

Khinshan Khan and Adeebur Rahman Capstone Technical Presentation 05/19/2021



d3: Data Driven Documents

- Javascript library that allows for dom manipulation based on data
- Provides data manipulation and transformation functions
- Provides a toolkit to abstract mathematical based operations to an extent

"D3 is not a monolithic framework that seeks to provide every conceivable feature. Instead, D3 solves the crux of the problem: efficient manipulation of documents based on data."

Background Info: Image Formats

Joint Photographic Experts Group (JPEG)

- generally smallest in size for image files but it comes with cons
- uses lossy compression, which means there is loss of data
- best for photos where there are no crisp lines or text.

Portable Network Graphics (PNG)

- allow for crisp lines and text best
- allow for transparency
- still lossy compression

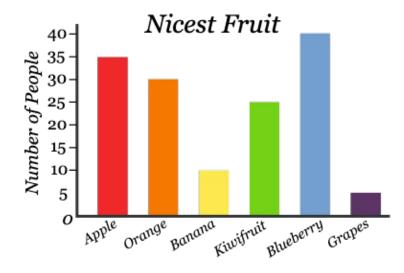
Scalable Vector Graphics (SVG)

- drawn from mathematically declared shapes and curves, not pixels
- resolution independent because you provide 'steps' for how an image should be created given a viewport
- best for logos or shapes, not necessarily images of people or posters



Breaking Down Bar Charts

- Axis
- Scale
- Bars
- Labels





Axis + Scale

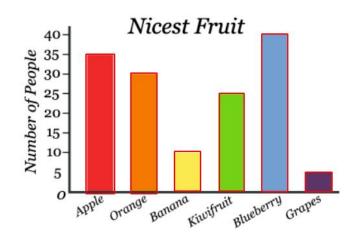
Essence of any axis in an image is that the pixels map to some quantity measure in the chart





Bars

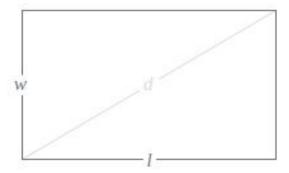
Thinking about a bar in a bar chart, it's really multiple rectangles well placed





Rectangles

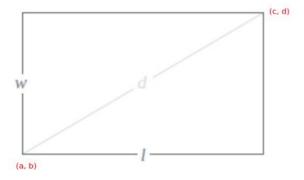
To form a rectangle, you don't need 4 points, instead you can use 2 points





Rectangles

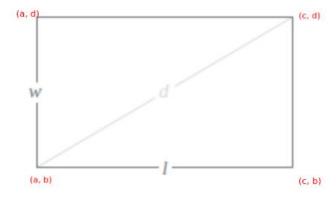
Choose 2 points lying on a diagonal





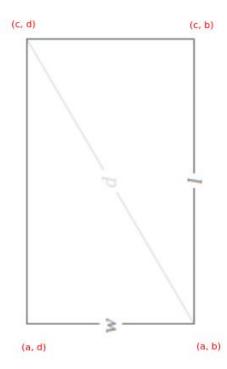
Rectangles

The other 2 points can be determined using the x and y values of collinear points on each 'axis' (width vs length in this case)





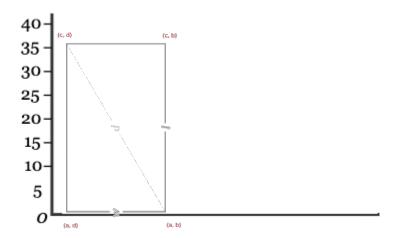
To see it more in bar form, let's rotate it by 90 degrees.





Overlay as a Bar

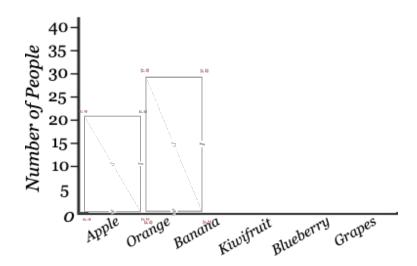
The rectangle then is lined up on the x-axis and centered around a label



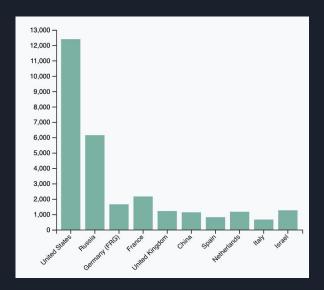


Labels

Text is injected into the SVG separately from the shapes







https://www.d3-graph-gallery.com/graph/barplot basic.html

```
// set the dimensions and margins of the graph
var margin = {top: 30, right: 30, bottom: 70, left: 60},
    width = 460 - margin.left - margin.right.
    height = 400 - margin.top - margin.bottom;
// append the svg object to the body of the page
var svg = d3.select("#my_dataviz")
  .append("svg")
    .attr("width", width + margin.left + margin.right)
    .attr("height", height + margin.top + margin.bottom)
  .append("q")
    .attr("transform",
          "translate(" + margin.left + "," + margin.top + ")");
// Parse the Data
const site = "https://raw.githubusercontent.com/holtzy/data_to_viz/master/
d3.csv(site, function(data) {
// X axis
var x = d3.scaleBand()
  .range([ 0, width ])
  .domain(data.map(function(d) { return d.Country; }))
  .padding(0.2);
svq.append("a")
  .attr("transform", "translate(0," + height + ")")
  .call(d3.axisBottom(x))
  .selectAll("text")
    .attr("transform", "translate(-10,0)rotate(-45)")
    .style("text-anchor", "end");
// Add Y axis
var y = d3.scaleLinear()
  .domain([0, 13000])
  .range([ height, 0]);
svq.append("q")
  .call(d3.axisLeft(y));
// 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")
```



- it's old (about a decade)
- large library/ bundle size
- there is a large learning curve
- there is a large amount of effort to make basic visualizations
- backwards incompatibility
- hard to modify existing visualization

"When someone is creating just another chart for the dashboard and reaches out for d3 you should raise a red flag ."

— Adam Mortka



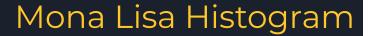


https://www.chartjs.org/docs/master/charts/bar.html

config Setup const config = { type: 'bar', data: data, };

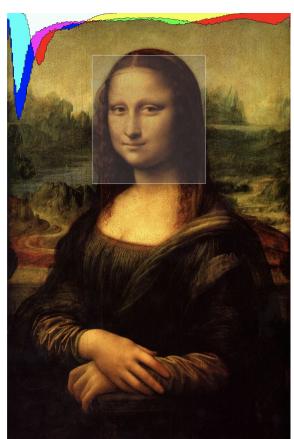
```
Config Setup

const labels = Utils.months({count: 7});
const data = {
  labels: labels,
  datasets: [{
    label: 'My First Dataset',
    data: [65, 59, 80, 81, 56, 55, 40],
    backgroundColor: '#69b3a2'
  }]
};
```



Pixel values from the square zone are shown as a histogram on top

https://observablehq.com/@d 3/mona-lisa-histogram

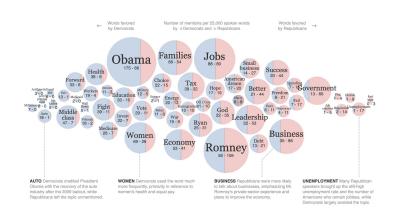




Convention Word Count

A comparison of how often speakers at the two presidential nominating conventions used different words and phrases, based on an analysis of transcripts from the Federal News Service.

https://archive.nytimes.com/www.nytimes.com/interactive/2012/09/06/us/politics/convention-word-counts.html





Constellations of Directors and Their Stars

A long-running relationship between an actor and a director can indicate an artistic understanding, a functional routine or even a marketing strategy. Here, a selection of notable directors are shown with actors they cast in at least four films.

https://www.nytimes.com/newsgrap hics/2013/09/07/director-star-chart/in dex.html



toman muchon wrapping to numeric in the psychological intrigue of his films.

Watching Cary Grant in "North by
Northwest," we almost feel as if we're in on a grand cosmic joke as he is put through multiple haffling adventures. Another recurring face, "limmy Stowart, had a way of making Hitchcock's intrigues hit close to home, as the actor found amid extraordinary circumstances (as in "Verigo" or "The Man Who Knew Too Much") a relatable, shifting emotional core.

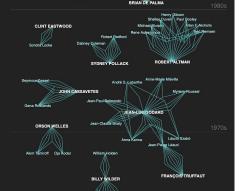
John Ford



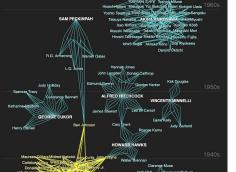
In a career spanning more than 200 films and stretching from the silents to the '60s. this Hollywood great cultivated a stock company of actors including Harry Carey Victor McLaglen, Ben Johnson and Ward Bond. He's popularly known for his work with John Wayne; he helped build the actor's status as an American legend and masculine icon in films like "The Searchers." But before Wayne came numerous silent movies with the early Western star Harry Carey Sr. Known for being a taskmaster when breaking an actor in. Ford nonetheless was praised by his actors for his sure hand in bringing out their native strengths. He was also known for his grand pictorial sense, as well as for never sacrificing either the human scale of his characters or the grandeur of his

Josef von Sternberg Perhaps the quintessential pairing of filmmaker and actor, the legendary

filmmaker and actor, the legendary collaboration between Sternberg and Marlene Dietrich yielded resplendent visions of desire across seven exquisite films, including "Shanghai Express" and "Blonde Venus." Sternberg's unparalleled expertise in the art and science of filmmaking made a kind of Gesamtkunstwerk out of and around Dietrich, through lighting, costume, production design, and pure force of melodrama. Sternberg is all too often described as the Svengali to Dietrich, turning a mere actress into an icon. But for the average viewer caught in her heavy-lidded gaze or beguiled by her wit, it's not just the filmmaker doing the hypnotizing.



Dom Delition





- Able to visualize anything
 - Just need an idea and data
- Conforms to web standards by sticking with HTML, SVG, and CSS
- Provides you with functions to manipulate elements for visualizations
- Ability to add event listeners, attributes, css, etc to visualizations
- Can provide animation of visuals with data interpolation

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Use a modern day framework like chart.js for

basic charts and cookiecutter templates

Use d3.js for

creative visualizations that don't necessarily have solutions yet

Questions?

Thank you