academic_services_spend average_cost_to_student average_fee degree_completion

Map

Chart

University	student_staff_ratio
Oxford / Oxford University	11.1
University of St Andrews	13.6
University College London / University College London (University of London) / University College London	10.1
University of St Andrews	13.6
University of St Andrews	15.30

DataPalette™

LIFE COUNTDOWN

[all](#) | [< prev](#) | [next >](#)

Depending upon what country you are born in, your life expectancy can be quite different. I looked at the [data](#) for the average life expectancies calculated in the year 2000 and unraveled it a teeny bit. It is now winter in Massachusetts where I live, and the trees are barren and the snow covers the ground. I wondered to myself, "How many more springs might I see?"

If you've already beaten the average, then I recommend that you keep on going! To h*ll with numbers I say! Also, note that women live a little longer on the average ... probably because they sometimes have to put up with men like me.

You are: years old living in 

view by: group line



Copyright 2006, John Maeda.

engaging the user

LIFE COUNTDOWN

[all](#) | [< prev](#) | [next >](#)

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engaging the user

WATCH DOGS WeareData

CLICK ON THE MAP OR ON A BLUE SYMBOL TO START THE EXPERIENCE THERE



putting it all together

Pivot by Live Lists

Go > http://localhost/collections/wikipedia/wikipedia.xml

Wikipedia

Sort: Wikipedia Category -

Filter by Keyword

Wikipedia Category

Subject Area

Sort: Quantity

Category	Quantity
Health, Fitness and Nutrition	72
Government, Politics and Law	49
Natural Sciences	45
General Reference	38
Technology and Applied Sciences	24
Music	25
Education and Academia	23
Art and Humanities	26
History, Events and Peoples	25
Computing and the Internet	24
Social Science and Society	20
Books, Literature and Authors	16
Business and Commerce	17
Geography and Places	17
Philosophy	16
Media and Publishers	12
Religion, Belief and Mythology	10
Theater, Film and Television	10
Games	7
Language and Linguistics	6

Discover More Collections

Home History Mortality Mortality Sports Wikipedia History The New... Wikipedia The New...

5:52 PM 7/11/2013

putting it all together

putting it all together

tasks

finding/refinding

discover

sensemaking

to make
personal or fun

putting it all together

tasks

challenges

finding/refinding

too much data

discover

too high
dimensional

sensemaking

too many relations

to make
personal or fun

difficult to
understand

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techniques

searching;
visual orienteering

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faceted filtering

selection;
coordinated views;
pivoting; brushing