

SARAH DRASNER

# DATA IN MOTION

@SARAH\_EDO

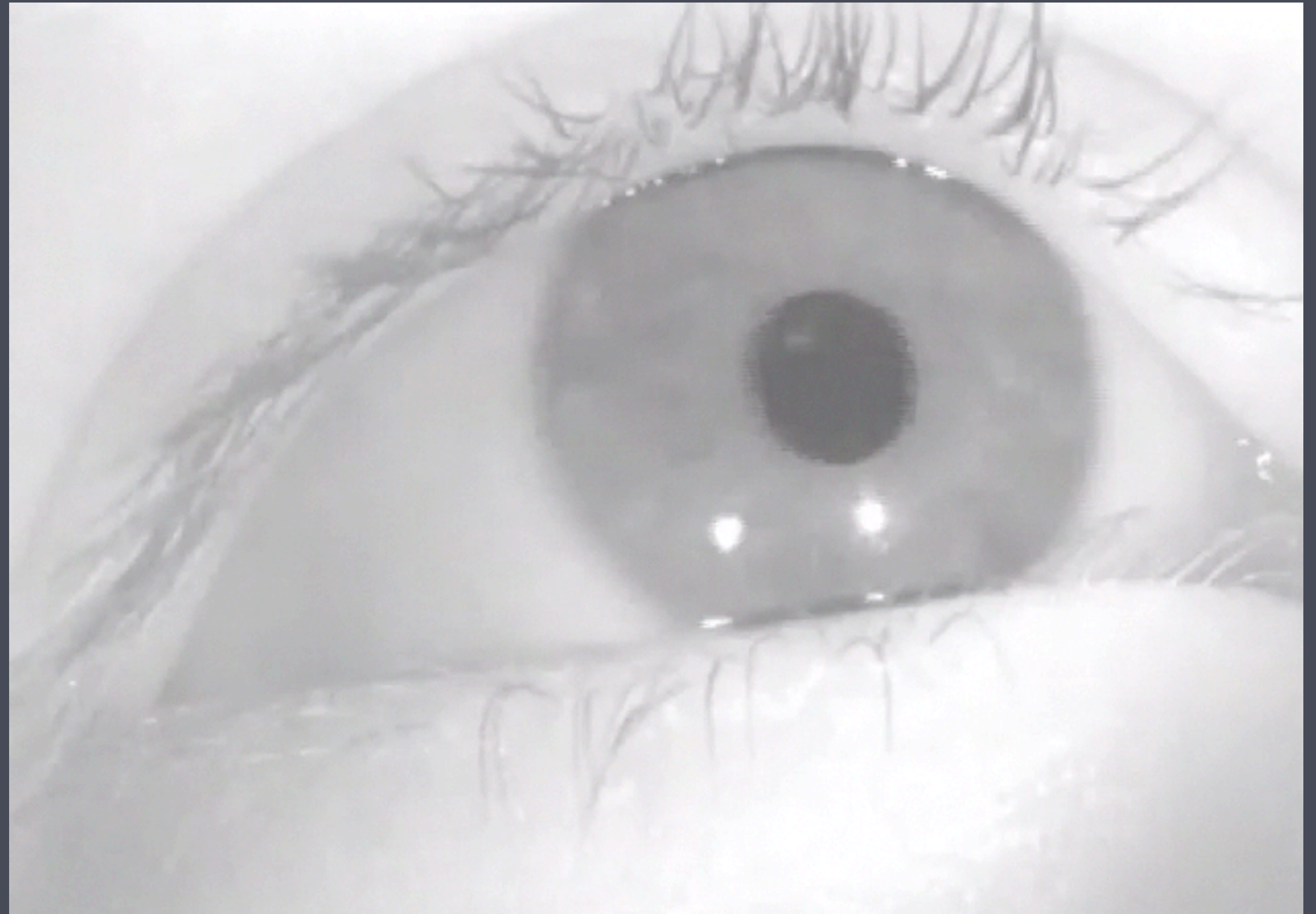


**LET'S START FROM THE BEGINNING.**

What happens when you  
look at an image?

SCANNING

# SACCADE



WHY IS THIS IMPORTANT?



# DRAW ATTENTION & CONNECT STATES

2	1	4	3	9	5	6	7	8	2	3	6	5	9	4	0	1
6	7	9	3	4	9	0	5	6	2	5	8	4	0	5	2	6
9	8	2	6	3	5	9	3	2	9	3	7	2	6	3	4	8
8	1	6	2	3	8	7	9	5	0	2	3	9	2	8	4	3
0	9	1	8	5	4	2	9	4	7	4	6	8	4	0	2	9
3	9	2	7	3	6	6	5	2	9	4	0	4	9	4	8	6
5	2	4	3	6	4	8	1	0	3	9	4	8	4	7	3	2
8	6	2	3	0	8	7	3	6	2	5	4	4	8	3	5	0

# HOW?



**FILTERING/  
REORDERING**

---



**SHOWING GREATER  
CONTEXT**

---



**SHOWING CHANGE  
OVER TIME**

---



**REVEALING FOR  
CLARITY**

---

# FILTERING / REORDERING

RETAINING CONTEXT

# FILTERING & REORDERING


UPDATED February 12, 2012

TWITTER LINKEDIN SHARE

## Four Ways to Slice Obama's 2013 Budget Proposal

Explore every nook and cranny of President Obama's federal budget proposal.

All Spending Types of Spending Changes Department Totals





# Fireball

SIMPLE TRANSITION

## D3 CHAINED TRANSITIONS

```
.transition()  
  .attr("cy", 820)  
  .attr("r", 5)  
  .attr("fill", "url(#radgrad)")  
  .duration(1300)  
  .delay((d, i) => {  
    return 6000 + (i * 40)  
  })
```

SIMPLE TRANSITION

---

# D3 CHAINED TRANSITIONS



D3 INTERPOLATE PATH

<https://github.com/pbeshai/d3-interpolate-path>

ADVANCED TRANSITION

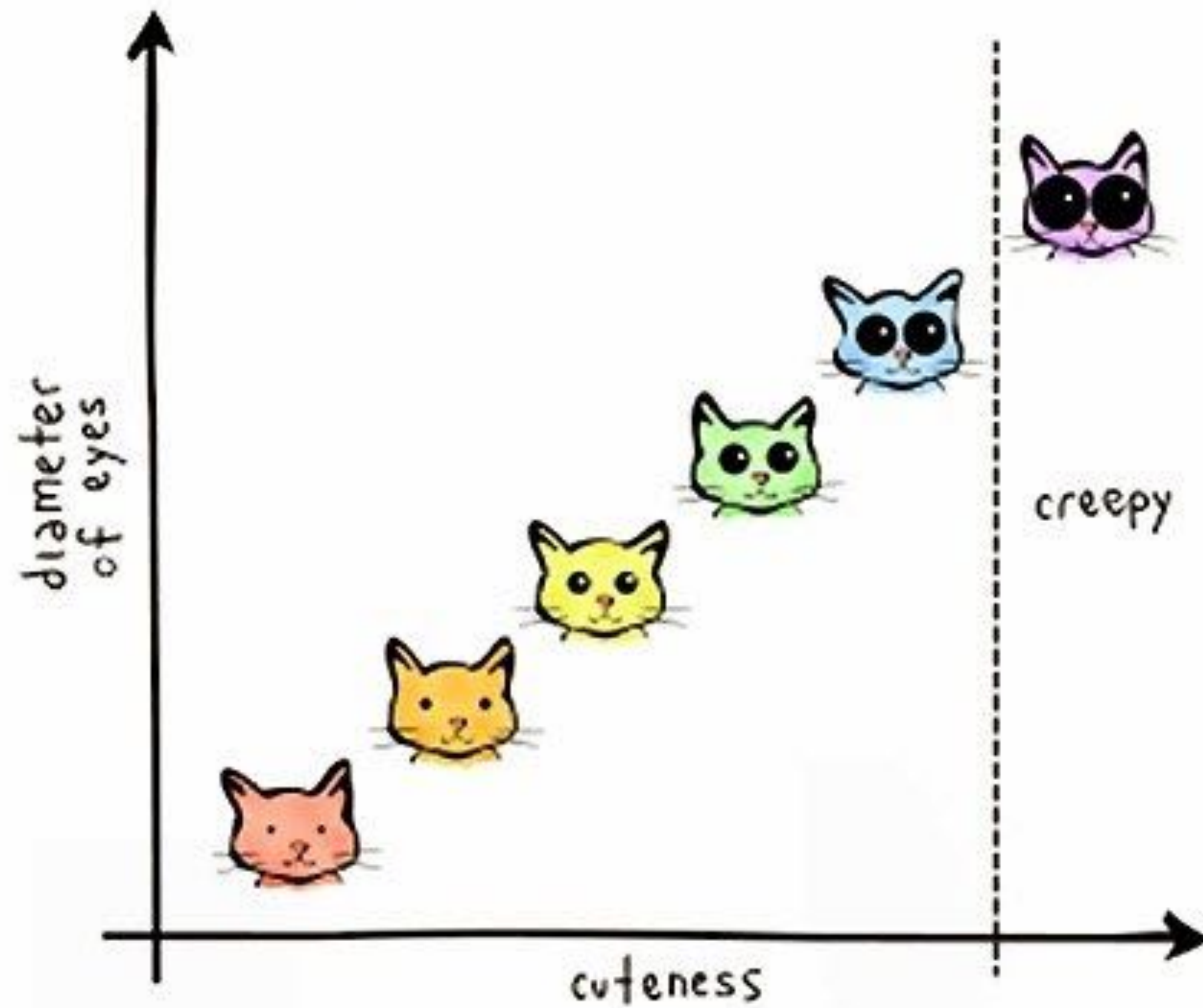
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# MORPHING: GREENSOCK



<https://codepen.io/sdras/pen/BodKjP>

Eye size vs Relative Cuteness



ADVANCED TRANSITION

MORPHING

CSS-TRICKS

ADVANCED TRANSITION

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MORPHING:  
GREENSOCK

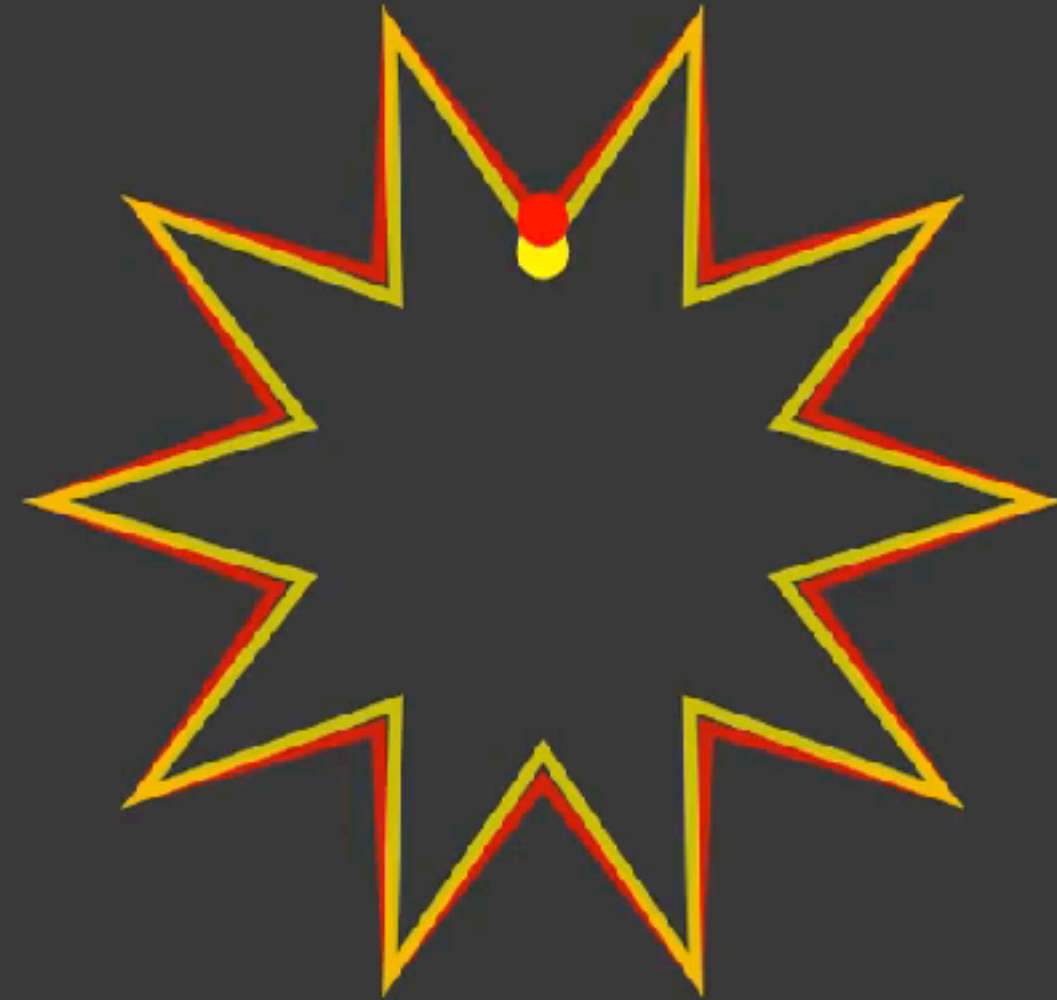
```
TweenLite.to("#circle", 1, {morphSVG:"#square"});
```

ADVANCED TRANSITION

MORPHING:

**GREENSOCK**

UTILITIES



- shapeIndex: 9 (auto) +

```
findShapeIndex("#square", "M10 315 L 110 215");
```

MORPHING:

GREENSOCK



```
function flame() {
  var tl = new TimelineMax();

  tl.add("begin");
  tl.to(blurNode, 2.5, {
    attr: {
      stdDeviation: 3
    }
  }, "begin");
  var num = 9;
  for (var i = 1; i <= num; i++) {
    tl.to(fStable, 1, {
      morphSVG: {
        shape: "#f" + i
      },
      opacity: ((Math.random() * 0.7) + 0.7),
      ease: Linear.easeNone
    }, "begin+=" + i);
  }
}
```



ADVANCED TRANSITION

---

MORPHING:  
**GREENSOCK**



FILTERING/REORDERING

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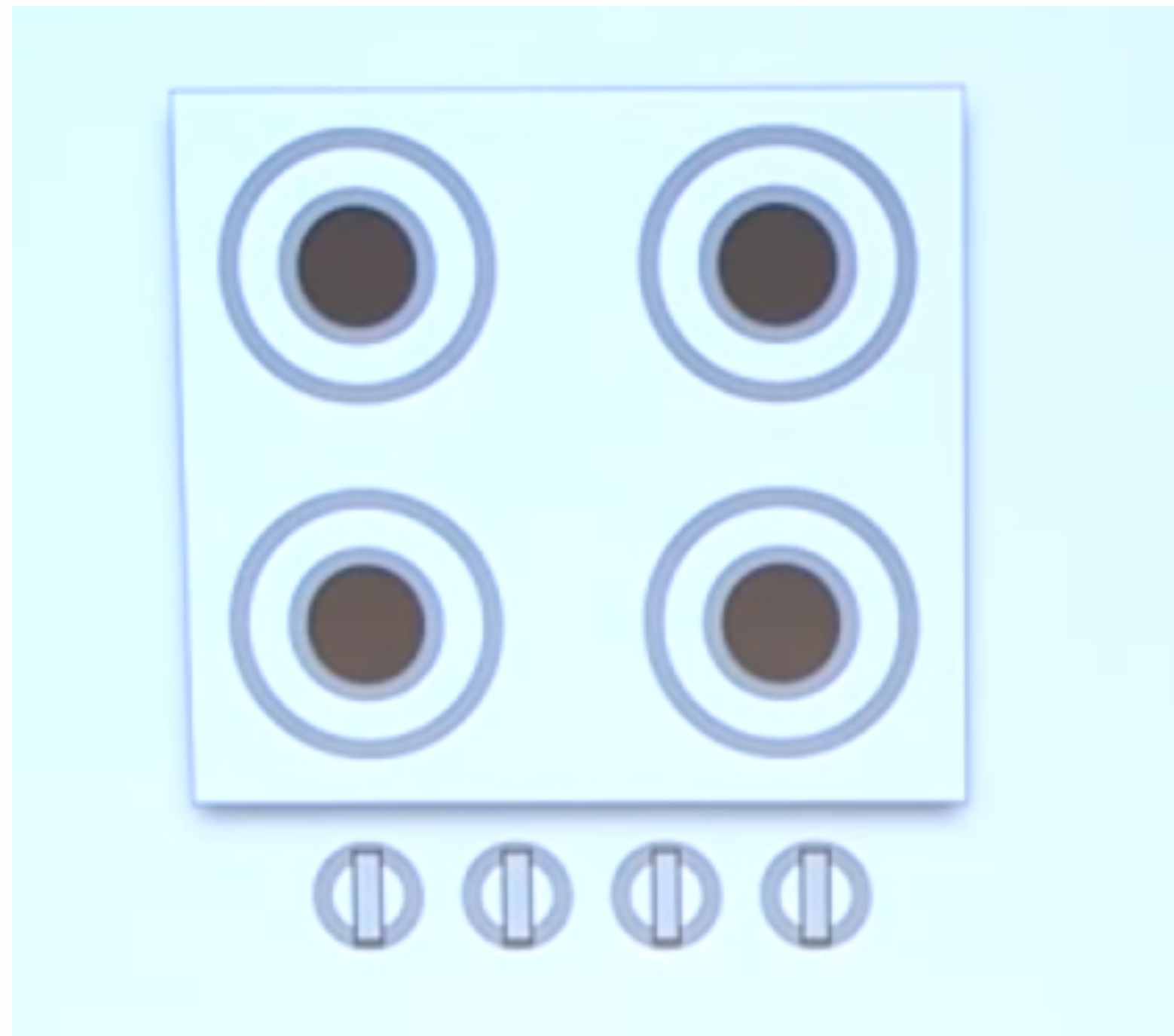
**D3** FOR CHAINING WITH SIMPLE ELEMENTS

**GREENSOCK** FOR COMPLEX SHAPE INTERPOLATIONS

SHOWING GREATER CONTEXT

SHOWING CONTEXT

REDUCED COGNITIVE  
LOAD THROUGH  
SPATIAL  
AWARENESS

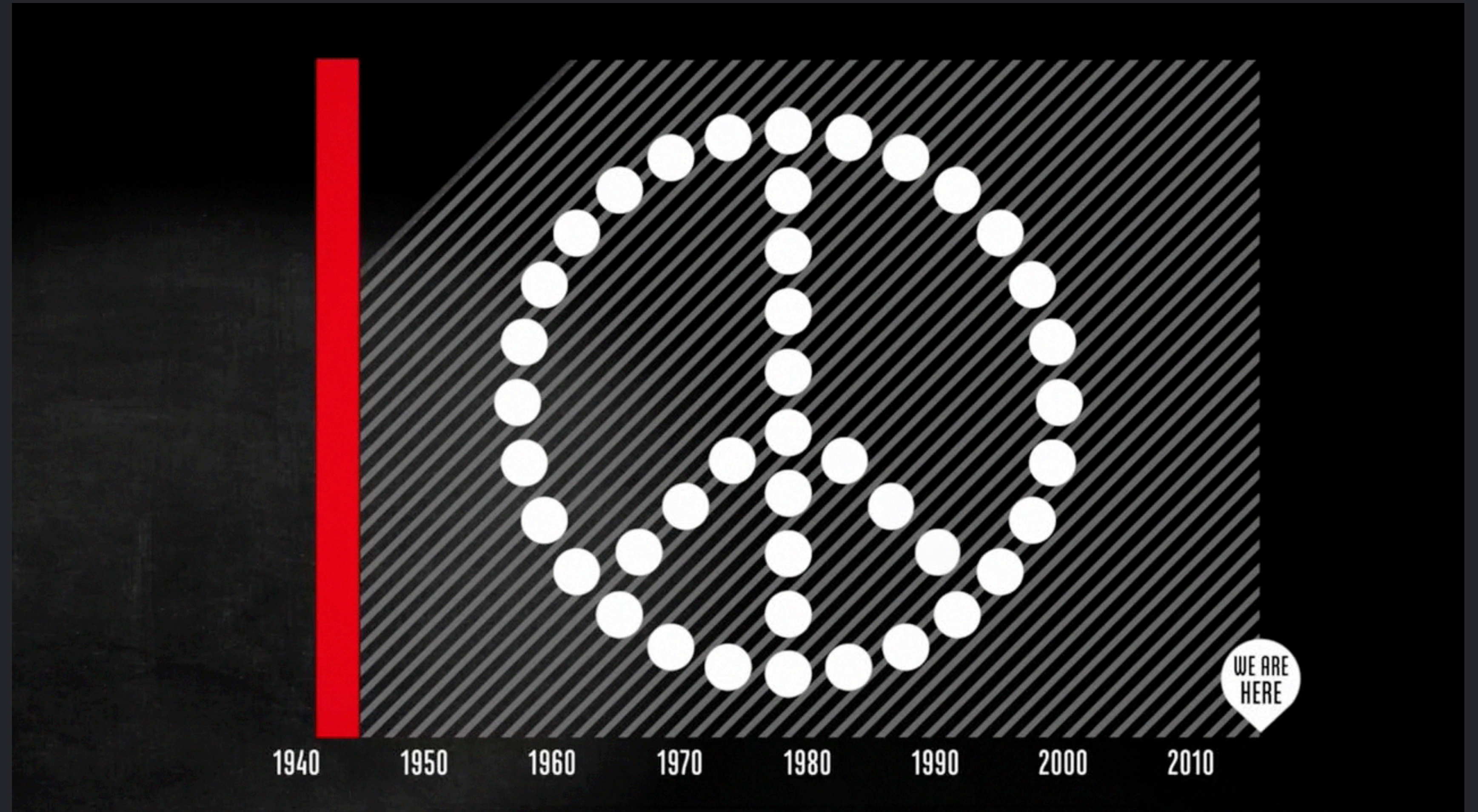


Kathy Sierra, "Badass: Making Users Awesome"

SHOWING GREATER CONTEXT

# USING SPATIAL AWARENESS TO DRIVE MEANING

fallen.io





# USE THE SVG'S VIEWBOX AS A CAMERA

RETAINING CONTEXT

# VIEWBOX AS A CAMERA



RETAINING CONTEXT

# VIEWBOX AS A CAMERA

```
getBBox();
```

```
▼ SVGRect ⓘ  
  height: 19.600006103515625  
  width: 42.199981689453125  
  x: 215.10000610351562  
  y: 160  
  ► __proto__: SVGRect
```

RETAINING CONTEXT

# VIEWBOX AS A CAMERA

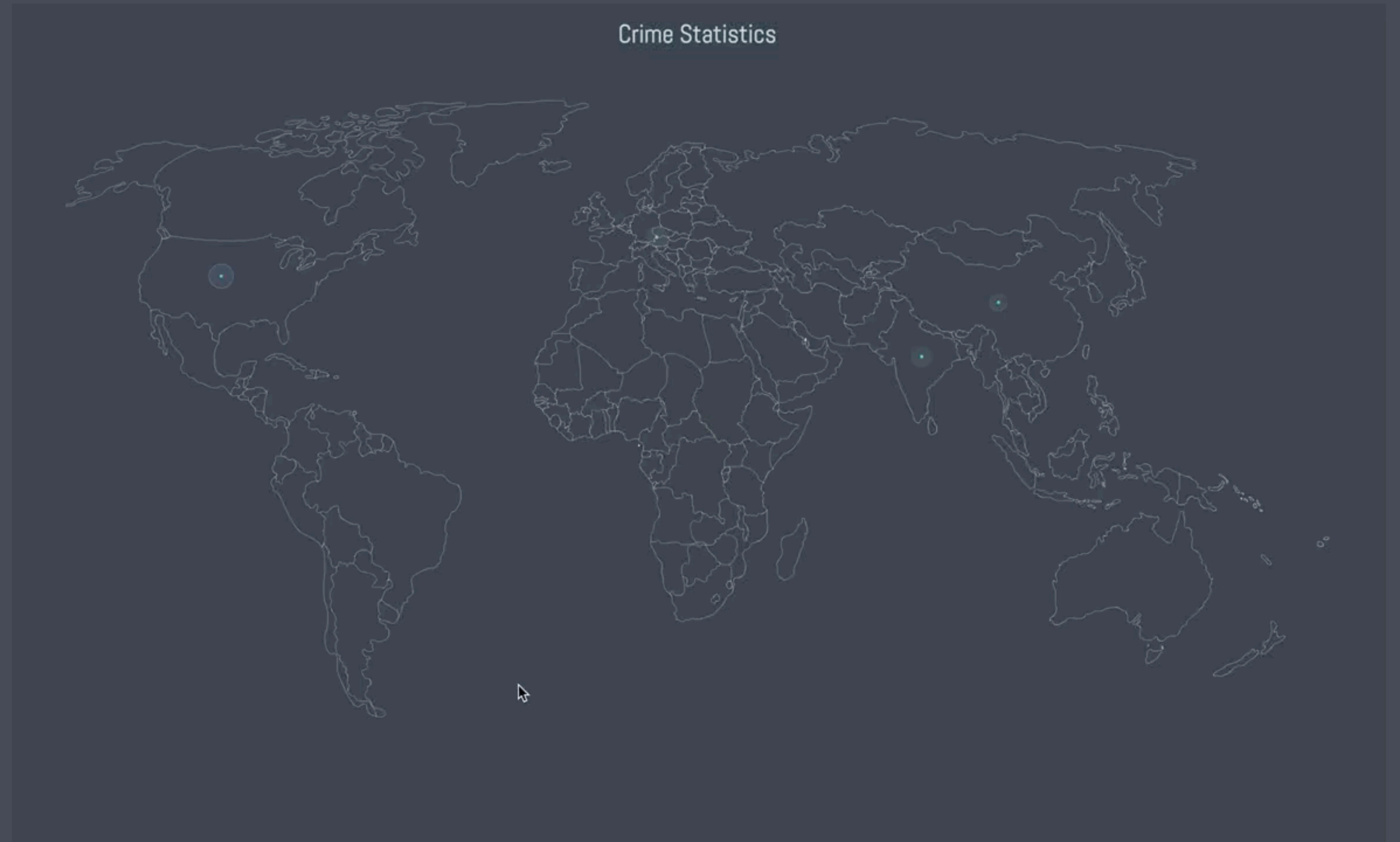
```
JS
1 var houses = document.getElementById("houses");
2 var s = houses.getBBox();
3
4 //check the console for the SVGRect object
5 console.log( s );
6
7 //we store the values from the object as our new viewBox string
8 var newView = "" + s.x + " " + s.y + " " + s.width + " " + s.height;
9
10 //we then set the new viewBox string as the viewBox attribute on the SVG
11 var foo = document.getElementById("foo");
12 foo.setAttribute("viewBox", newView);
```





RETAINING CONTEXT

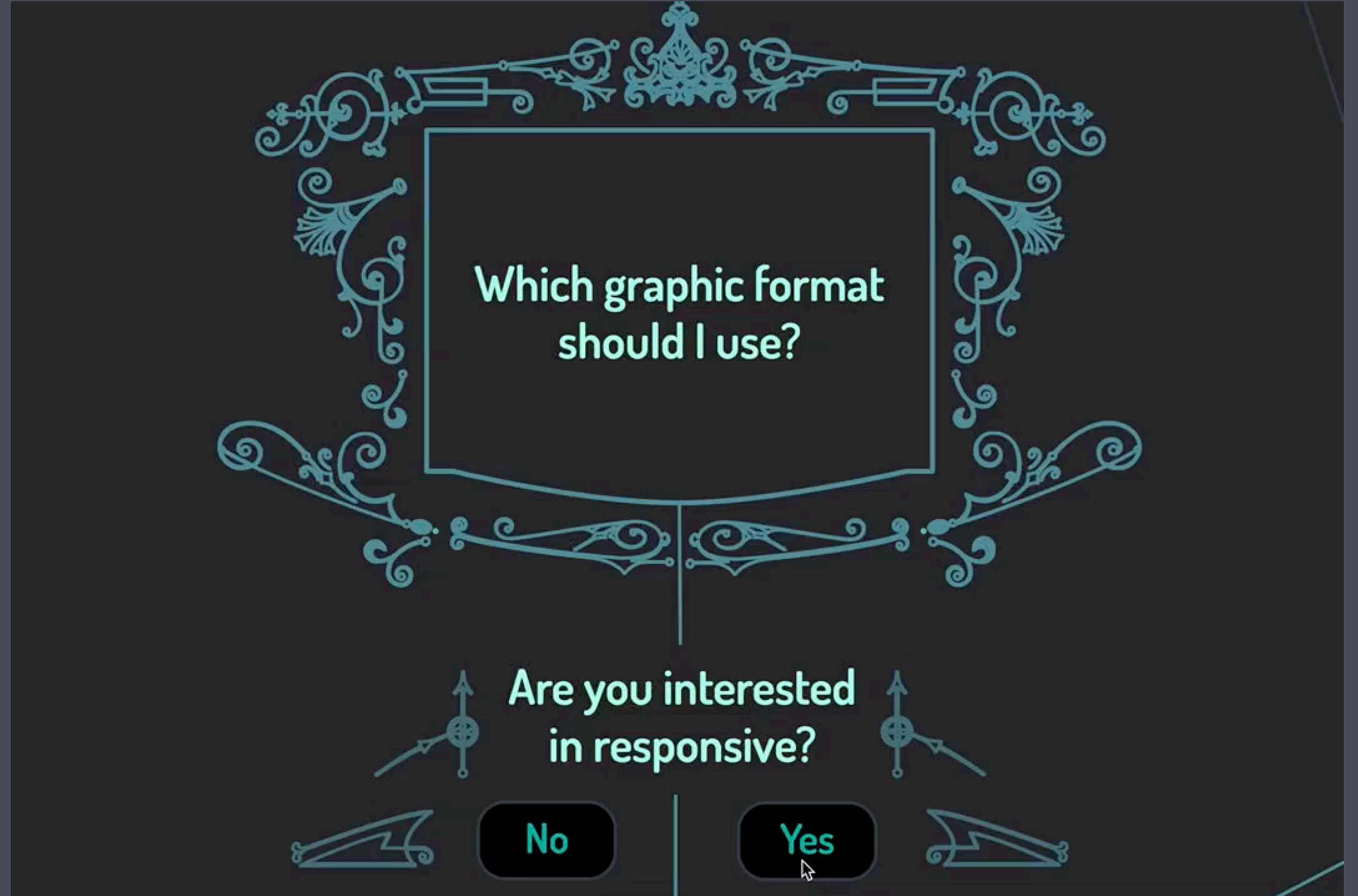
# VIEWBOX AS A CAMERA

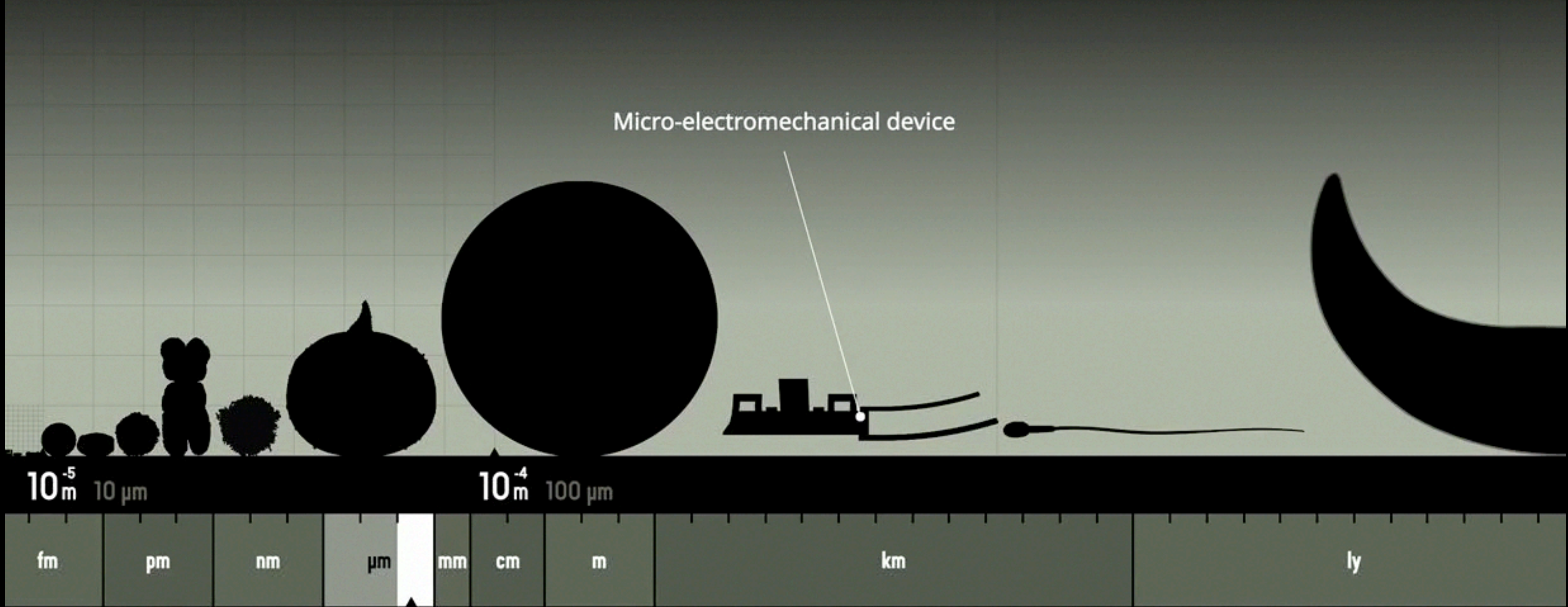


[codepen.io/sdras/pen/dXoLEJ](https://codepen.io/sdras/pen/dXoLEJ)

RETAINING CONTEXT

# VIEWBOX AS A CAMERA





$\mu\text{m}$

Micrometer | The Microcosm under the Microscope



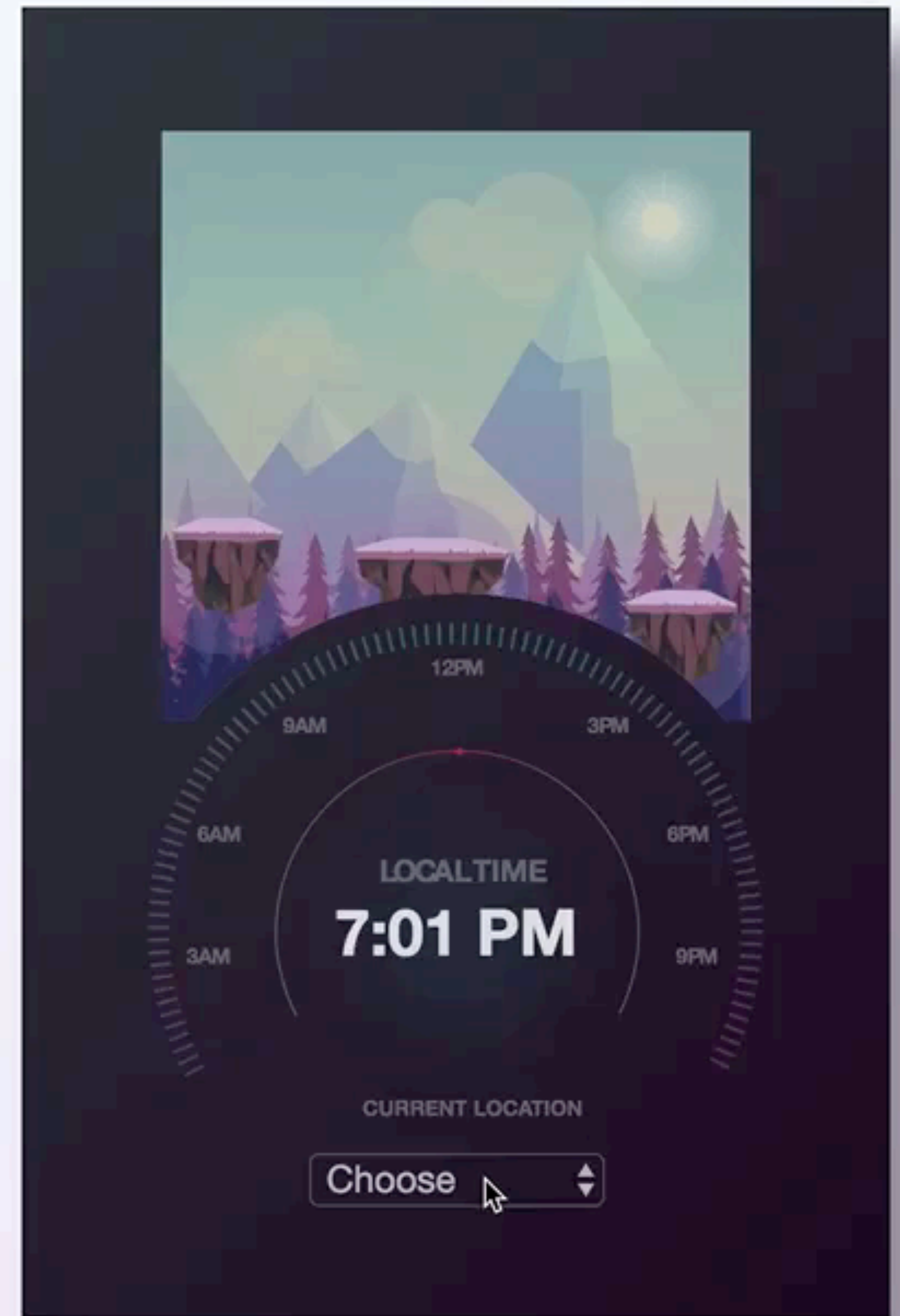
SHOWING CHANGE OVER TIME

CHANGE OVER TIME

# MOTION AS A TIME SIGNIFIER

```
//this formats the hour info without a library
getCurrentHour(zone) {
  let newhr = new Date().toLocaleTimeString('en', {
    hour: '2-digit',
    minute: '2-digit',
    hour12: true,
    timeZone: zone
  })
  return newhr
},
```

[codepen.io/sdras/pen/RZGqxR](https://codepen.io/sdras/pen/RZGqxR)



CHANGE OVER TIME

# SCROLLYTELLING

[letsfreecongress.org](http://letsfreecongress.org)



*A tiny group of **powerful funders** give our politicians the money they need to win elections.*

CHANGE OVER TIME

# SCROLLYTELLING

Home

The New York Times

SPORTS

Share

# The Dawn Wall

## El Capitan's Most Unwelcoming Route

By SHAN CARTER, WILSON ANDREWS, DEREK WATKINS and JOE WARD JAN. 9, 2015

Tommy Caldwell and Kevin Jorgeson etched their names into climbing lore on Wednesday by successfully completing a 19-day free-climb of the Dawn Wall on El Capitan. The route up the mostly smooth granite face is widely considered to be the most difficult free-climb in the world. A free-climb means that ropes are used only to catch a climber's fall — not to aid the ascent.

Photograph of El Capitan by [xRez Studio](#). 3-D model from M. Jaboyedoff, B. Matasci and A. Guerin of the University of Lausanne.

RELATED ARTICLE



CHANGE OVER TIME

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# GREENSOCK'S TIMELINE



[codepen.io/sdras/pen/ByEWON](https://codepen.io/sdras/pen/ByEWON)



CHANGE OVER TIME

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# GREENSOCK'S SYNTAX

[codepen.io/sdras/pen/Wramvo](https://codepen.io/sdras/pen/Wramvo)



CHANGE OVER TIME

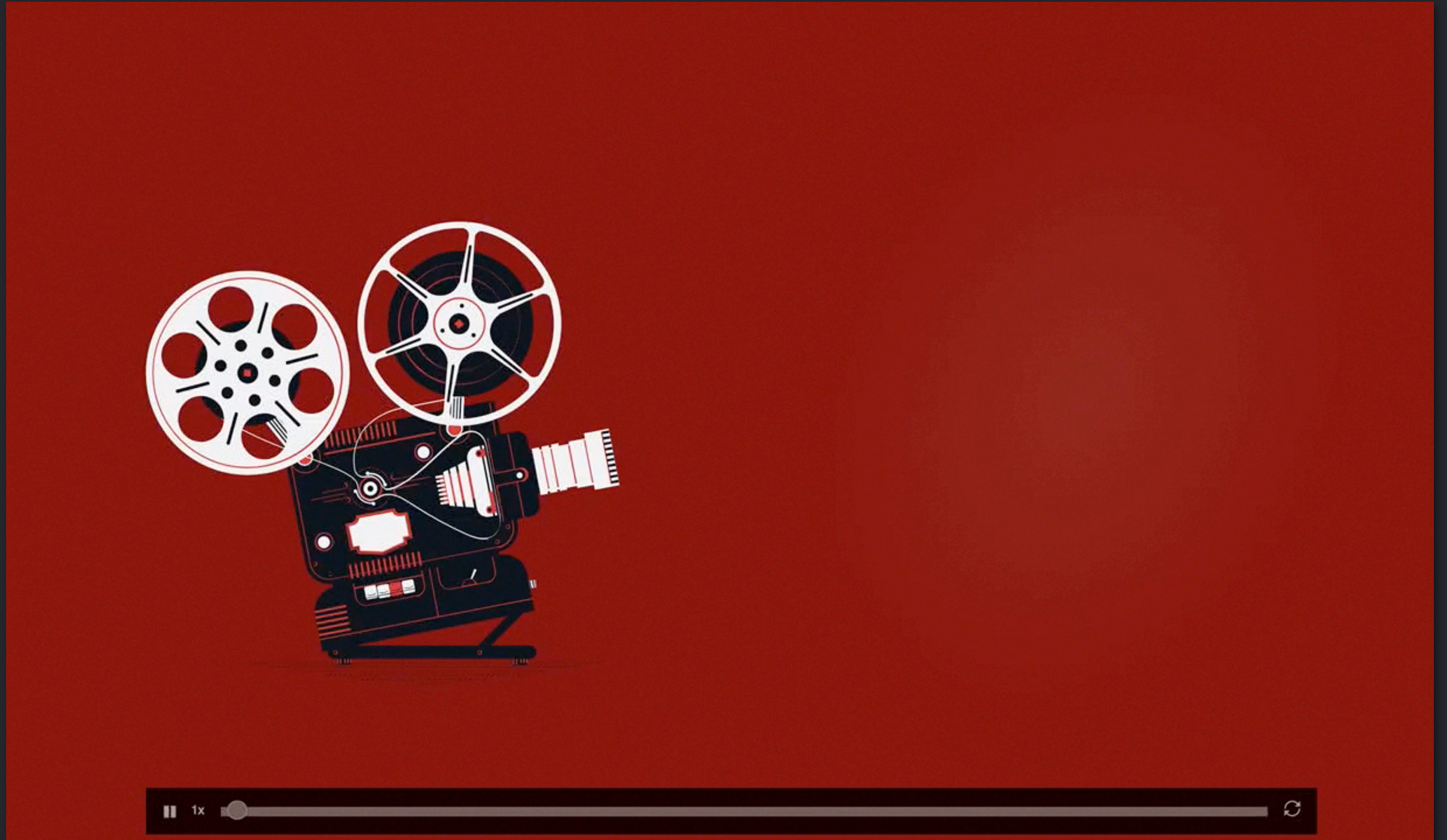
---

## GREENSOCK'S TIMELINE

```
t1.pause(); // Pause timeline
t1.resume(); // Continue playback
t1.restart(); // Restart the timeline
t1.play(X); // Play from Xs
t1.play(-X); // Play Xs from end
t1.seek(X); // Go to Xs or 'label'
t1.reverse(); // Reverse playback anytime
t1.timeScale(x); // Speed up/slow down timeline
t1.progress(0.5); // Skip to halfway
```

CHANGE OVER TIME

# GREENSOCK'S TIMELINE



[github.com/sdras/gsap-player](https://github.com/sdras/gsap-player)

# SCROLLYTELLING OPTIONS

STORYTELLING IN CODE

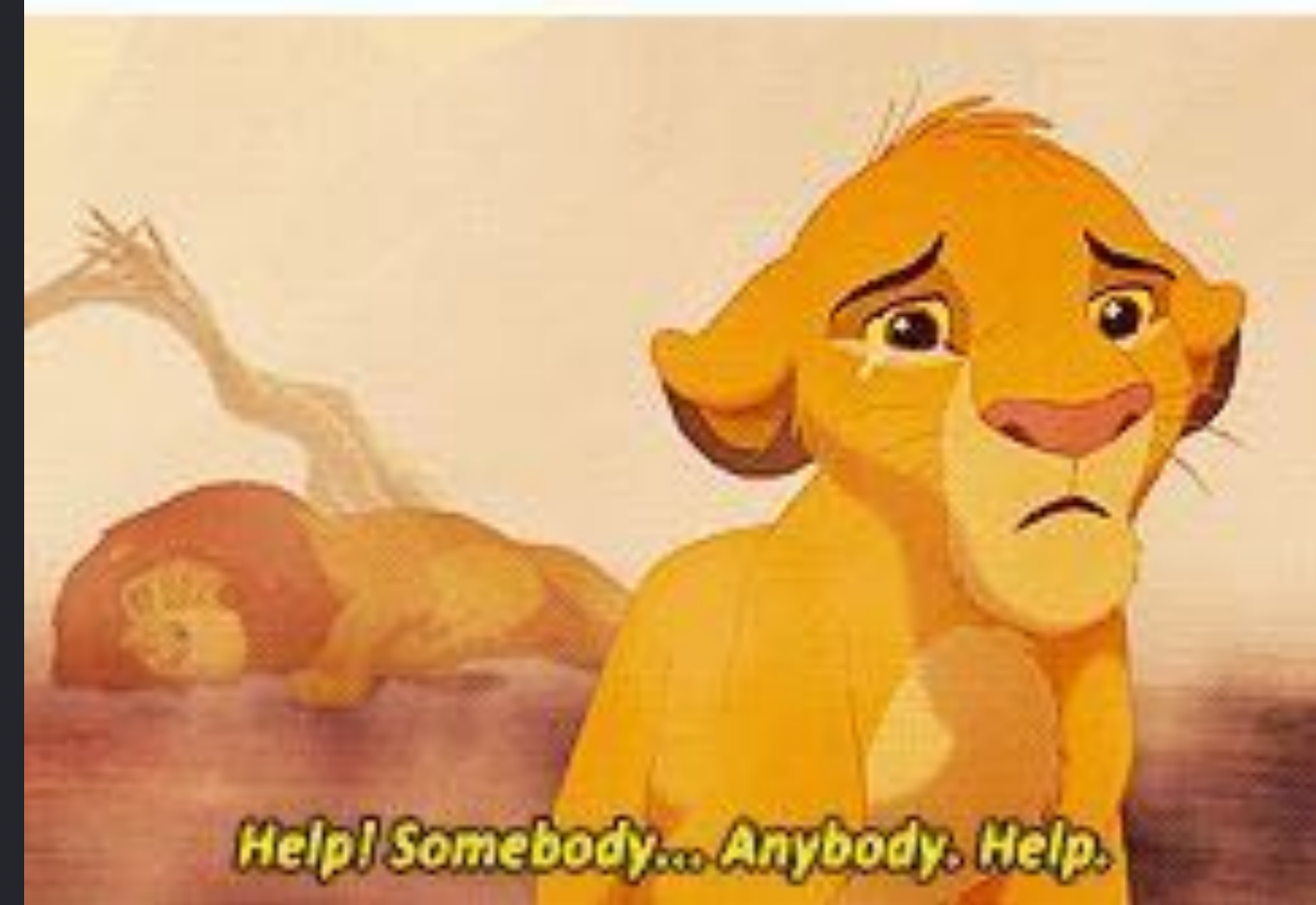
## PIXEL TO PIXEL

- Skrollr
- Map timeline progress to scroll event (semi-manual)
- ScrollMagic
- ScrollStory

## POINT TRIGGERED

- Waypoints
- Trigger single timeline off of scroll event (semi-manual)
- ScrollMagic
- ScrollStory
- GraphScroll

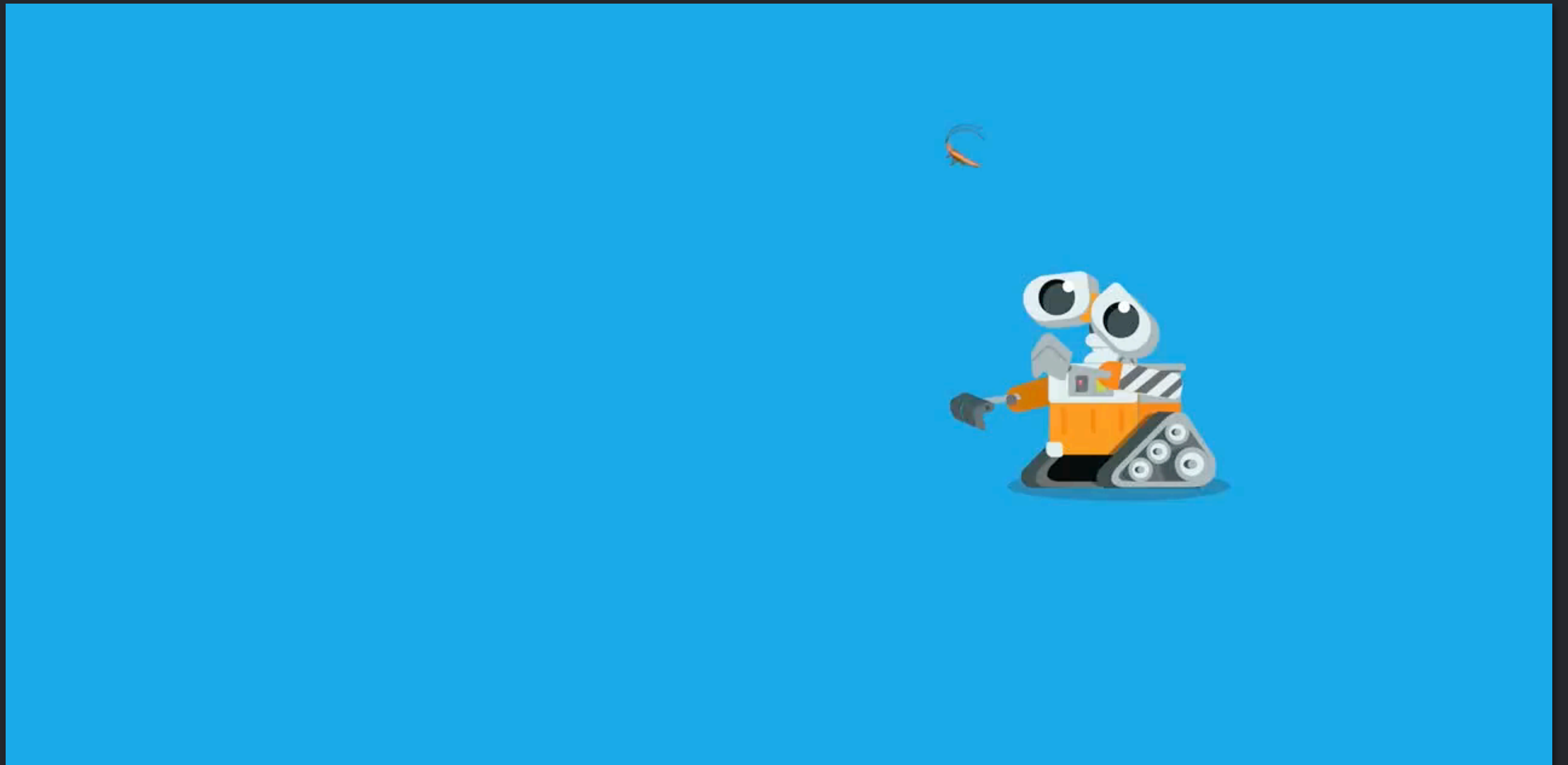
# EMOTION ATTACHES TO THE LIMBIC SYSTEM



# EMOTION ATTACHES TO THE LIMBIC SYSTEM

```
coordinates(e) {  
  this.startArms.progress(1 - (e.clientX / walleCoords)).pause();  
},
```

[codepen.io/sdras/pen/YZBGNp](https://codepen.io/sdras/pen/YZBGNp)



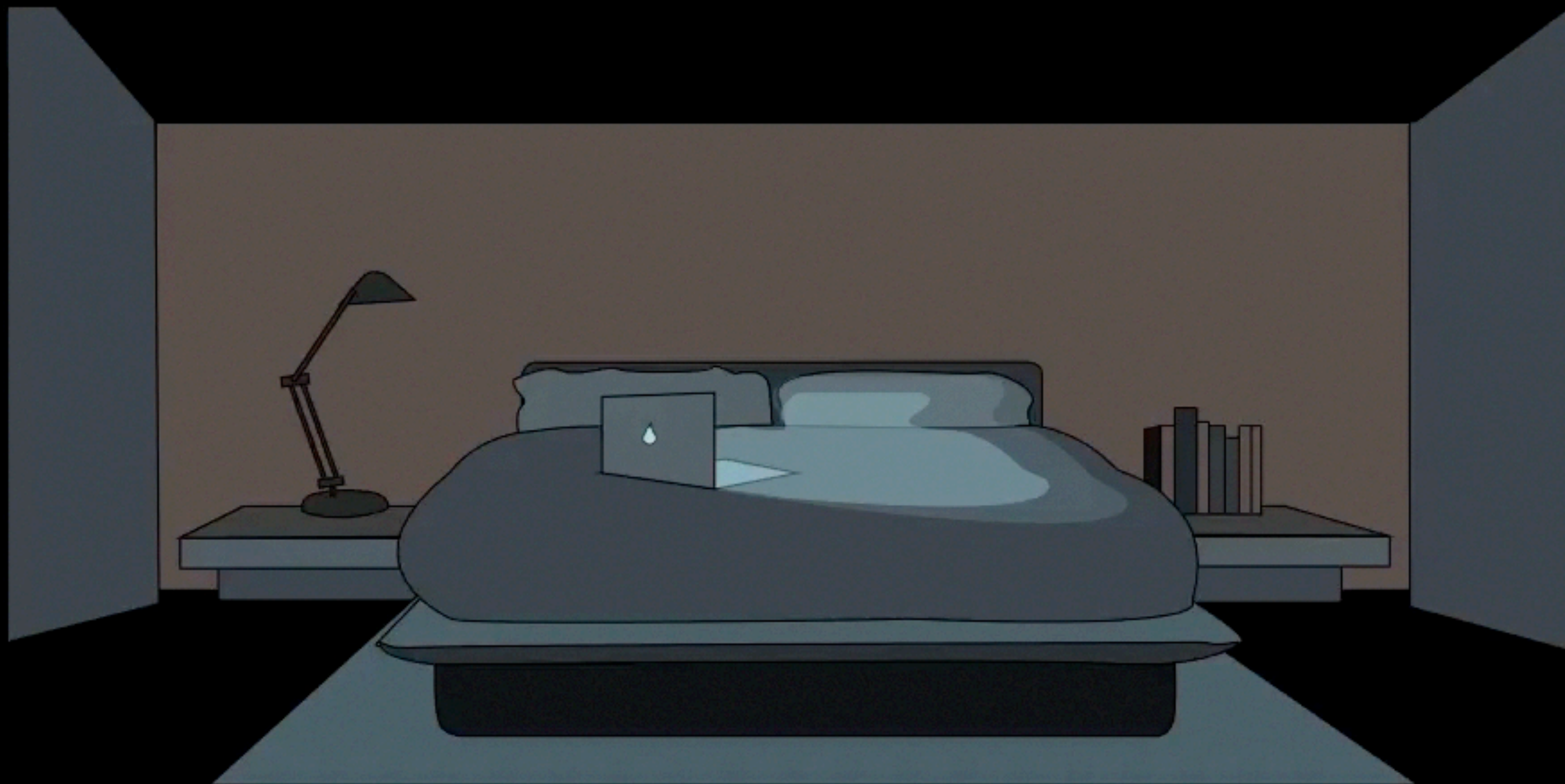
CHANGE OVER TIME

# SCROLLYTELLING

TEXT AND  
IMAGE



[nytimes.com/interactive/2016/07/07/world/americas/bolivia-climate-change-lake-poopo](https://www.nytimes.com/interactive/2016/07/07/world/americas/bolivia-climate-change-lake-poopo)



[codepen.io/sdras/pen/dPqRmP](https://codepen.io/sdras/pen/dPqRmP)

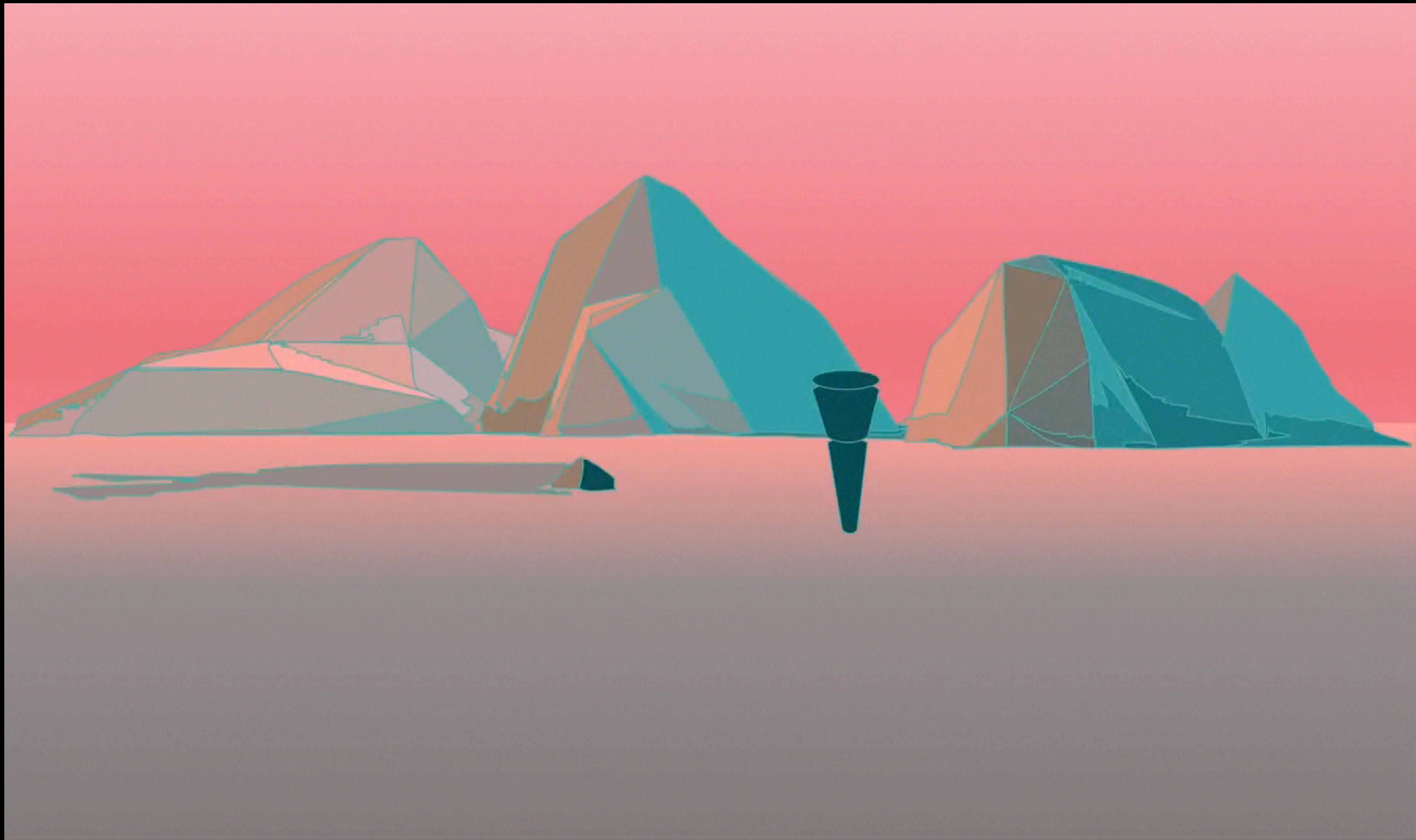


# MARRYING TEXT AND IMAGE

SPLITTEXT

```
// instantiate new split text
var foo = new SplitText("#bar", {type:"words",
  //optional
  wordsClass:"word"
});

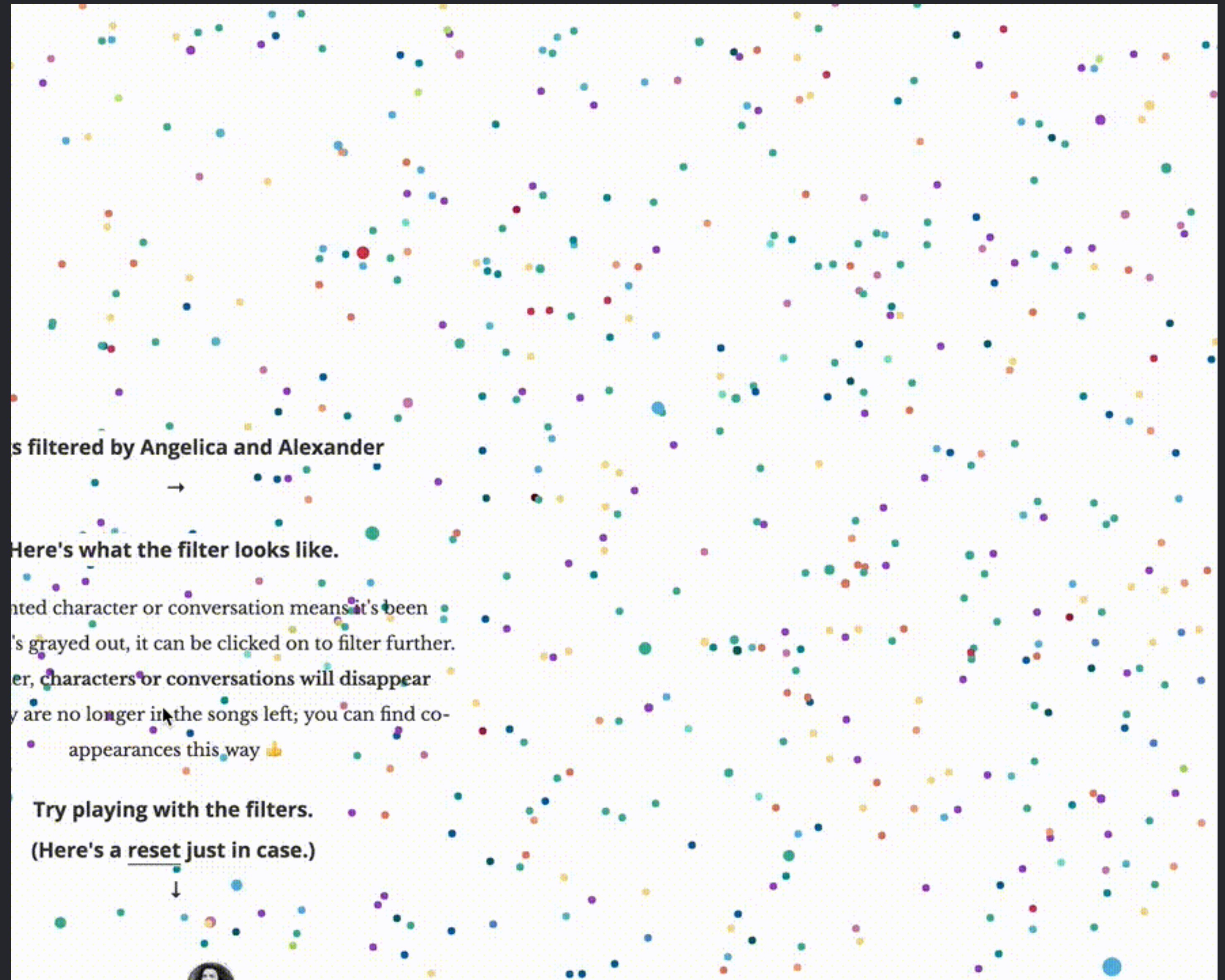
// use in a timeline call
tl.staggerTo(foo.words, 0.8, {
  rotationY: 60,
  y: 300,
  opacity: 0,
  ease: Power4.easeIn
}, 0.1);
```

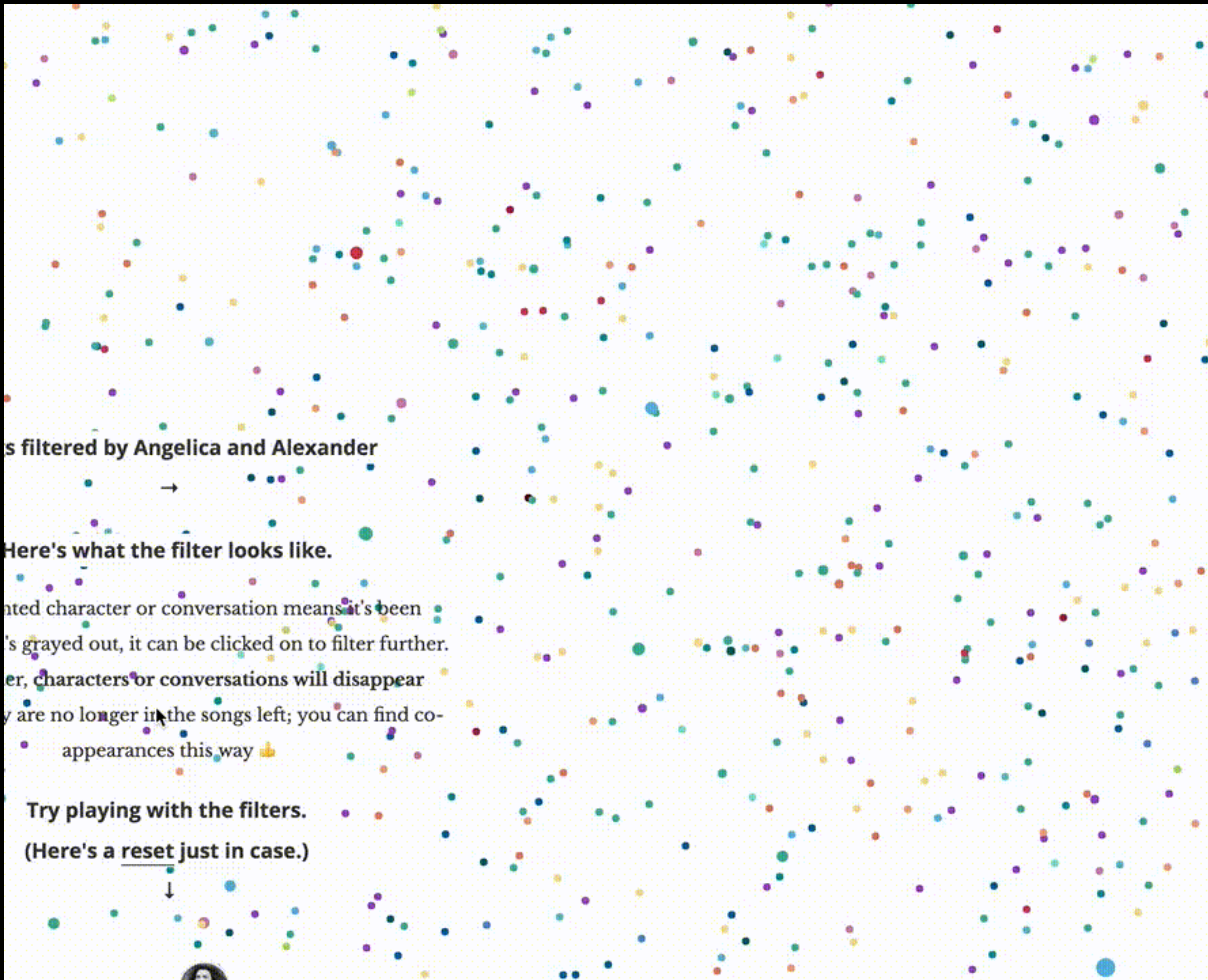


[codepen.io/sdras/pen/RNWaMX](https://codepen.io/sdras/pen/RNWaMX)



# STORYTELLING WITH INTERACTIVE TEXT AND IMAGE





REVEALING FOR CLARITY

REVEALING FOR CLARITY

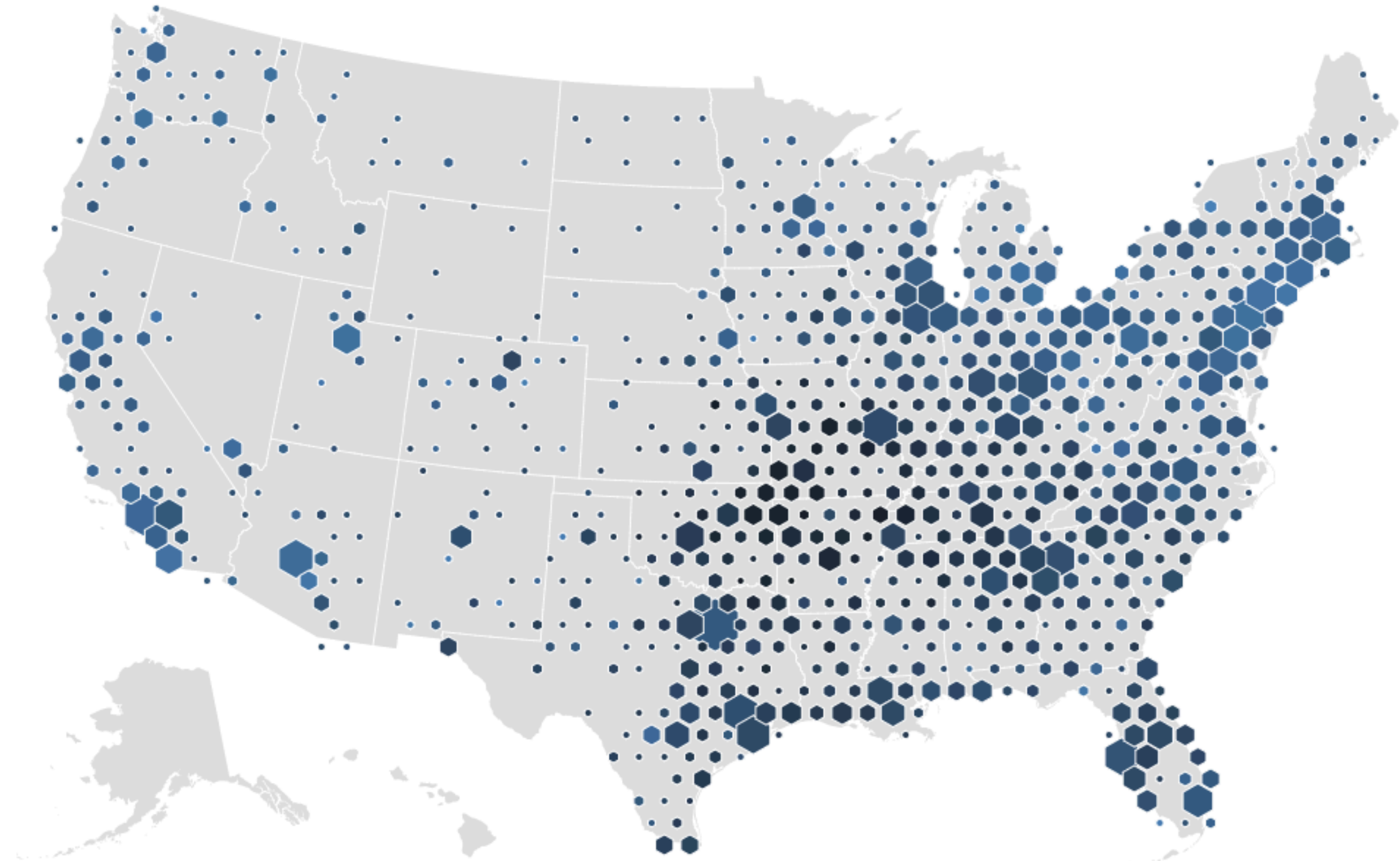
# MOTION AS INFORMATION



Mike Bostock's Block 4330486 ← 4248146  
Updated May 23, 2017

Popular / About

## Bivariate Hexbin Map



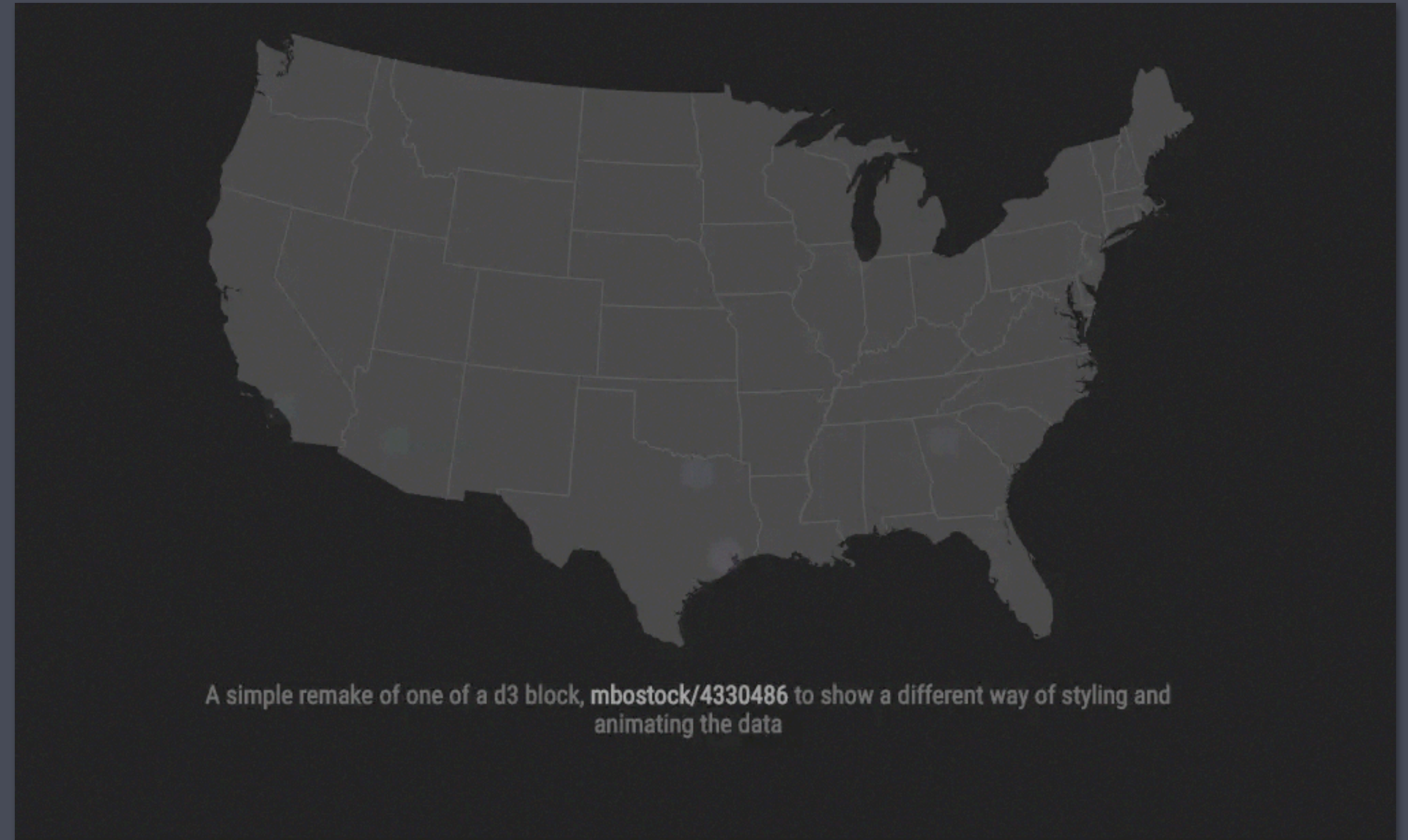
This example shows how to use [d3-hexbin](#) for hexagonal binning on a map with the [d3.geoAlbersUsa](#) projection. Approximately 3,000 locations of Walmart stores are shown. These are binned into hexagons, and the hexagon area encodes the number of stores that fall into each bin. Color encodes the median age of Walmart stores in that area, with the oldest stores in black and the youngest stores in blue.

[Open](#)

REVEALING FOR CLARITY

# MOTION AS INFORMATION

```
.hexagons path {  
  opacity: 0;  
}  
  
$elements: 2000;  
@for $i from 0 to $elements {  
  .hexagons path:nth-child(#{ $i }) {  
    $per: $i/50;  
    animation: 2s #{$per}s ease hexagons both;  
  }  
}  
  
@keyframes hexagons {  
  100% {  
    opacity: 1;  
  }  
}
```



A simple remake of one of a d3 block, [mbostock/4330486](#) to show a different way of styling and animating the data

[codepen.io/sdras/pen/qZBgaj](https://codepen.io/sdras/pen/qZBgaj)



REVEALING FOR CLARITY

# MOTION AS INFORMATION

## wind map

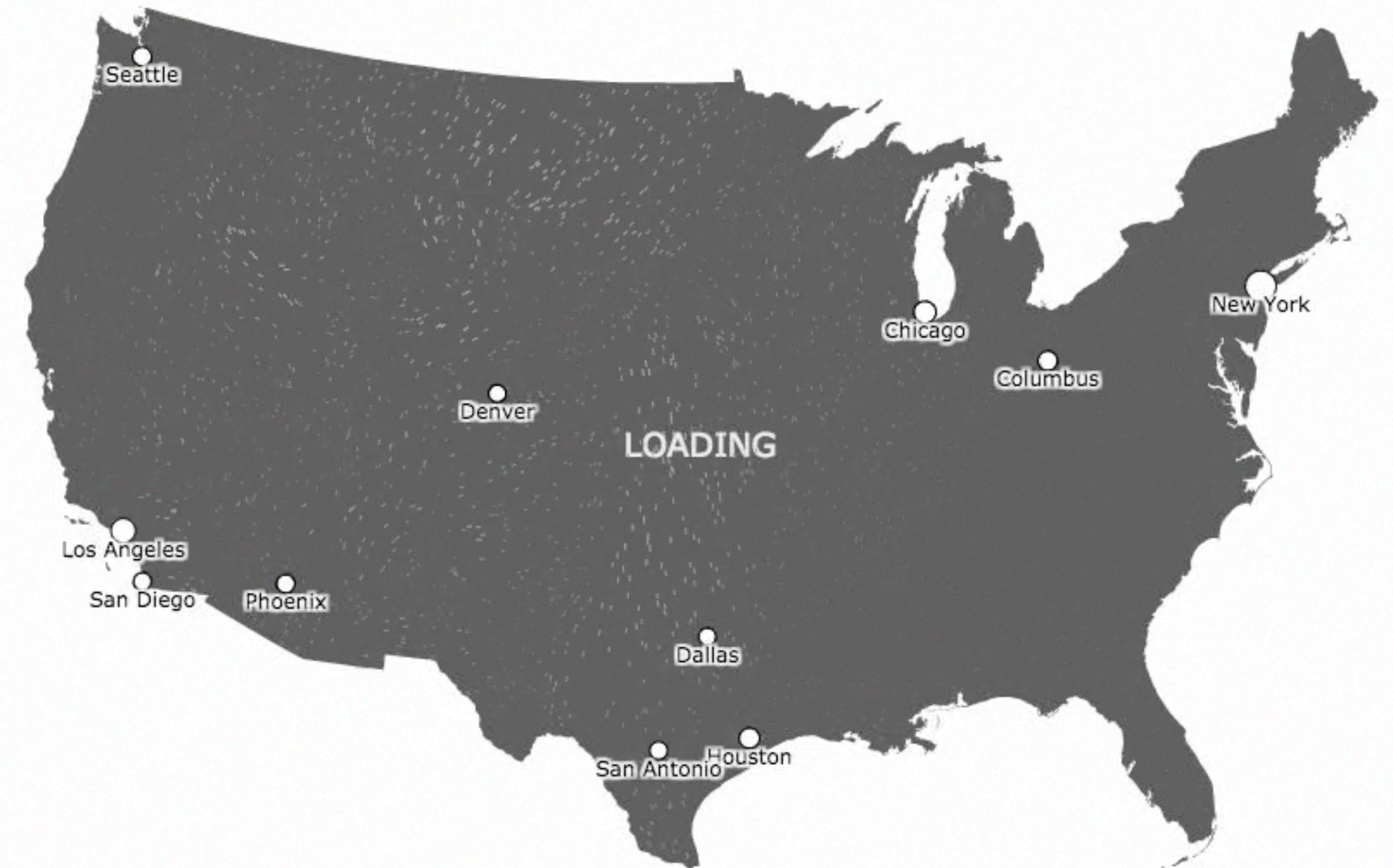
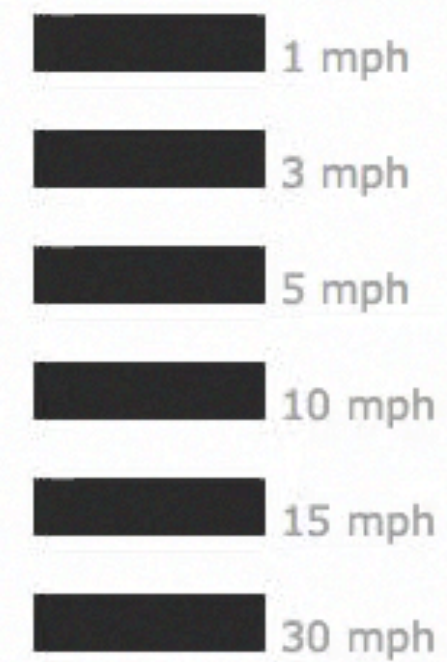
**Sept. 15, 2017**

10:37 am EST

(time of forecast download)

top speed: **53.0 mph**

average: **7.5 mph**



# Royal Constellations

A 1000 years of ancestral connections in the European royal families



## Discover the shortest path between two royals

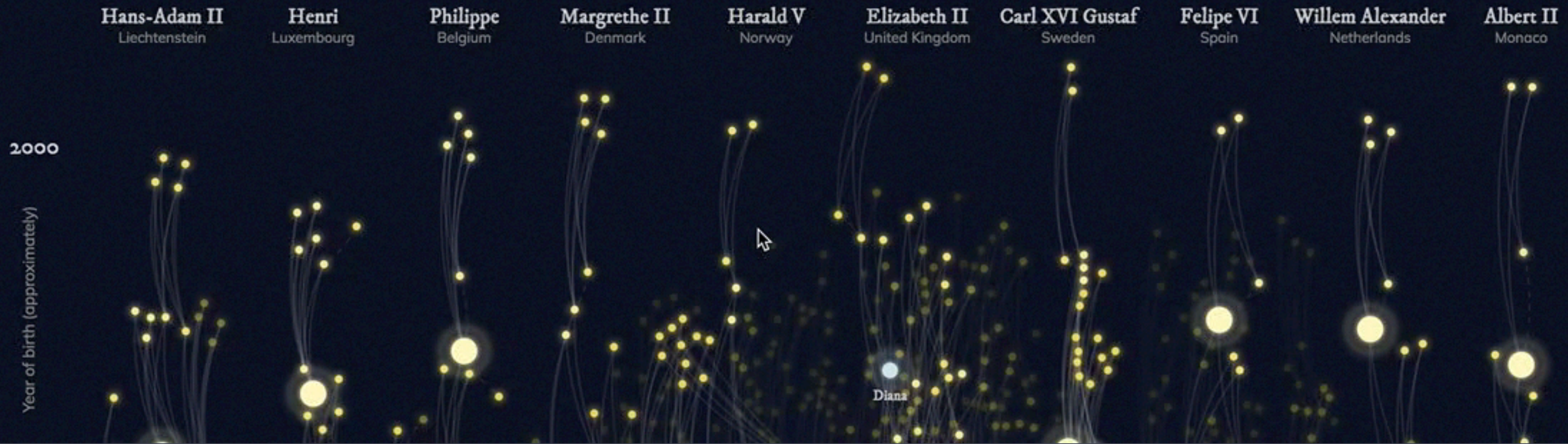
If you click on a star you will select & fix that person. By clicking on another star the visual will show you the shortest path between the two (although sometimes multiple shortest paths exist. The algorithm will then show one of these). To clear the fix on the first person, click anywhere outside of the star filled area.

Royal & aristocratic families are known for their fondness of marrying within their own clique. Restraining aggression between two families, creating a stronger front towards a third family, increasing territorial acquisitions, legal claim to a foreign throne through inheritance are some of the most common reasons.

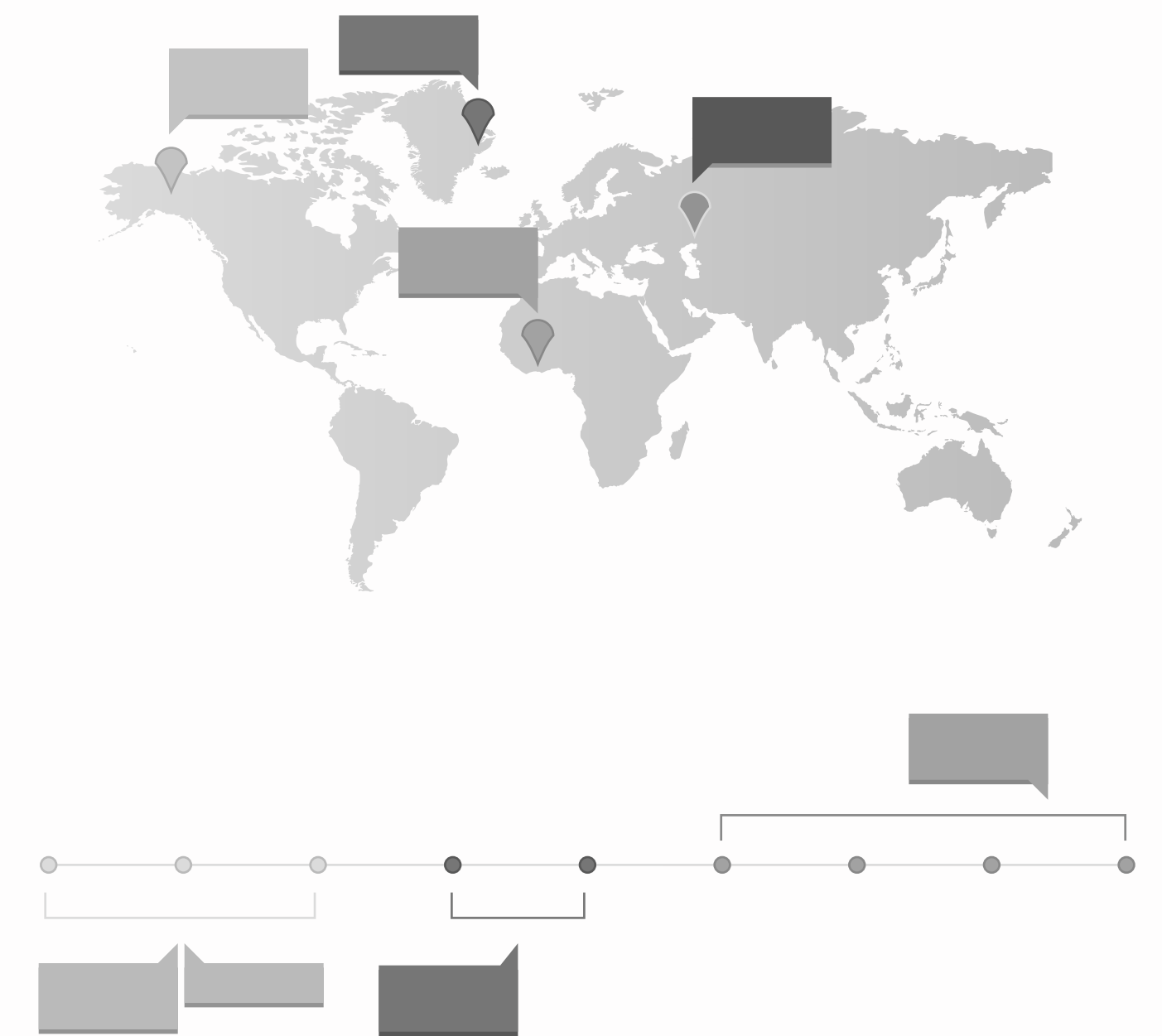
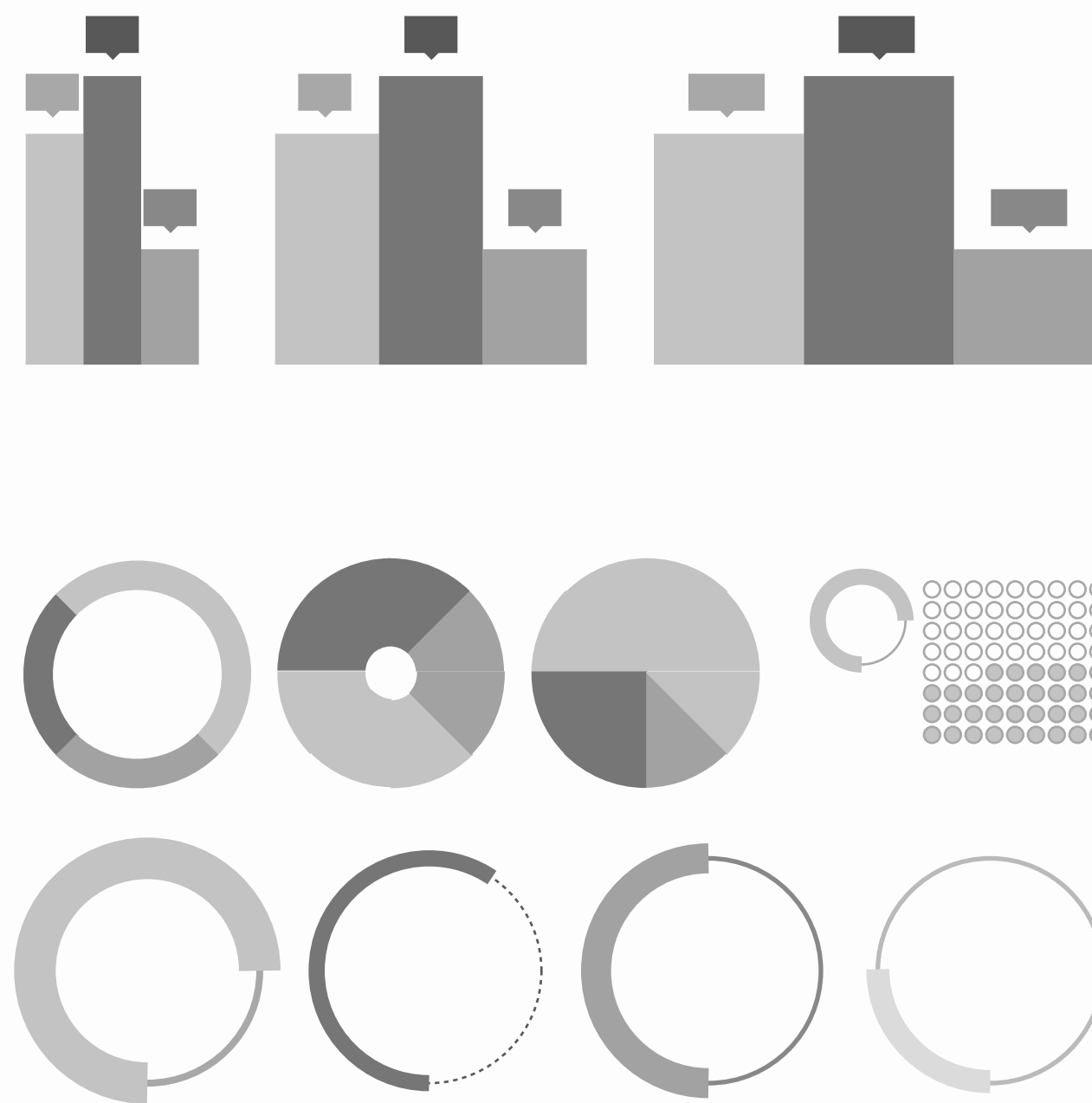
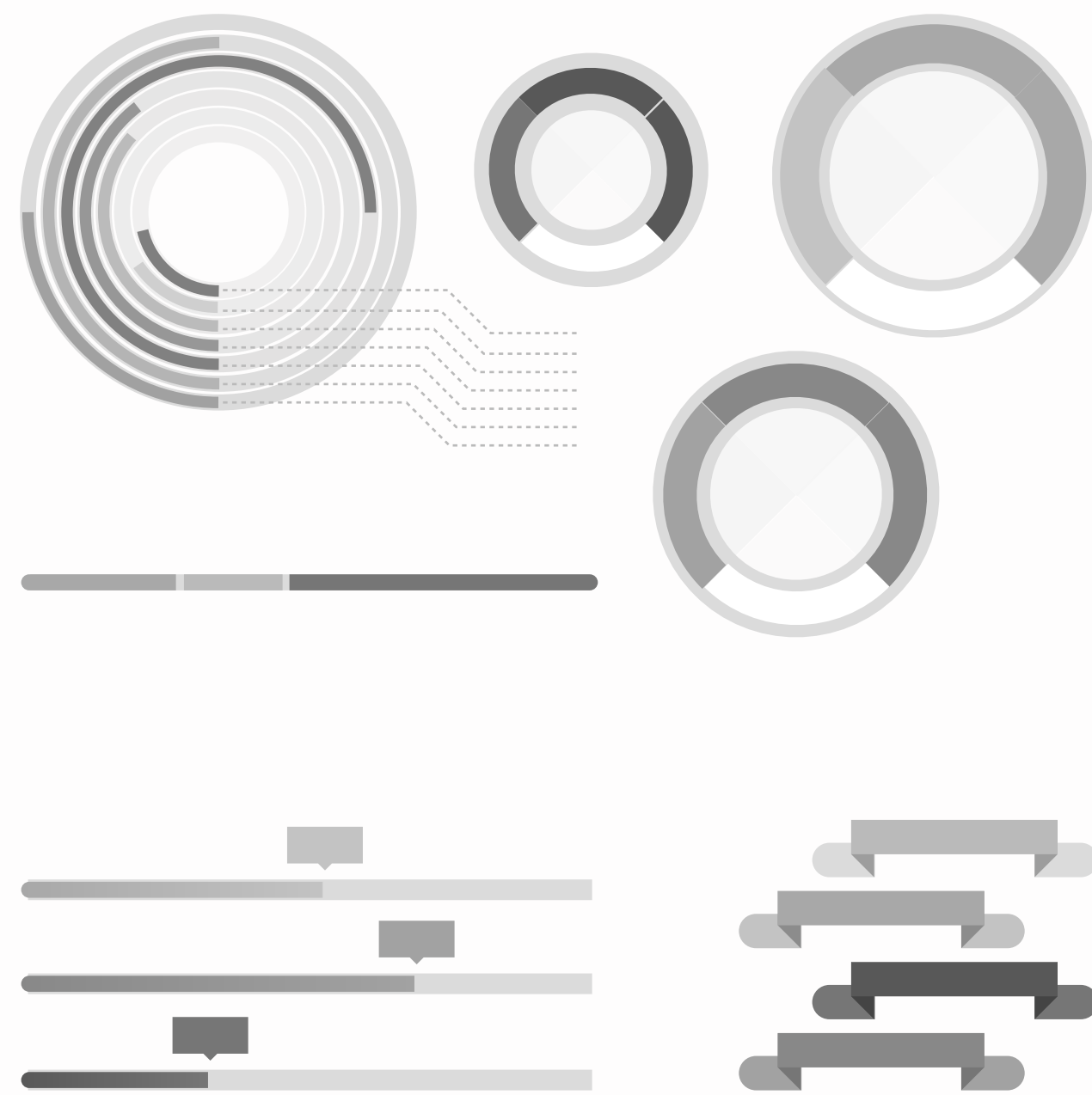
This leads to very interesting & entangled family trees which the visual below tries to convey. It shows how all 10 of the current hereditary royal leaders of Europe can be connected to each other through their ancestors. We don't have to look very far back. Even the most distant royal relatives have their shared forebears born after the year 1700.

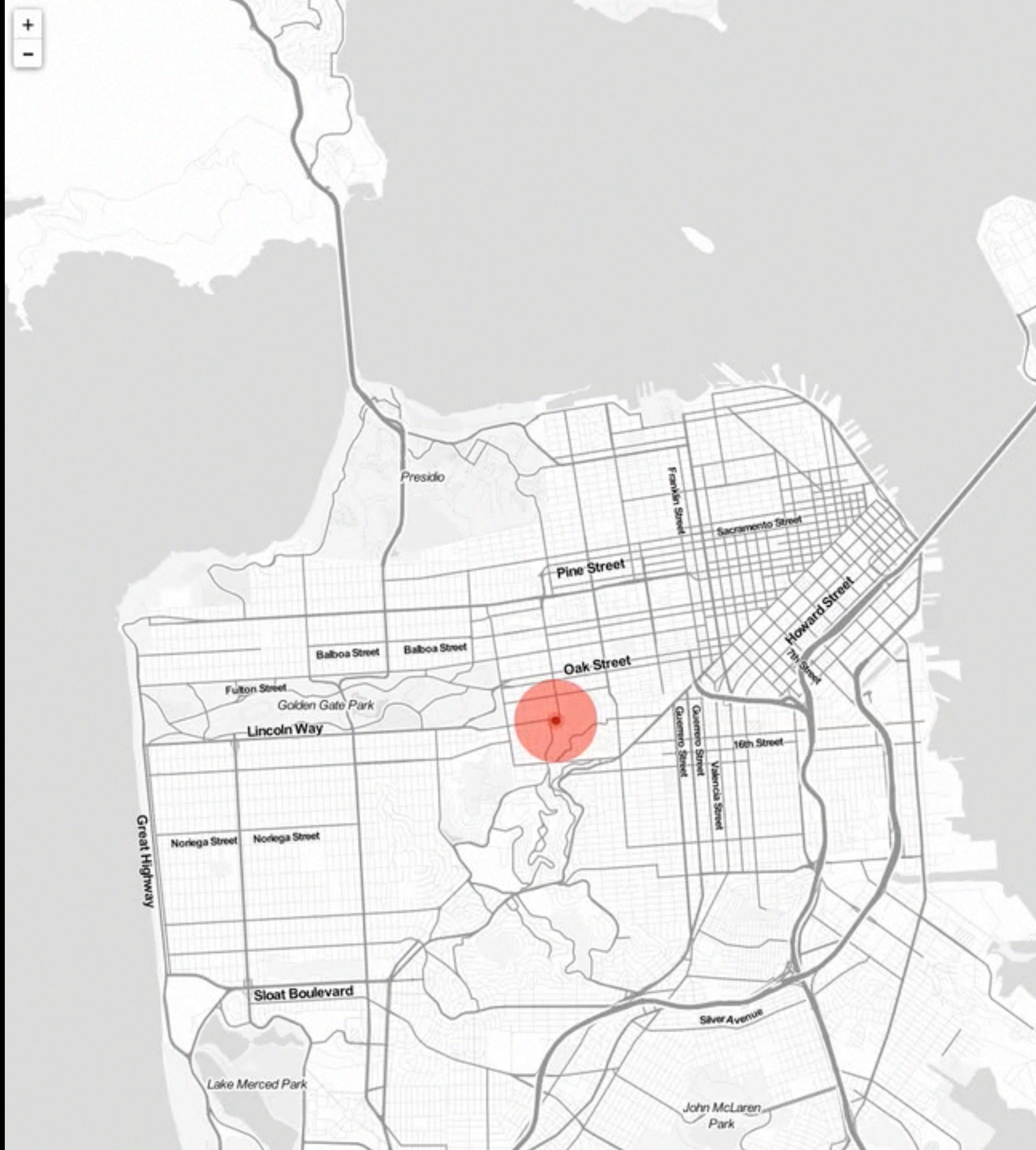
Each "star" below is a person, placed approximately on their year of birth in the vertical direction and to their closest relative who is a royal leader today in the horizontal direction. Hover over a star to see how many relatives can be connected to that person in "6-degrees of separation". For highly connected royals, such as Pauline of Württemberg, born in 1810, who is a relative of 6 current royal families, it may take a second to calculate all connections.

This genealogy is far from complete, or perfect, probably many more interconnections exist, but this peek into the history of Europe's royals shows that it's all one big (happy?) family.



# GET THE DATA ON THE PAGE, THEN REVEAL IT

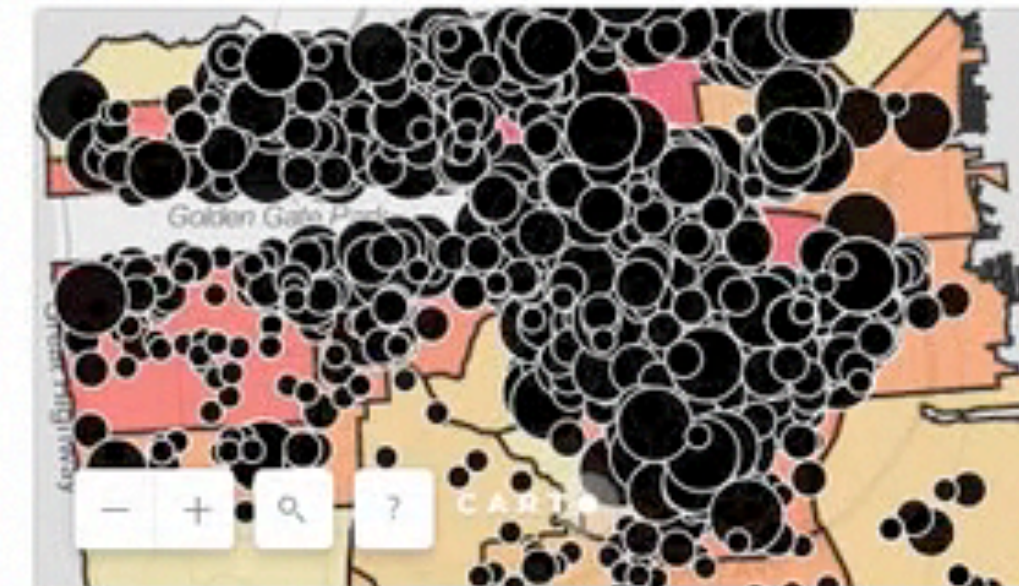




# ELLIS ACT EVICTIONS

0

SAN FRANCISCO FAMILIES FORCED OUT OF  
THEIR HOMES,  
1/1/1994 - 7/11/1994



date\_filed 0 SELECTED

Evictor Zip

ALL SELECTED		ALL SELECTED	
44	CHETCUTI...	6	ALAIN CA...
3	JAMES J. ...	3	JOHN WAI
		1.4k	OTHER
			94110
			94122

SEARCH IN 1404 CATEGORIES

Map by Anti-Eviction Mapping Project

For map with more analysis, [click here](#).

The Ellis Act is a state law which says that landlords have the right to evict tenants in order to "go out of business". All units in the building must be cleared of all tenants- no one can be singled out. Most often it is used to convert to condos or group-owned tenancy-in-common flats. Once a building becomes a condo it is exempt from Rent Control, regardless of the age of the building, and even if a unit owner subsequently rents to a long-term tenant.



THE BARTER  
8000-4000 BC



DATA IN MOTION

# COMBINE!

FILTERING

GREATER CONTEXT

SCROLLYTELLING

REVEALING

Why did the Boston Celtics select **Jaylen Brown** as the 3rd overall pick in the 2016 NBA draft?

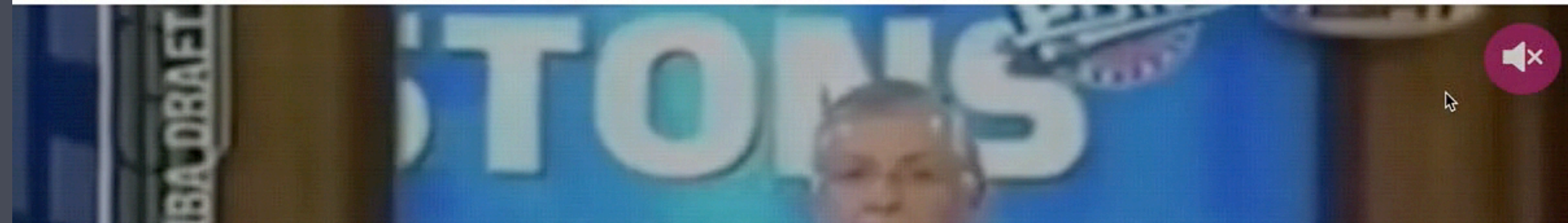
It's questions like this that fuel the subreddit [r/nba](#) during "shitpost" season – the down time between free agency and the start of the next NBA season.

Conversations often gravitate toward the debate of a draft pick's potential versus proven ability. Is he worth the risk?

While we can't predict how this year's rookie class will stack up, we can look at what the past can teach us as we redraft 20 years of picks using their career stats.

[How bad was Darko, really?](#)

To illustrate how the redraft works, let's look at the most notorious draft pick in modern basketball, Darko Milicic.



[pudding.cool/2017/03/redraft/](https://pudding.cool/2017/03/redraft/)



# MOTION

GIVES OUR DATA ANOTHER DIMENSION

THANK YOU!

SARAH DRASNER

**@SARAH\_EDO**