Responsive Data Visualisation

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Abstract

In responsive web design, web pages are assembled from flexible components, which adapt to the characteristics of the display device. For web pages to be truly responsive, any charts or visualisations embedded within them must themselves be responsive. Approaches are presented through which four commonly used visualisations (line chart, bar chart, parallel coordinates, and scatterplot) can be made responsive.

Responsive Visusalisations

Responsive visualisations do more than simply scale freely. They adapt their form, layout, and interactivity according to the available space and characteristics of the display device.

Responsive Line Chart

At narrower widths, tick labels can be thinned out, rotated, or abbreviated. Data point density can be adjusted. At very narrow widths, axes can be removed completely, creating a sparkline.

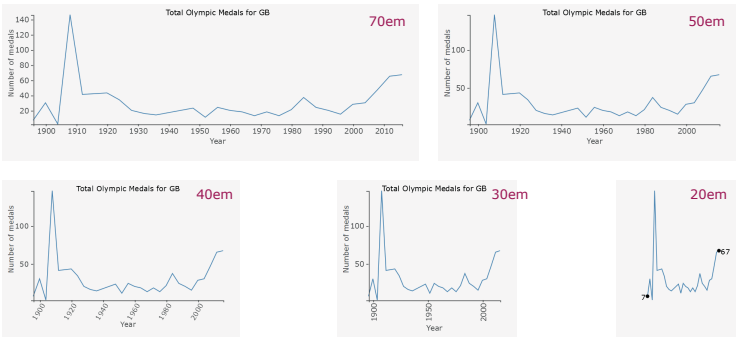

Figure 1: Responsive line chart at five display widths.

Responsive Bar Chart

At narrower widths, labels on the x axis can be rotated or abbreviated. At very narrow widths, the chart can be flipped 90° to better utilise vertical space.

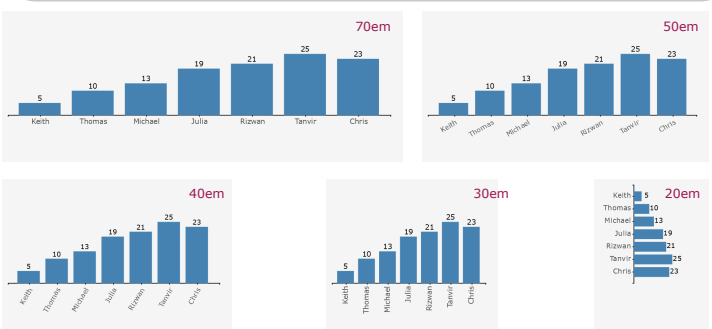

Figure 2: Responsive bar chart at five display widths.

Responsive Parallel Coordinates

At narrower widths, separataion between vertical axes is reduced and labels are rotated. When the axes become too dense, the user is given control over which dimensions to display. Alternatively, the visualisation could be flipped 90° to extend vertically rather than horizontally.

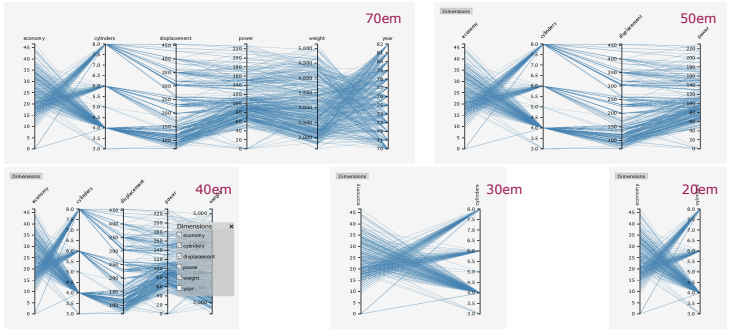

Figure 3: Responsive parallel coordinates at five display widths.

Responsive Scatterplot

Filtering and (pinch) zooming are essential to ameliorate the effects of occlusion. Extra disambiguation through fisheye and Cartesian distortion and temporary displacement.

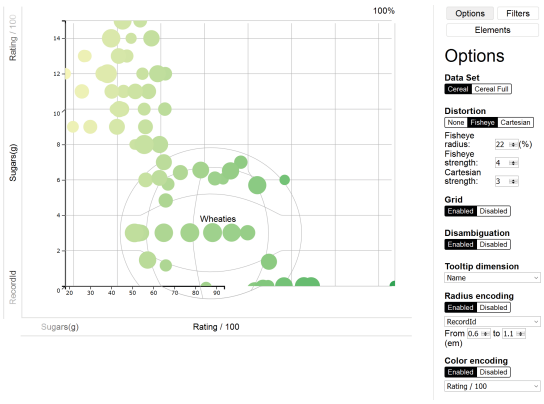

Figure 4: Responsive scatterplot with fisheye lens.

Summary

A responsive visualisation component contains logic within itself, so that it can adapt to specific display constraints and opportunities.

References

[1] Keith Andrews and Aleš Smrdel; *Responsive Data Visualisation*. Examples. http://projects.iicm.tu-graz.at/respvis/.

[2] Keith Andrews; *Responsive Data Visualisation*. Talk at Graphical Web 2016, Exeter, UK, 06 Nov 2016. https://youtu.be/cQKzpKfea-E