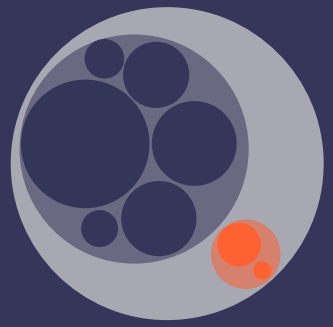

Data&Design

Interactive Data Visualisations with D3.JS and Svelte

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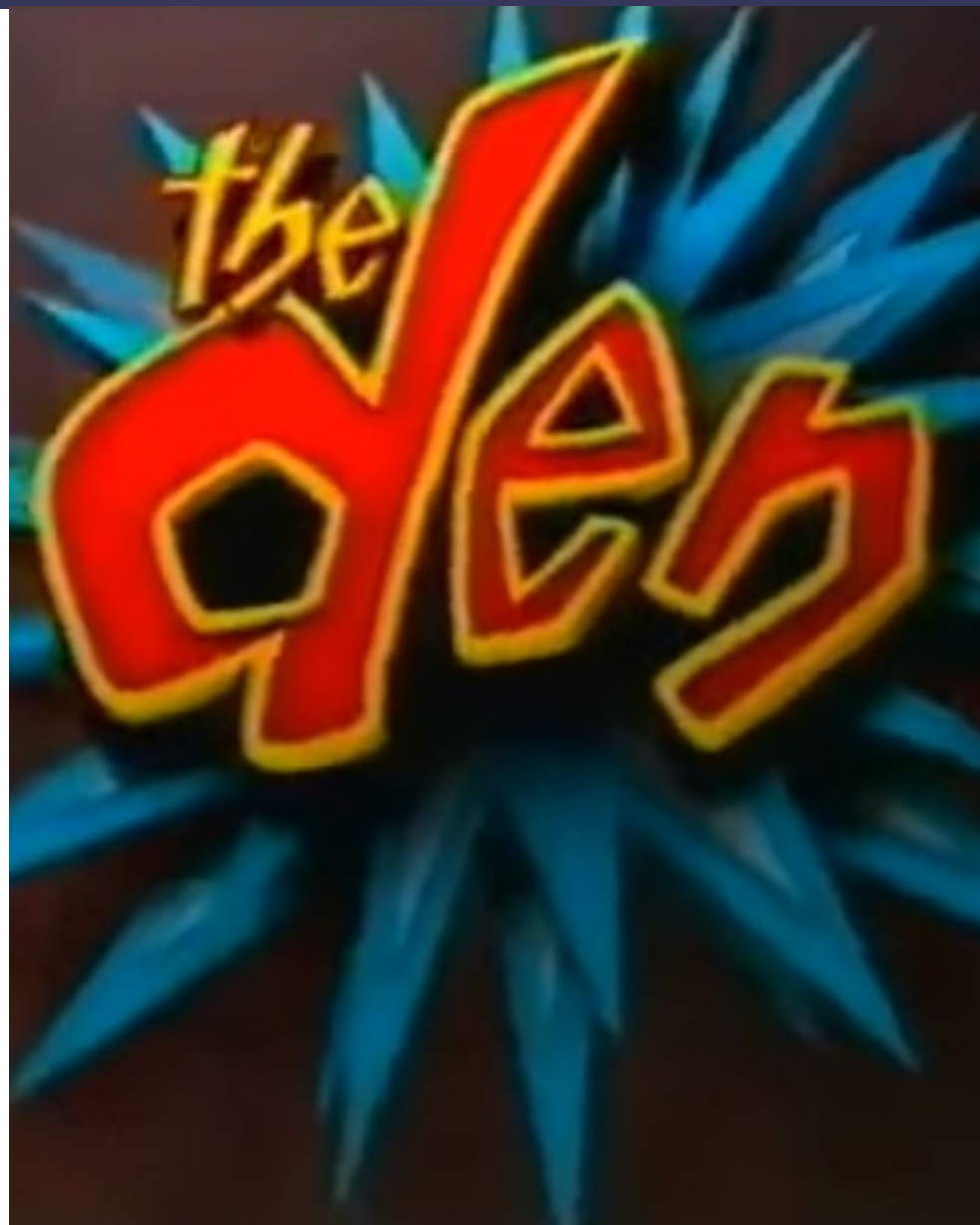
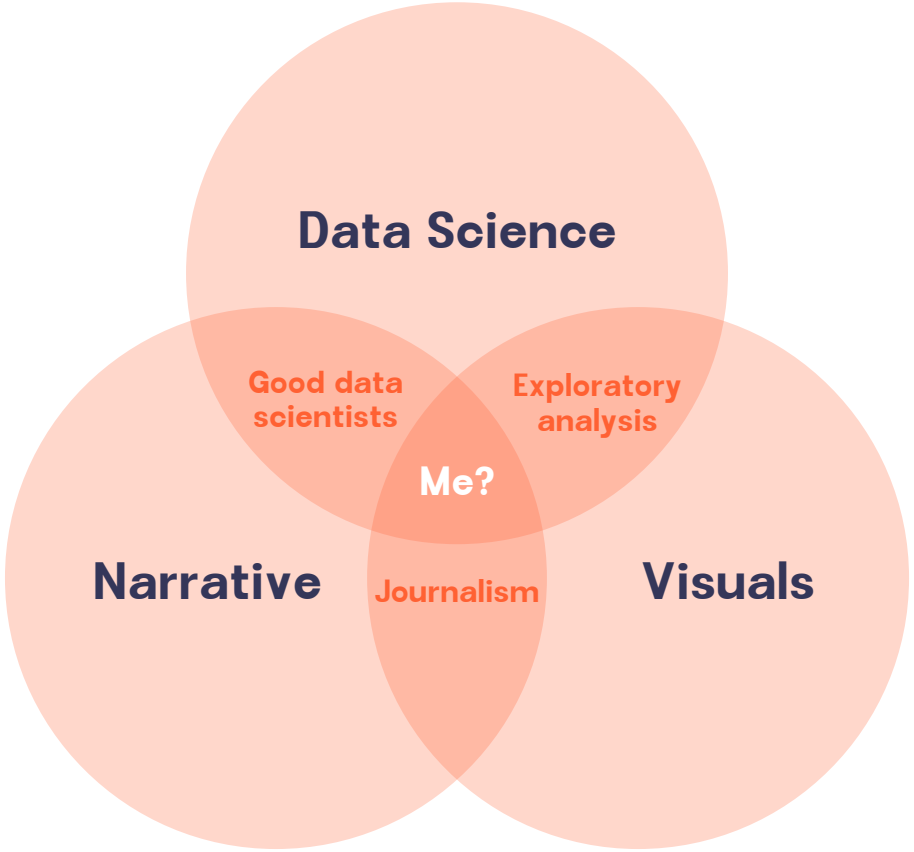
About me

- Originally a Mechanical Engineer – my first coding language was MATLAB.
- I recently worked for 3 years as a Data Designer in The Dock - Accenture's Global Centre for innovation.
- I left last year to set up a company – more on this later!
- **Claim to fame:** My cousin and I were on the Big Bus Quiz on the Den on RTE2.

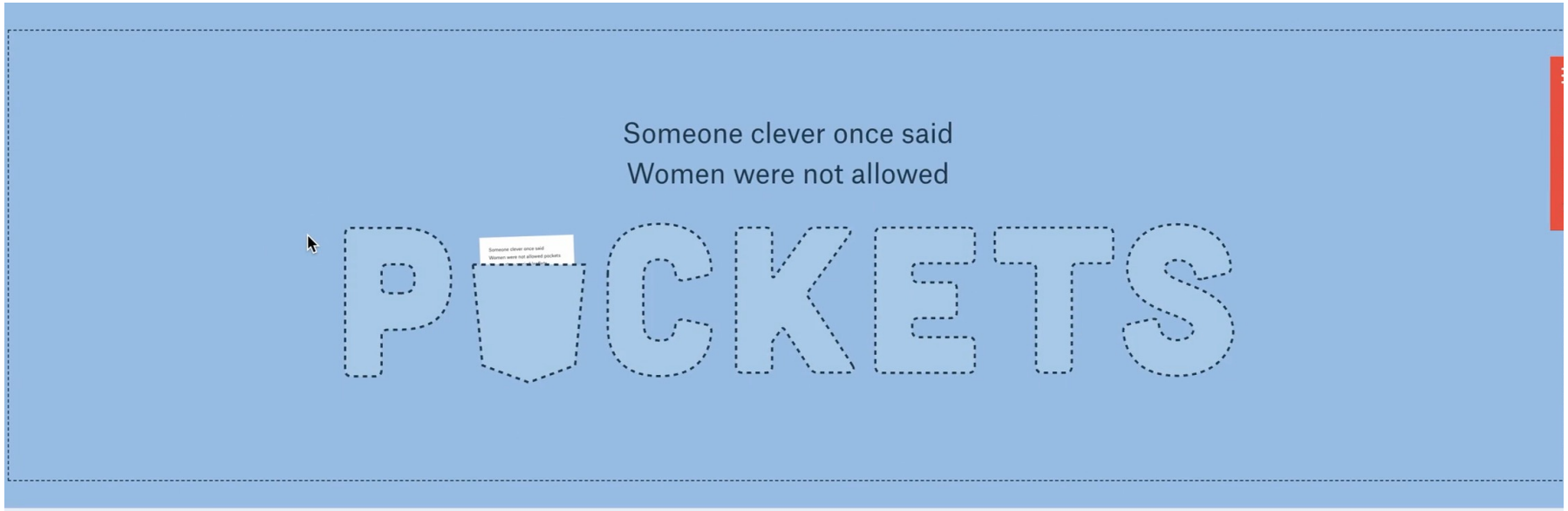


Finding a niche

- In my role in The Dock, I was tasked with brining Accenture's clients' data to life in interesting ways.
- This often meant combining data science, visuals and narrative.
- Two things became apparent:
  - Comparatively few people have all of these.
  - Allowing clients to explore and interact with their own data would be amazing.



The piece that inspired me



https://pudding.cool/2018/08/pockets/

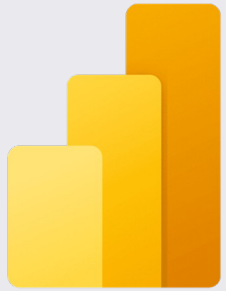
Data visualisation – where to start?

Static

Datawrapper

RAWGraphs

Interactive



Starting out? Try these

Flourish

Data visualisation – where to start?

Pros

- Create interactive vis quickly
- Gentle learning curve
- Powerful

Cons

- You have to pay for it
- It's €70 a month
- Did I mention you have to pay for it?

Data visualisation – where to start?

Pros

- Easy data integration
- Gentle learning curve
- Works with excel

Cons

- Hard to customise
- Hard to go beyond dashboards
- No Mac version
- Cheaper than Tableau but not free

Data visualisation – where to start?

Pros

- Incredibly powerful
- Totally customisable
- Open source

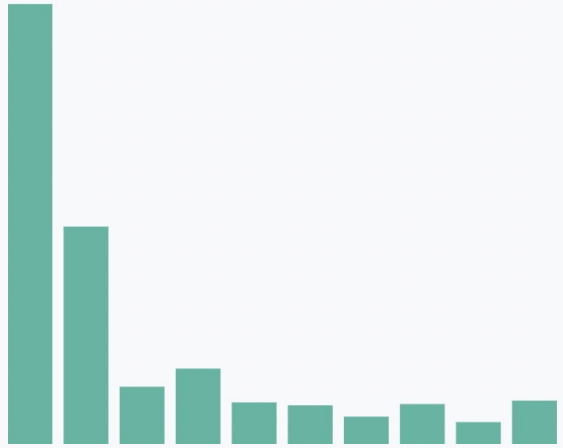
Cons

- Very steep learning curve
- Not responsive, tricky coding style

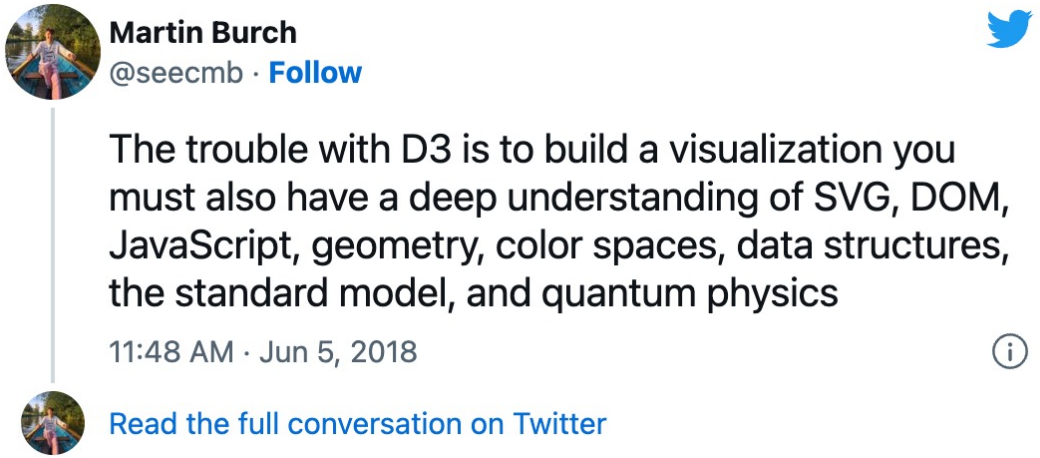
Starting the D3 journey

Problem #1 – complexity / learning curve

```
// Bars
svg.selectAll("mybar")
  .data(data)
  .enter()
  .append("rect")
    .attr("x", function(d) { return x(d.Country); })
    .attr("y", function(d) { return y(d.Value); })
    .attr("width", x.bandwidth())
    .attr("height", function(d) { return height - y(d.Value); })
    .attr("fill", "#69b3a2")
```



- D3 code is known for being very verbose, hard to read and having a rather unforgiving learning curve.
- Even to create simple bar charts requires significant understanding around the DOM.

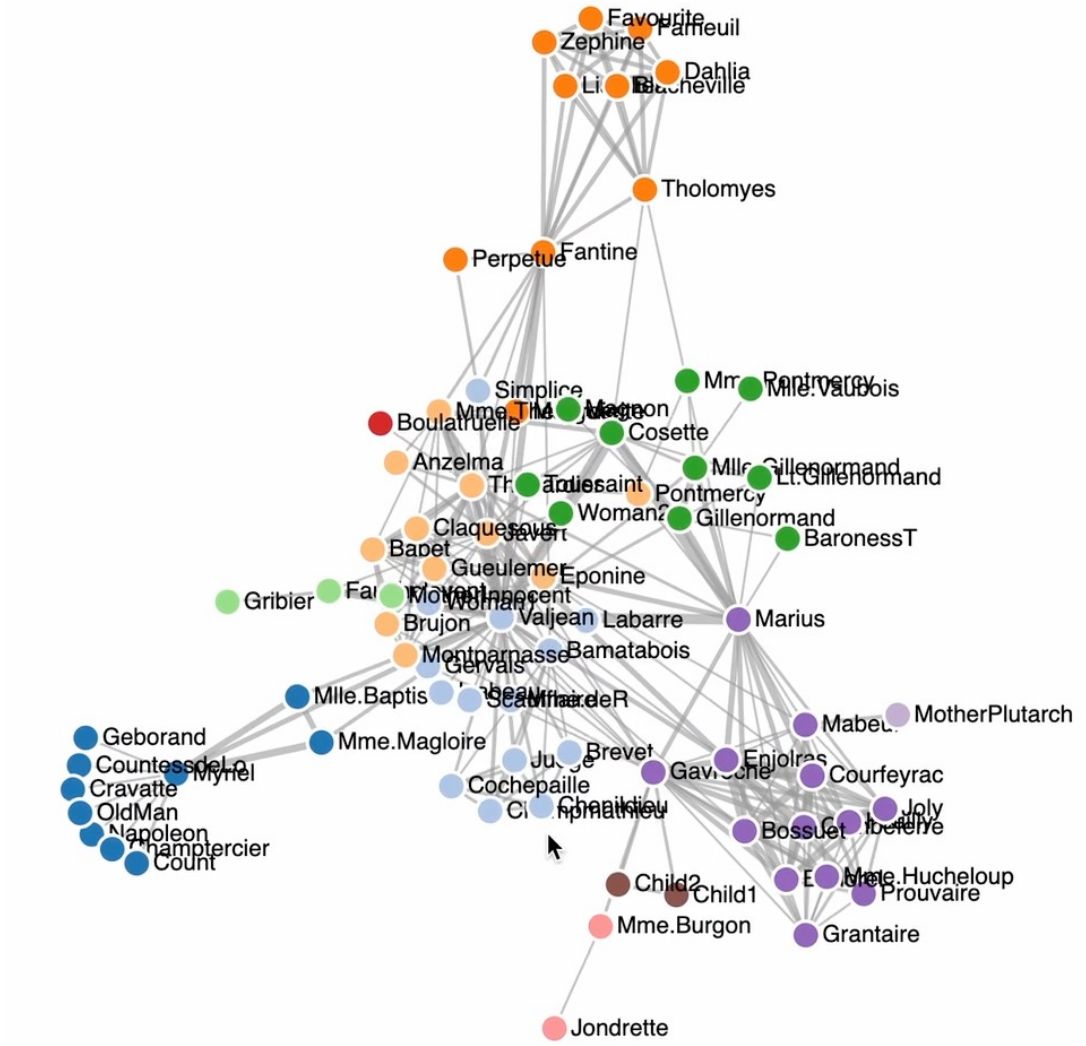


Solution 1: “Data Cuckooing”

Data cuckooing

- Below is the JSON file from a D3 visualisation showing the interactions between the characters in Les Miserables.

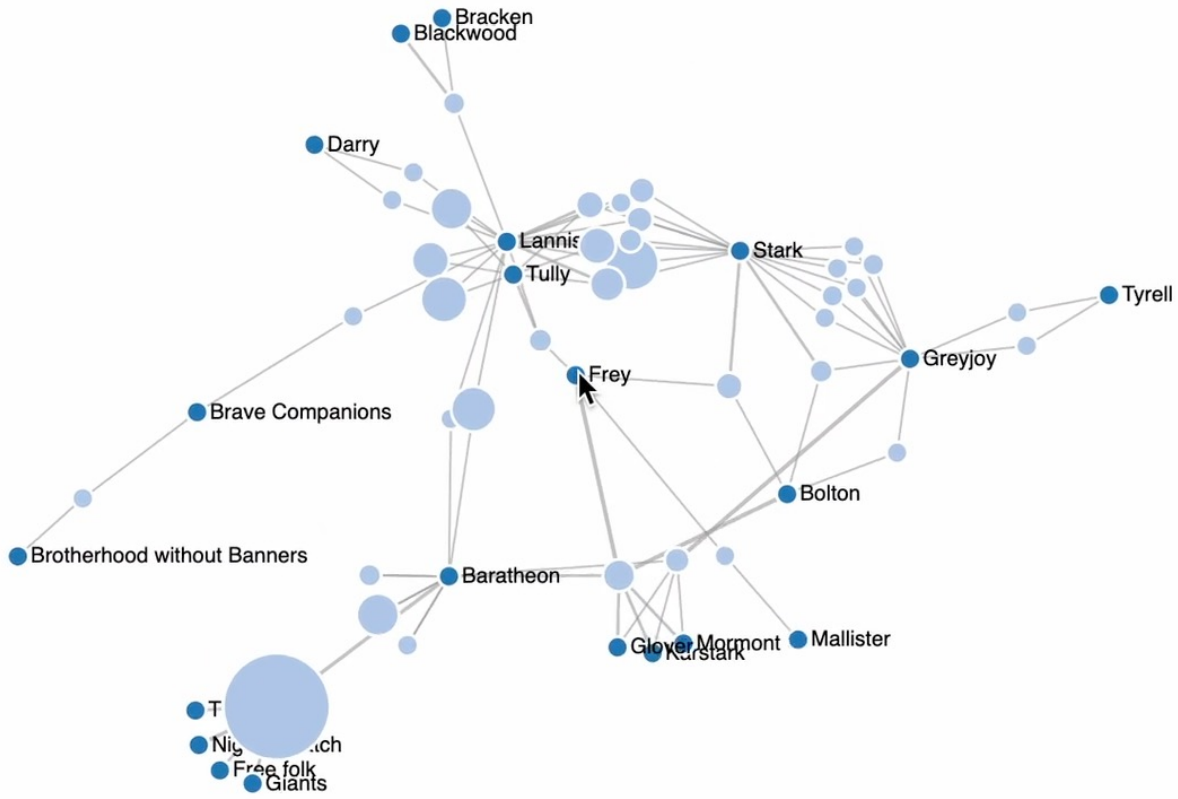

```
{
  "nodes": [
    {"id": "Myriel", "group": 1},
    {"id": "Napoleon", "group": 1},
    {"id": "Mlle.Baptistine", "group": 1},
    {"id": "Mme.Magloire", "group": 1},
    {"id": "CountessdeLo", "group": 1},
    {"id": "Geborand", "group": 1},
  ],
  "links": [
    {"source": "Napoleon", "target": "Myriel", "value": 1},
    {"source": "Mlle.Baptistine", "target": "Myriel", "value": 8},
    {"source": "Mme.Magloire", "target": "Myriel", "value": 10},
    {"source": "CountessdeLo", "target": "Myriel", "value": 1},
    {"source": "Geborand", "target": "Myriel", "value": 1},
    {"source": "Champtercier", "target": "Myriel", "value": 1},
```

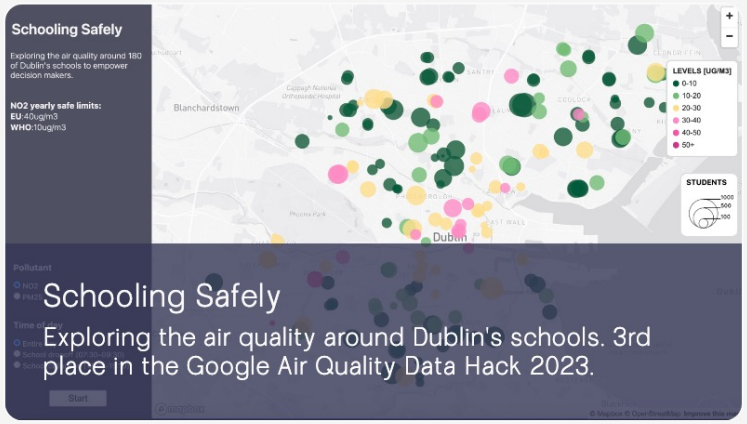
Data cuckooing

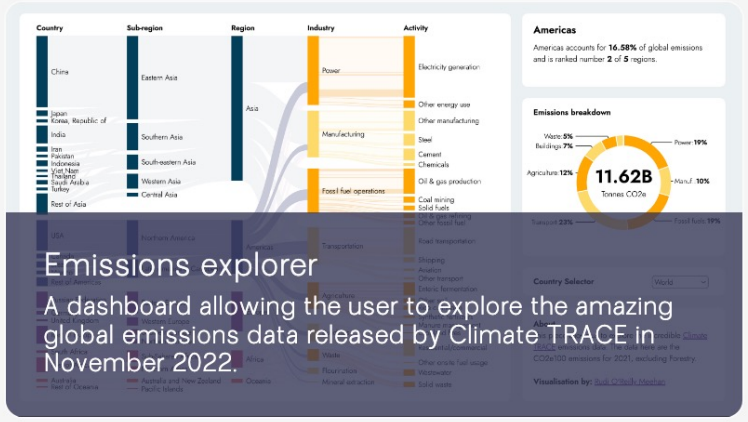
- **We convert our own data into the exact same JSON format** and get a visualisation that works straight away. We then learn everything else as we need to in a ″top down″ manner.


```
{"nodes":[
    {
        "id": "Lannister",
        "group": 0
    },
    {
        "id": "Tully",
        "group": 0
    },
],"links":[
    {
        "source": "Lannister",
        "target": "Battle of the Golden Tooth",
        "value": 1
    },
```

Examples of D3 – my work

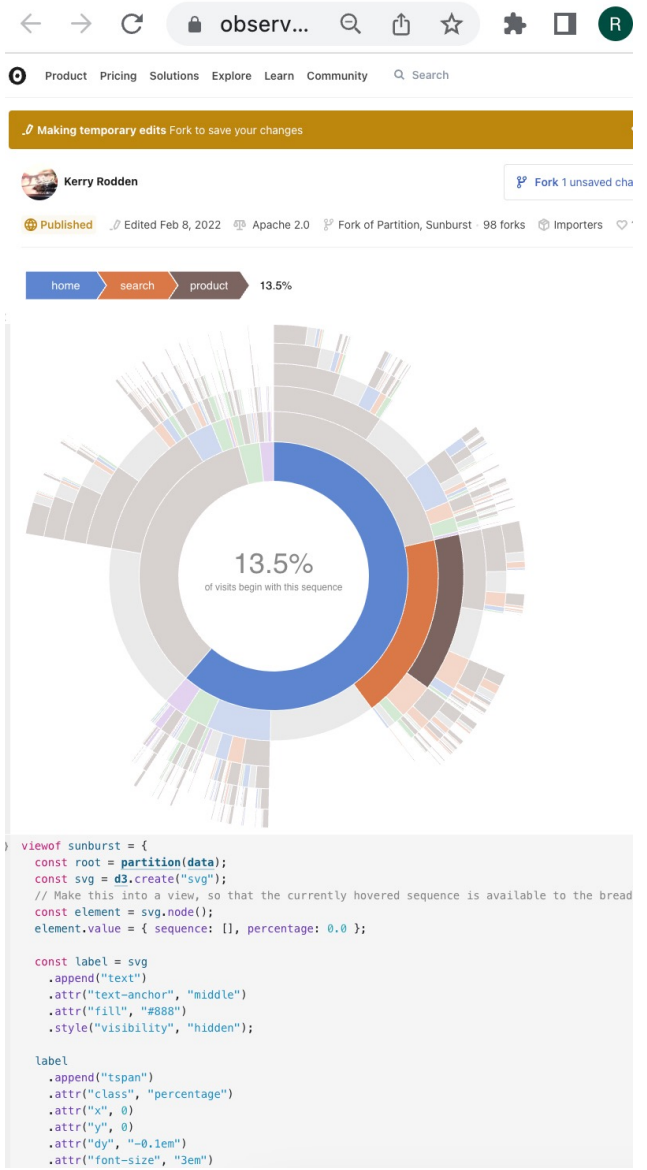




www.dataanddesign.ie

Problem #2 – Observable

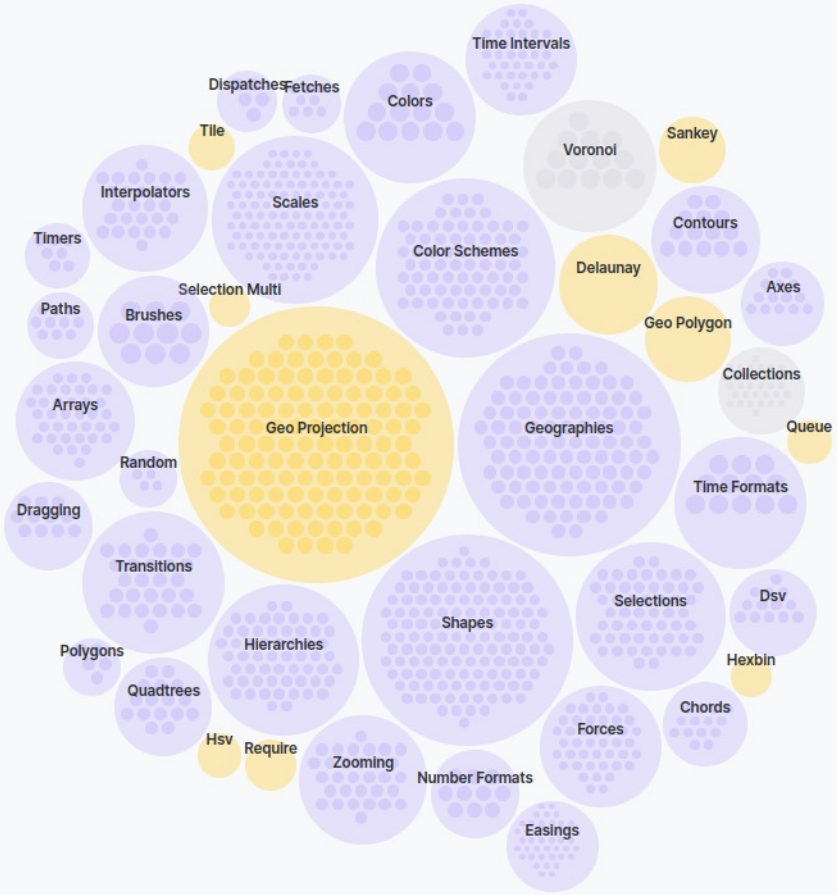
- D3.JS has gone in a new direction in recent years.
- The ecosystem has moved to Observable – a platform that runs D3.JS code in cells, similar to Jupyter Notebooks. And the examples I used for data cuckooing are no longer hosted!
- However, unlike Jupyter Notebooks, **Observable websites are not pure JS.**
- This is a major issue as it means that you can't run the code outside of Observable.



Solution 2: Svelte + D3

Svelte saves the day!

- Svelte is a **compiler** that takes your code and turns it into imperative JavaScript (instructions).
- Unlike D3, Svelte writes SVG directly.
- Svelte doesn't replace D3 - it **complements** it. You import the D3 functions you want. You use D3 for things it's good at - like maths, hierarchies, paths or maps.
- Svelte has modular components, great transitions and is responsive to different screen sizes.



Example code: Svelte + D3

```
<script>

  import { onMount } from 'svelte';
  import * as topojson from 'topojson-client';
  import { geoPath, geoAlbersUsa } from 'd3-geo';
  import { draw } from 'svelte/transition';


   const path = geoPath().projection(null);

<svg viewBox="0 0 975 610">
  <!-- State shapes -->
  <g fill="white" stroke="black">
    {#each states as feature, i}

      <path d={path(feature)} on:click={() => selected
= feature} class="state" in:draw={{ delay: i * 50,
duration: 1000 }} />
    {/each}


  </g>
```

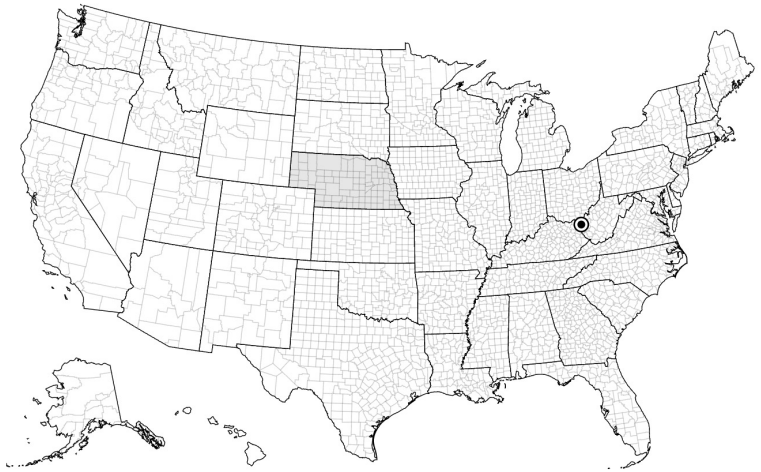
Use D3 function “geopath” for drawing state lines

bind geopath to variable

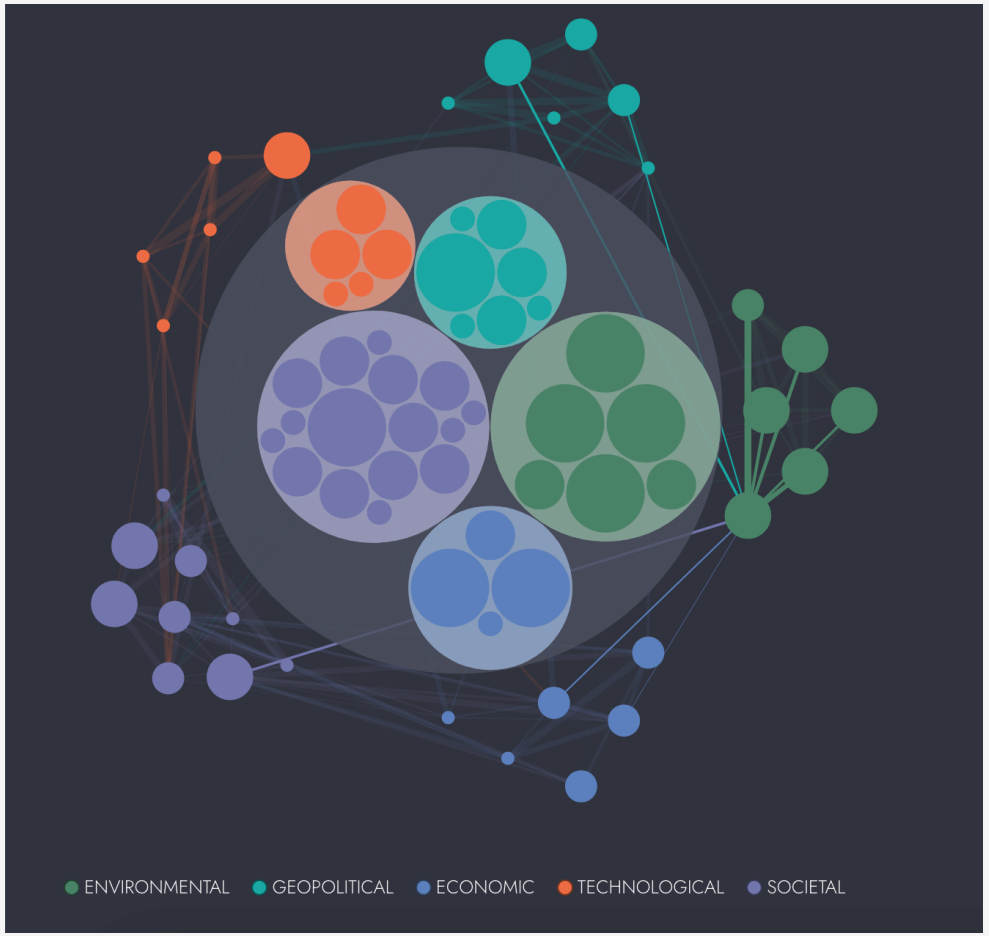
For each US state...

...draw the paths...

...using these animations



Examples of D3 + Svelte – my work



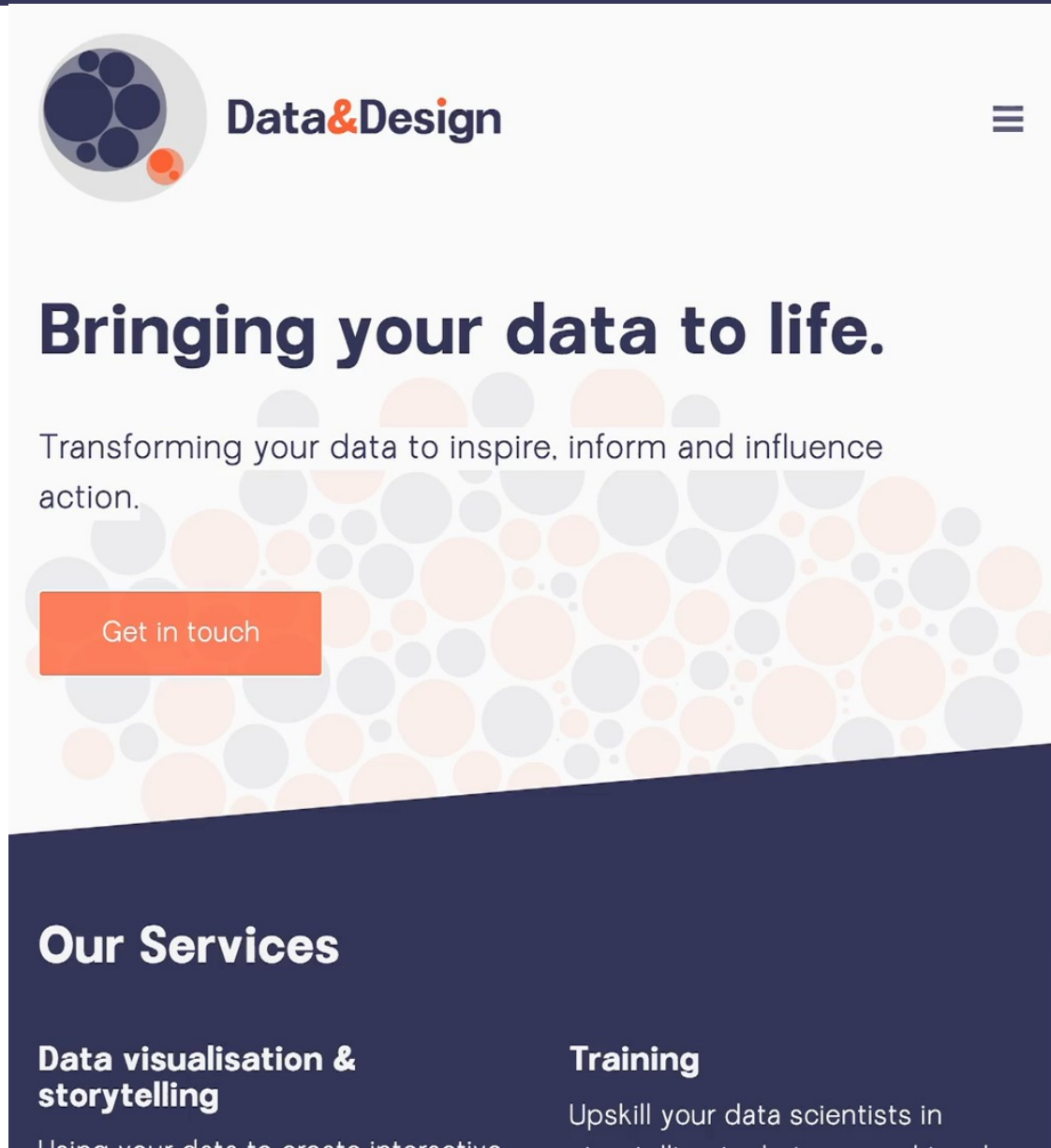
https://rudiorm.github.io/avoiding-flying-cars/

Summary

- There are great tools out there for visualising data – I really recommend giving any of them a go!
- If you are interested in Svelte or using it already, there has never been a better time to dip into Svelte for data visualisation!
- Svelte lets you have your cake and eat it – you can use the full power of D3 in your visualisations

Finally - a quick plug

- My company website is www.dataanddesign.ie – it was built with SvelteKit!
- We offer two main services:
  - **Data visualisation & storytelling:** Using your data to create interactive pieces.
  - **Training**: Upskilling data scientists in storytelling and designers in data literacy
- Interested? Get in touch at rudi@dataanddesign.ie



Thank you!