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Harry Plotter & The Multiple Visualisation Softwares

Introducing some of the options for plotting and data visualistion

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Why This Talk

- Requested at PhD Forum
- An experiment in terms of scope
- Hopefully everybody will learn something new

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Resources

- Collection of resources including
  - links to on-line tutorials, examples, galleries
  - codes for some of the plots in the talk (& sample data)
  - these slides
- `github.com/ChasNelson1990/harry-plotter-resources`
- Hopefully everybody will find them useful

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Introduction

- The Sorting Hat
- Ordinary Wizarding Levels
- Nastily Exhausting Wizarding Test

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Microsoft Excel:- the Squib

- Not Free
- Windows & Mac OS X only
- Familiar
- Commonly used
- Limited
- Very limited

Excel might be okay for knocking together quick plots, but you can't easily save your actions for the next experiment's data set.

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Our Four Houses

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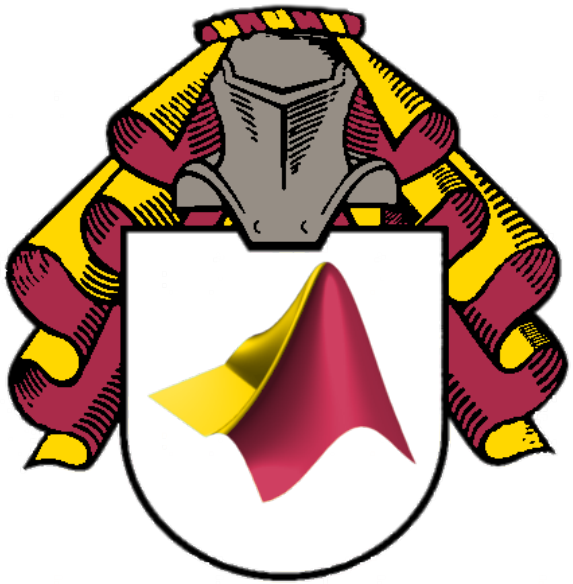

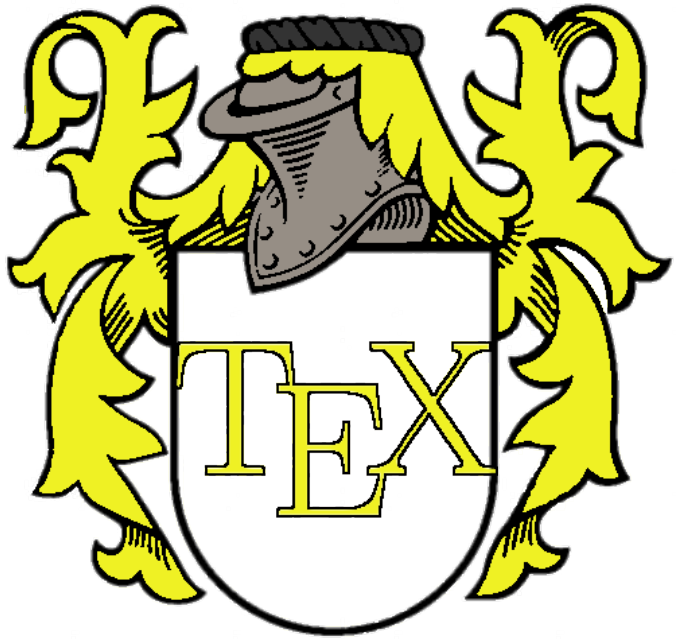

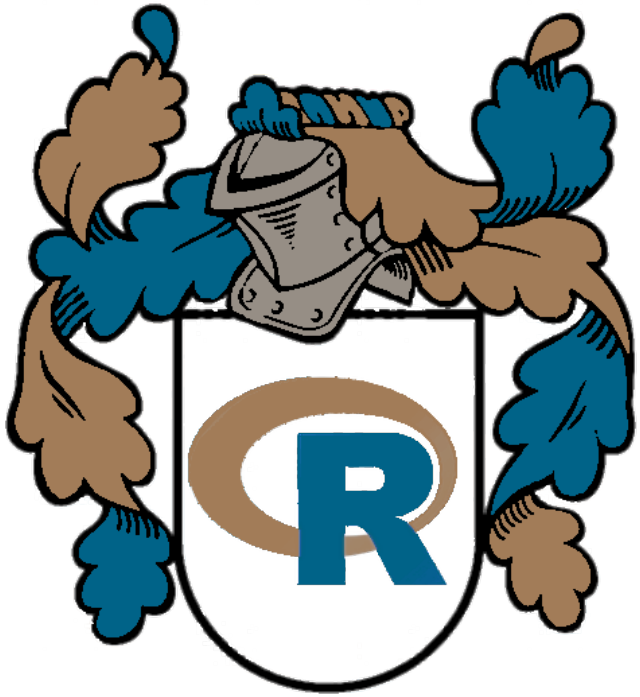

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MATLAB

- Not Free
- Large community
- 3D+
- A New Language

For free alternatives,

try GNU Octave or

python's

`matplotlib`.

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R (with `ggplot2`)

- Free
- Large community
- Extendible
- Language
- Experience needed
- Collaboration?

If you're going to try

one new tool

mentioned in this

talk, make it this one!

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LaTeX (with PGFPlots)

- Free
- Ideal for papers & reports
- Large community
- Extendible
- Language
- Experience needed
- Collaboration?

Whilst this isn't the quickest way to produce publication quality figures, a deeper understanding of this will make that job easier overall.

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gnuplot (py-gnuplot)

- Free
- Good documentation
- Language
- Experience needed
- Collaboration?

GNUOctave plots are based on gnuplot in the backend.

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Bar Charts

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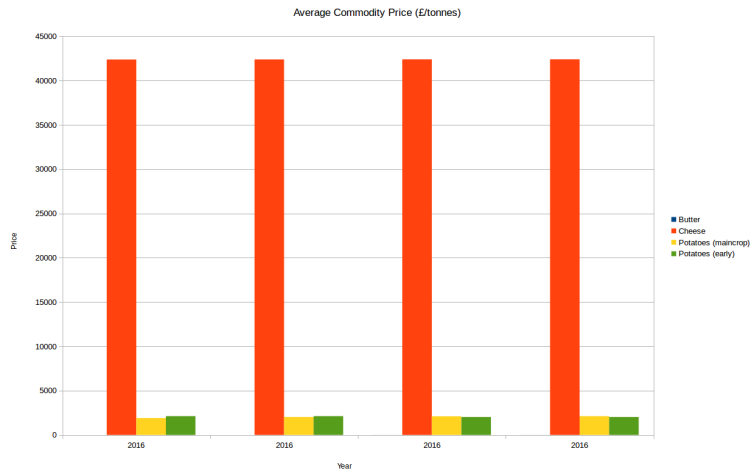
Bar Charts & Histograms

- Horizontal bars
- Vertical bars (column chart)
- Discrete vs. continuous data
- Binned continuous data vs. continuous (histogram)
- Can be grouped, stacked or faceted



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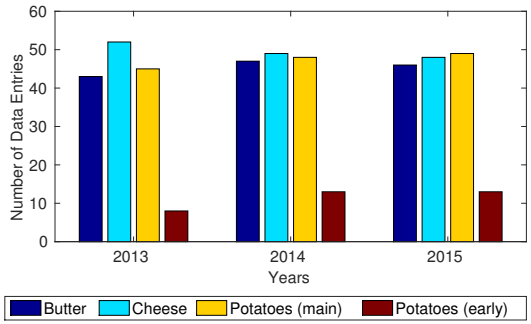
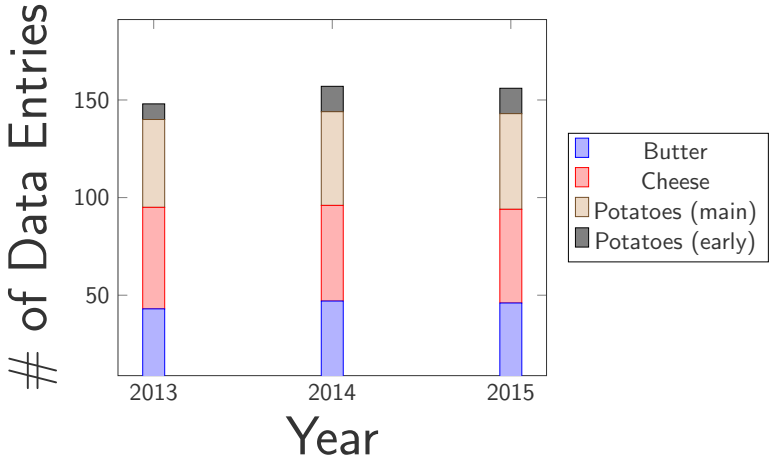
Bar Charts & Histograms

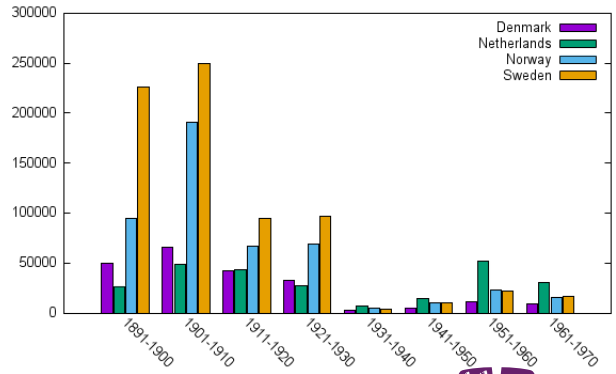


(a) MATLAB

(b) R



(c) LaTeX



(d) gnuplot

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Scatter & Line Plots

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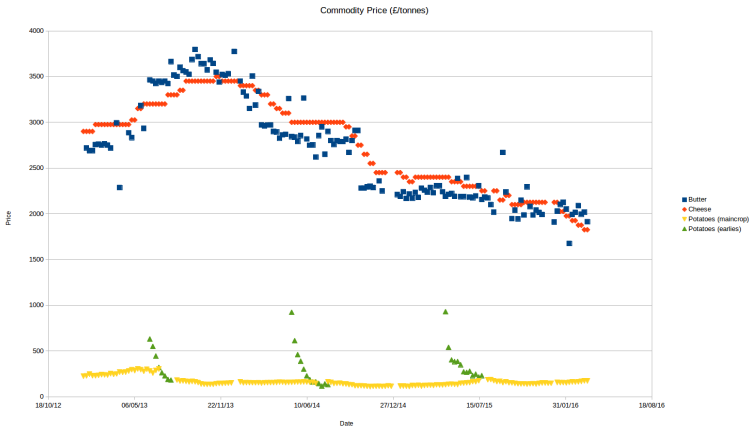
Scatter & Line Plots



- Continuous data vs. continuous data
- Can add error bars to show uncertainty
- Can add regression lines to show trends
- Can be have multiple data plotted on single axis

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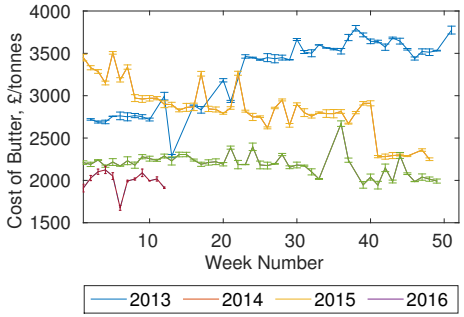
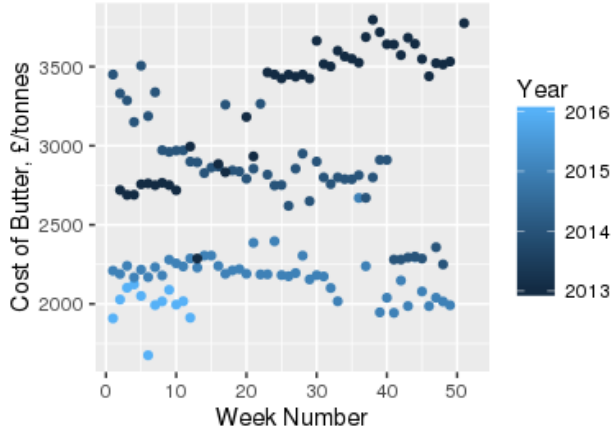
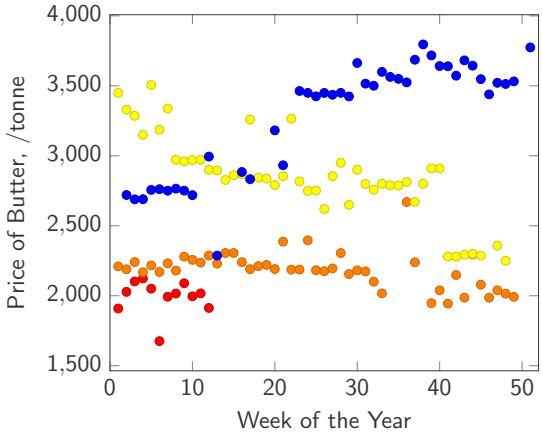
Scatter & Line Plots



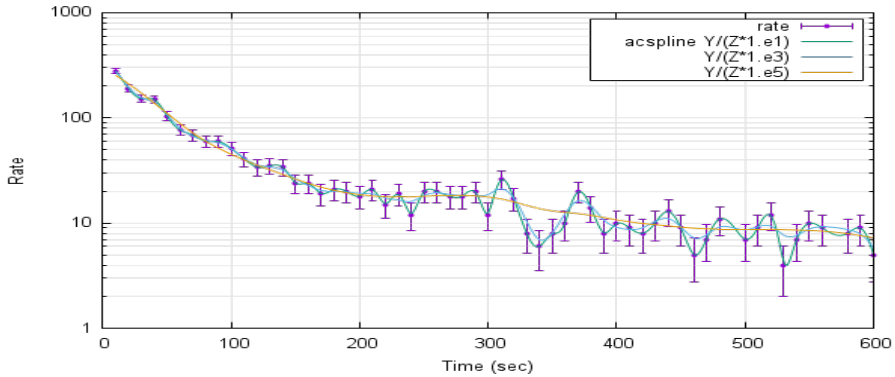
(e) MATLAB



(f) R



(g) LaTeX



(h) gnuplot

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Box Plots

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Box Plots

- One dimensional distributions
- Can be used to compare statistics of different distributions, e.g. experiments on different hardware
- Effective and easy to read

LibreCalc does not do easy box plots!!.

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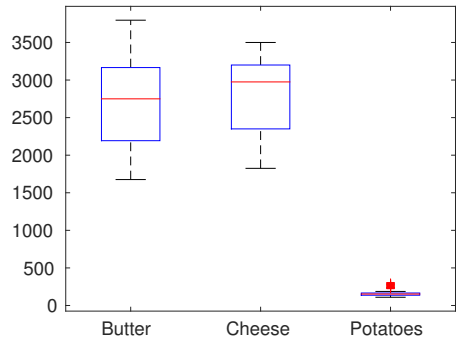
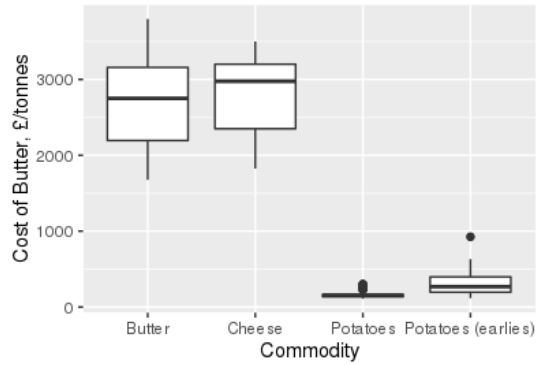
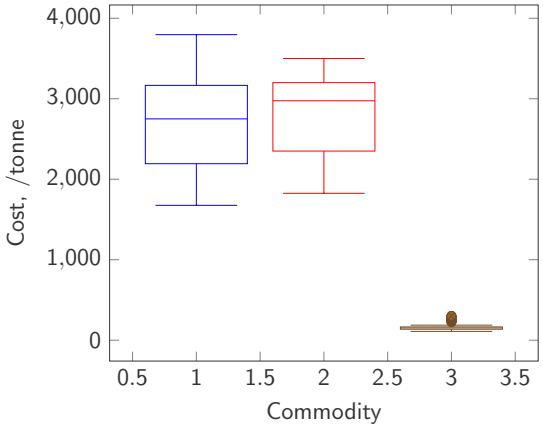
Box Plots



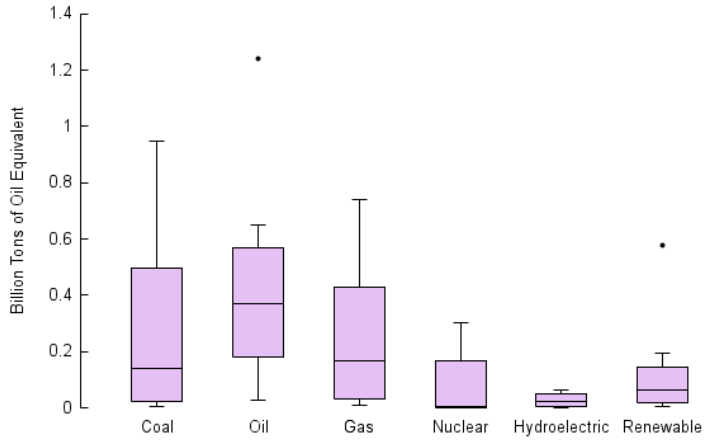
(i) MATLAB



(j) R



(k) LaTeX



(l) gnuplot

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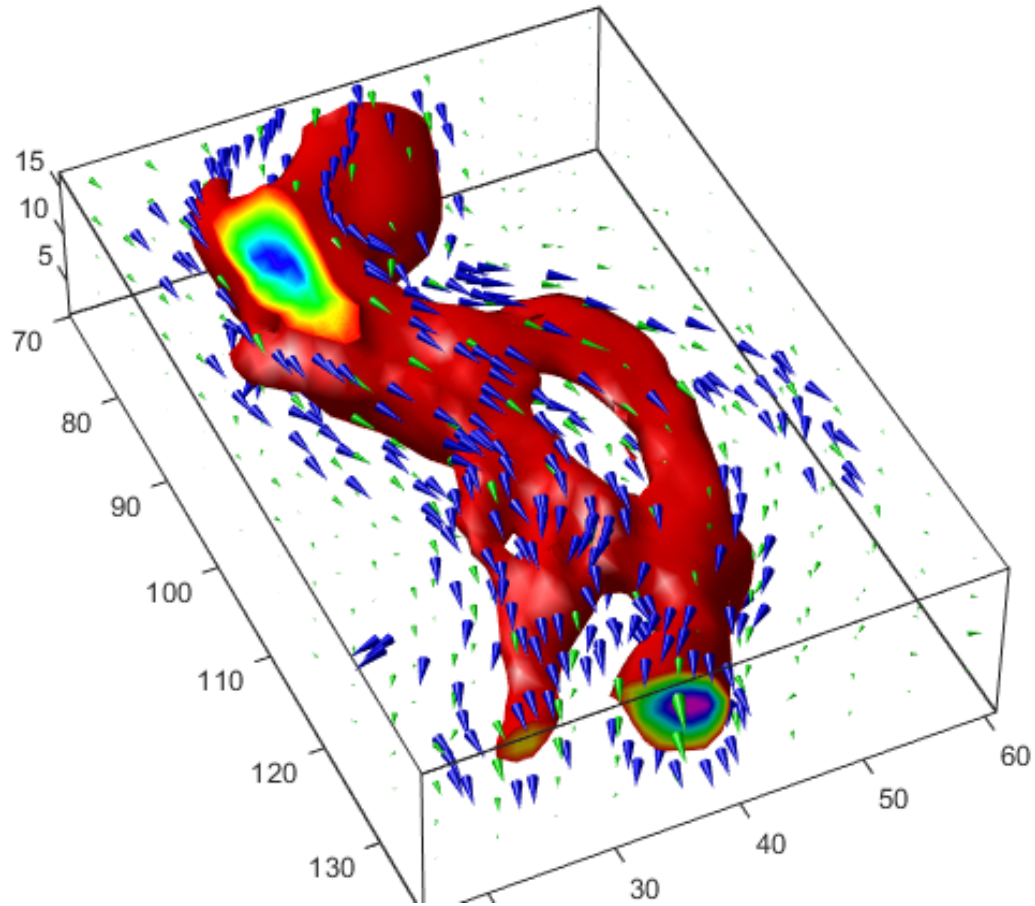
Volume Plotting



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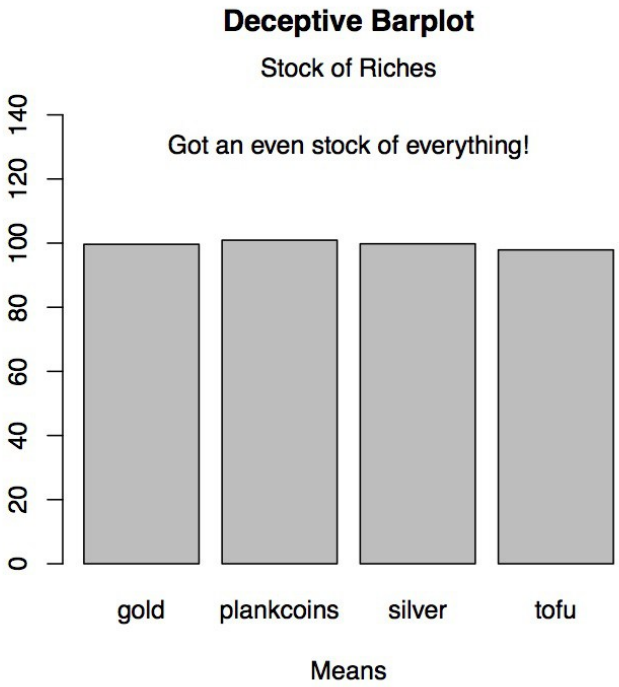
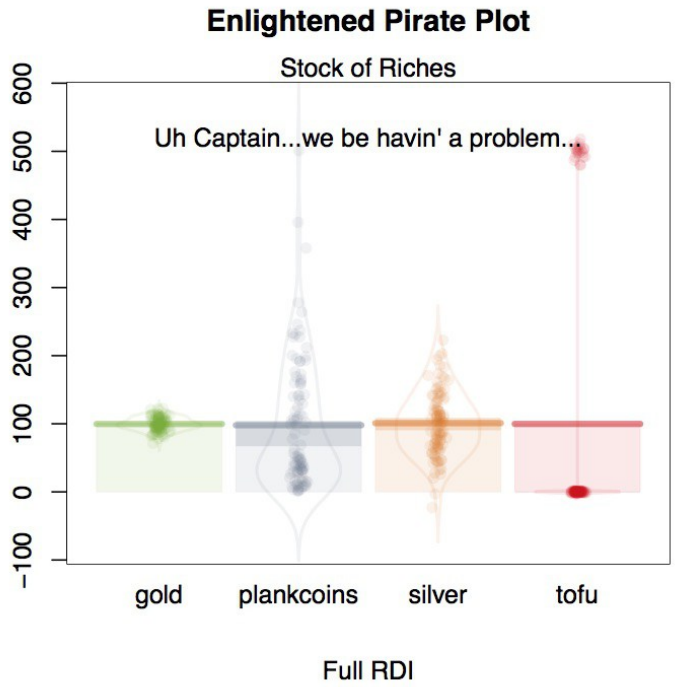
The Pirate Plot





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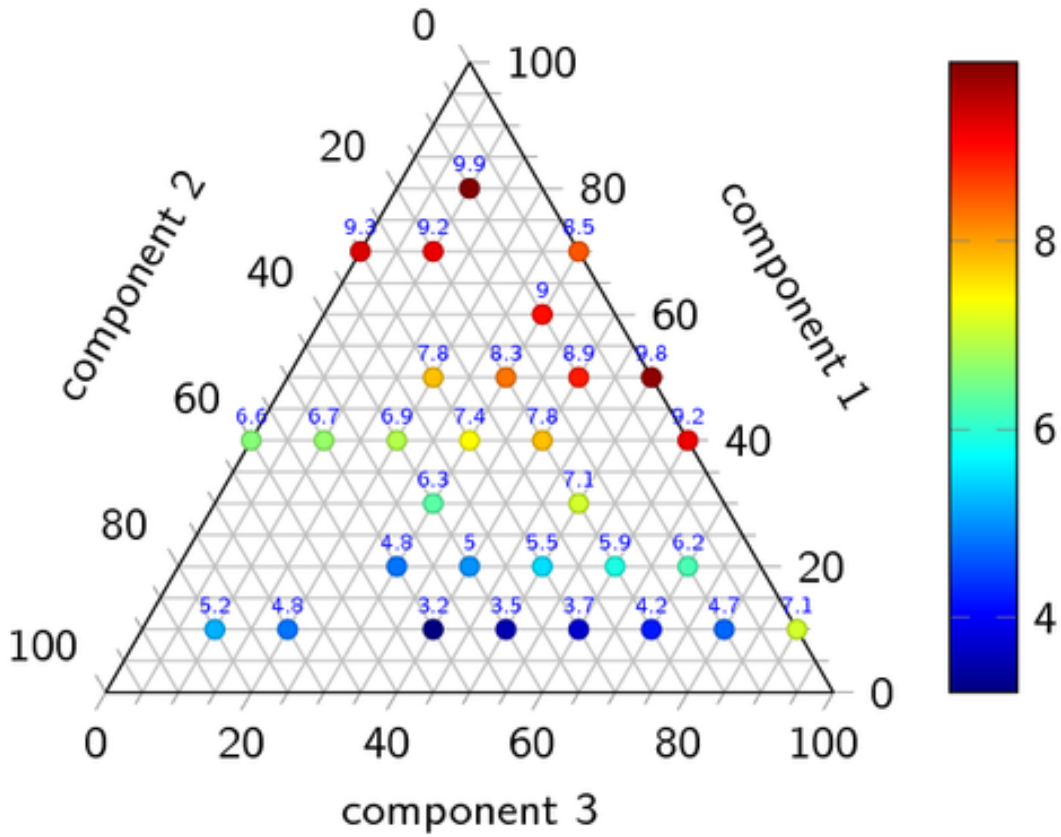
Ternary Plots



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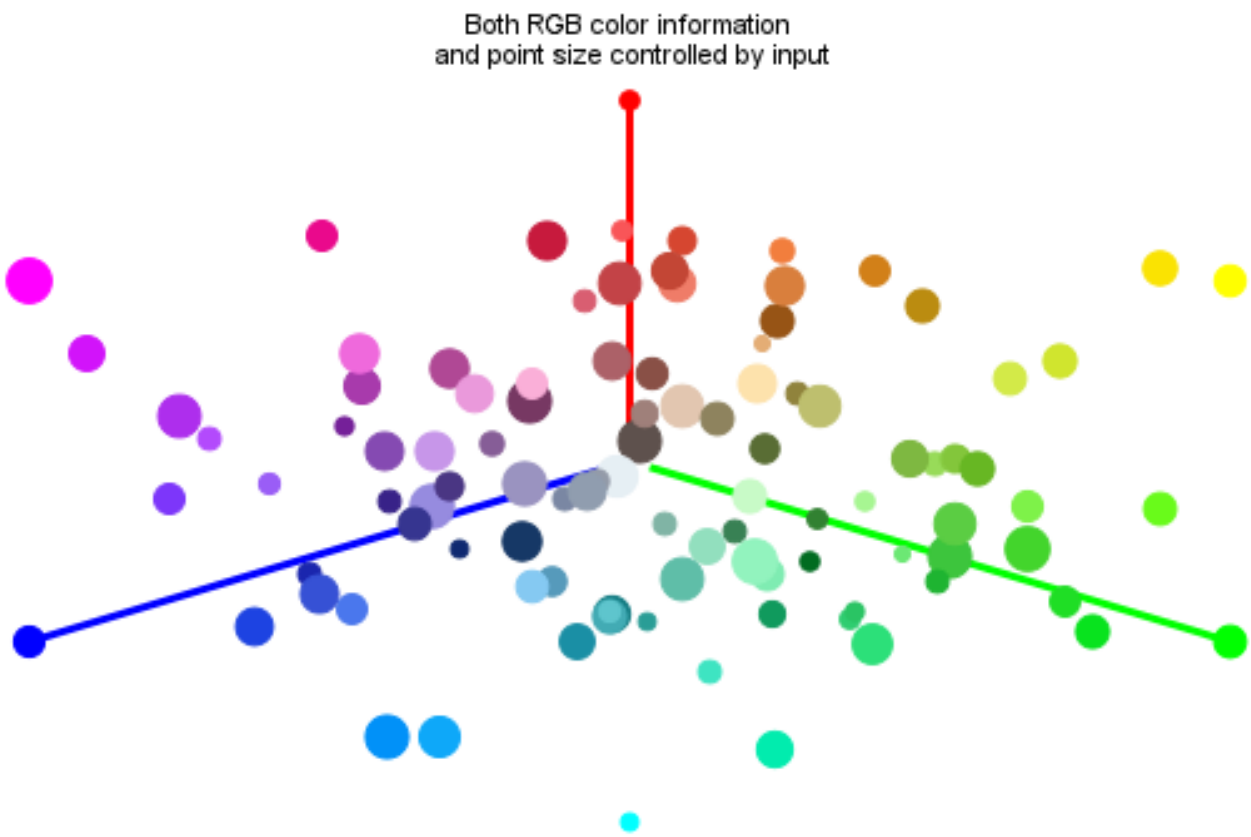
Using the Spectrum



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d3.js:- The Dark Wizard

- Java script
- Stupendous range
- Very customisable
- Interactive, web figures
- Difficulty exporting

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plotly:- The Puppet Version

- More user-friendly
- Easyily importing data
- Standardising existing figures
- Exporting plots easily
- More limited

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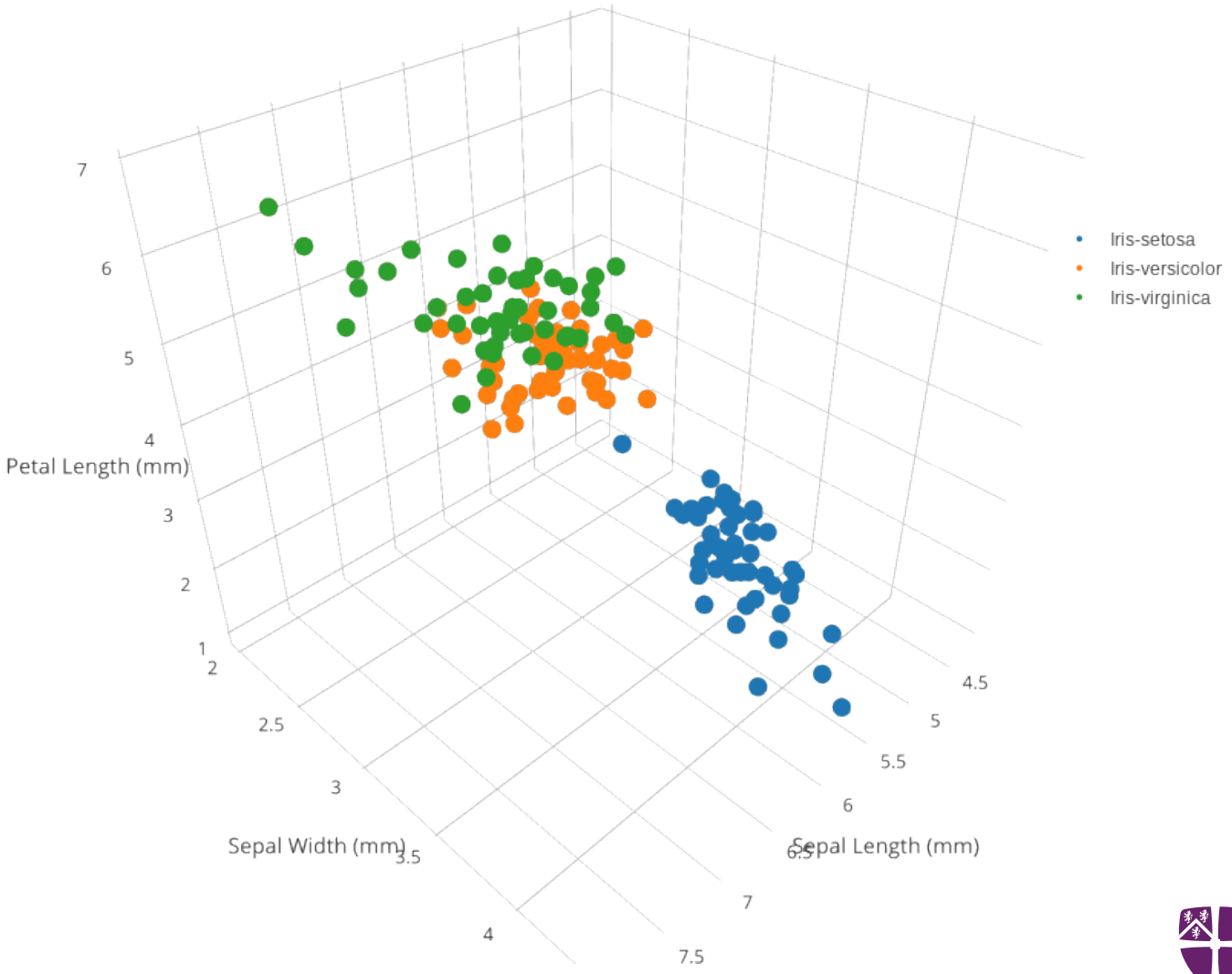
Using Plotly and d3.js



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The Triwizard Tournament

Gephi	Orange	VisIt
• Network analysis	• Machine learning	• Scientific data viewer
• Visualisation	• Data mining	• Focus on higher dimensions
• Large user base	• Plotting & visualisation	• Very large datasets

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Where to go next?

- Picking a tool is largely down to your requirements, preferences and what those you work with use
- But why not try something new, it might just be the perfect fit
- GitHub resources (`https://github.com/ChasNelson1990/harry-plotter-resources`)

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Questions?