Displaying Cross Cultural Differences in News Videos
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1 Introduction

With the rapid growth of globalization, information is spread and exchanged extensively all around the world. The same international events are likely to be reported by media of diverse countries via videos, so we would like to study how the same events will be reported and represented via video in different cultures and nations. In this report, I will introduce how I design and implement a user interface that displays the result of cultural differences analysis in new videos.

In particular, I would like to present the result of cross cultural differences analysis of a three-game Go match between the top-ranking player Kejie and the computer Go program Alpha Go Master in 2017. I would like to present how this event was reported by Chinese new videos and U.S. new videos respectively, and highlight the similarity between them.

2 Wireframe

This section briefly introduce what types of information of certain new videos should be contained, and how they should be displayed in my design solution.

2.1 Features

The following features of certain new videos are greatly important so they should be contained in my design solution: time(date) of the video released, representative sample screenshots(images) of the video, text corresponding to the images, source of the video and hyperlinks to actual video. However, in the samples provided to me, the source and hyperlinks of new videos are missing so I will not represent them in my current design solution. In addition, most samples do not have accurate release time so I counterfeit times that approximate Kejie versus Alpha Go in order to clearly display my design solution. Eventually, the features of certain new videos are release date, text, and sample images.

2.2 Prototype

The design solution aims to highlight the images in common of new videos reported respectively in China and U.S., so I would like to use an event timeline with three rows: the first row containing dots that represent news videos in China, the third row containing dots that represent news videos in U.S., and the second row in between with dots indicating that some images are shared by news videos in China and U.S. simultaneously. Noticeably, the dots in all three rows are sorted and arranged by their release times. Each time when a user clicked on dots, a tooltip pops up and shows detailed description (sample images and text) of corresponding news video.
To visualize my design solution, I would like to imitate a time-based Event Drops Demo of D3, that is a JavaScript library for manipulating and visualizing documents based on data with HTML, SVG and CSS.

Event Drops Demo shows a zoomable time-based interactive event series, with 4 rows containing dots that represent Github commits. There are some important features I would like to highlight and thus imitate in my own design solution.

**Feature 1:** Users are able to change time intervals via cursor dragging and moving.
Feature 2: Users are able to zoom in and zoom out data via cursor sliding and moving.
Feature 3: When users hover cursor on a particular dot, a tooltip pops up and displays the information of corresponding Github commit.

Hence, I would like to imitate the Event Drops Demo above, and use similar timeline to display new videos reported in China and in U.S. respectively, as well as to highlight the same images they are using.

3 Code implementation

In this section I will go through the process of code implementation of my design and solution, and explain the ideas behind them.

3.1 Data Organization
### 3.1.1 Raw Data

I label each news video by indices, and sort its sample images and text by indices under its corresponding directory. The directories *Chi* and *Eng* that stores information of new videos in China and U.S. respectively, and the directory *Common* stores common sample images and the information of correspondences (that means which news video(s) in *Chi* and which news video(s) in *Eng* share such same sample image(s)).

**Figure 7 Raw Data**

### 3.1.2 Organized Data

In final code implementation, I store data in the array that contains three elements. The first and third element store the information of news videos in U.S. and China. Each element in them stores multiple features: *index* (index of current news video), *message* (text of current news video), *images* (names of image files that correspond to current news video), *date* (release time of current news video) and *correspondence* (the index/indices of news videos in other cultures that share common images with current news video).

**Figure 8 Organized Data Array**
The second element stores the correspondence. If some news videos in China and some new videos in U.S. share the same image(s), then I regard this as a correspondence. Therefore, a correspondence includes the common image(s) shared by certain news videos in China and U.S., and the corresponding texts in both languages. Noticeably, the correspondence takes the latest date (release time) of all relevant news videos as its date.

3.2 Basic Event Drops Timeline

3.2.1 HTML Layout

3.2.2 JavaScript Elements and Functions

(1) Load Data

```javascript
data.forEach(function() {
    d.commits.forEach(function() {
        c.date = new Date(c.date);
    });
    console.log(data);
    var n = data.length;
});
```

(2) Basic Layout

```javascript
var width = 1400;
var lineHeight = 100;
var lineWidth = 100;
var margin = {left:50, right:100, top:30, bottom:50};
var height = lineHeight+margin.top+margin.bottom;
var lineWidth = width-margin.left-margin.right-name-width;
var svg = d3.select("#eventdrops-demo")
    .append("svg")
    .attr("width",width)
    .attr("height",height);
var g = svg.append("g")
    .attr("transform","translate(0,-margin.top)"");
```

(3) Starting Time, Ending Time and Time Scale
var min = new Date("Jan 1, 2017"); // Minimum Date
var max = new Date("June 30, 2037"); // Maximum Date
var tScale = d3.scaleTime()
    .domain([min, max])
    .range([0, lineWidth]);

var startTime = g.append("text")
    .attr("x", minWidth)
    .attr("y", lineHeight + lineHeight/2)
    .attr("text-anchor", "start")
    .attr("font-size", "20px");

var endTime = g.append("text")
    .attr("x", nameWidth + lineWidth)
    .attr("y", lineHeight + lineHeight/2)
    .attr("text-anchor", "end")
    .attr("font-size", "20px");

var scale = tScale;

---

Figure 12 JavaScript: Starting Time, End Time and Time Scale

---

(4) Coordinate Axis, Droplines and Separators that separate three rows

var axis = d3.axisTop()
    .ticks(12);

var gAxis = g.append("g")
    .attr("transform", translate("-" + nameWidth, "0"));

var dropLines = g.selectAll(".dropLine")
    .data(data)
    .enter()
    .append("g")
    .attr("class", "dropLine")
    .attr("transform", (d,i) => translate("-" + nameWidth, "-" + i + " " + lineHeight));

var lines = dropLines.append("line")
    .attr("class", "separator")
    .attr("x1", 0)
    .attr("y1", lineHeight)
    .attr("x2", 0)
    .attr("y2", lineHeight);

var names = dropLines.append("text")
    .attr("x", 0)
    .attr("y", lineHeight/2)
    .attr("text-anchor", "end");

---

Figure 13 JavaScript: Axis, Droplines and Separators

---

(5) Color Scheme

var colors = d3.scaleOrdinal(d3.schemeCategory10);

---

Figure 14 JavaScript: Color Scheme

---

(6) D3 built-in Tooltip

var tooltip = d3.select("#tooltip")
    .style("opacity", 0);

---

Figure 15 JavaScript: Tooltip

---

(7) D3 built-in Zoom

var zoom = d3.zoom()
    .on("zoom", zoomed);

update();
svg.call(zoom);

function zoomed()
{
    scale = d3.event.transform.rescaleX(tScale);
    update();
}

---

Figure 16 JavaScript: Zoom in and Zoom out
3.2.3 Real-time Dots Update

```javascript
var counts = [];
var dots = [];
data.forEach(function(d,i){
  let commits = d.commits.filter(function(c){return c.date>start && c.date<end});
  counts.push(commits.length);
  let circles = g.append("g")
    .attr("class","circles")
    .attr("transform","translate(0,0)"")
    .selectAll("circle")
    .data(commits)
    .enter()
    .append("circle")
    .attr("cx",d => scale(d.date))
    .attr("cy",d => lineHeight*1-lineHeight/2)
    .attr("r",10)
    .attr("fill",colors(i))
    .attr("id",d => d.i)
    .attr("time",d => d.date)
    .on("click",mouseClicked)
});
```

*Figure 17 JavaScript: Element Loading and Dots Rendering*

3.2.4 Exemplar Presentation

### Cross Cultural Video News Difference

**Ke jie vs. AlphaGo**

![Cross Cultural Video News Difference](image)

*Figure 18 Exemplar Presentation of Basic Event Drops Demo*

3.3 Tooltip

When users click on dots, a tooltip should pop up and display the text and images of corresponding news videos. Since a new video could contain multiple images, I would like to use image slides to present the images so that users could use buttons to loop through all the images.

3.3.1 Layout
The following screenshot shows an exemplar tooltip that contains image slides, buttons to switch to previous or next slide, and corresponding text.

![Exemplar Tooltip](image)

**3.3.2 Image Slides**

**HTML**

```html
<button class="w3-button w3-black w3-display-left" onclick="plusDivs(-1)">«</button>
<button class="w3-button w3-black w3-display-right" onclick="plusDivs(1)">»</button>
```

**JavaScript**

```javascript
function plusDivs(n) {
  var divs = document.getElementsByClassName("mySlides");
  var index = (divs[0] ? divs[0].getElementsByTagName("div").indexOf(this) : 0) + n;
  if (index < 0) {
    index = 0;
  } else if (index >= divs.length) {
    index = divs.length - 1;
  }
  showDivs(index);
}

function showDivs(i) {
  var divs = document.getElementsByClassName("mySlides");
  for (var j = 0; j < divs.length; j++) {
    divs[j].style.display = "none";
  }
  divs[i].style.display = "block";
}
```

---

**Figure 19 Exemplar Tooltip**

**Figure 20 HTML Layout of Image Slides Buttons**
If users click the buttons, the method `plusDivs(-1)` or `plusDivs(1)` will be called and it switch to the previous or the next image slide in the circular order.

### 3.3.3 Text
The following method display the text of new video that is stored as “message” in the data.

```javascript
$(".Text").text(d.message);
```

### 3.3.4 Exemplar Presentation
Figure 23 When the video only contains one image, only one image will be presented without image slides buttons
3.4 Connection Presentation for Correspondences

One important functionality of this design solution is to highlight the correspondences between news videos in China and U.S. When users see a tooltip of images(s) in the common row, they would like to know exactly which new video(s) in China and which news video(s) in U.S. contain such image(s). Therefore, when users click on a particular dot in common row, I would like to show the connections between corresponding dots in China row and U.S. row and current dot.

3.4.1 Connecting Line

When users click on a dot in common row, connection lines that connecting the current dot to any other dots that represent news videos containing one or multiple images in current dot appear.
3.4.2 Vanishing Point

When users zoom in and out or drag the event drops timeline, it is likely to have a dot that share the same image(s) with current common dot locates outside the visible part of timeline. Hence, in order to remind the users of the existence of such dots, I will connect the current common dot to a vanishing point as a hint.

Since the correspondence takes the latest date (release time) of all relevant news videos as its date, then the vanishing point must be located at the beginning of the timeline, which is (0, 50) for U.S. row or (0, 250) for China row.
4 Future work

In the future work, I would like to improve my data loader so it could take a large-scale dataset and display them in the timeline. In addition, I would like to conduct some interviews to obtain some feedback to improve my solution.

5 Acknowledgement

6 Attachment / Code

HTML (index.html)

```html
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<title>Cross Cultural News Event Difference</title>
<link rel="stylesheet" type="text/css" media="screen" href="main.css" />
<script src="https://d3js.org/d3.v5.min.js"></script>
</head>

<body>
<h1>Cross Cultural Video News Difference</h1>
<h2>Ke jie vs. AlphaGo</h2>
<div id="eventdrops-demo"></div>
<div class="tooltip">
<div class="w3-content w3-display-container">
<img class="mySlides" src="" style="width:100%"></div>
<button class="w3-button w3-black w3-display-left" onclick="plusDivs(-1)">&#10094;</button>
<button class="w3-button w3-black w3-display-right" onclick="plusDivs(1)">&#10095;</button>
<div class="Text" style="text-align: left">content</div>
</div>
<div class="commit">
<div class="content">
<h3 class="message"></h3>
<p>
<span class="author"></span> on <span class="date"></span> - <span class="sha"></span>
</p>
</div>
</div>
<p class="infos">
<span id="numberCommits"></span> commits <span class="light">found between</span> <br/>
<span id="startTime"></span> <span class="light">and</span> <span id="endTime"></span>
</p>
<footer>
<p class="light">
</p>
</footer>
```

## CSS (main.css)

```css
body {
  font-size: 16px;
  color: #222;
  background: #eee;
  padding: 0 3rem 1rem 3rem;
  font-family: 'Muli', sans-serif;
}

h1 {
  text-align: center;
  margin: 1.5rem auto 1rem;
  font-family: 'Josefin Sans', sans-serif;
  font-weight: normal;
  font-size: 3rem;
  color: #aaa;
}

h2 {
  text-align: center;
  margin: 1.5rem auto 1rem;
  font-family: 'Josefin Sans', sans-serif;
  font-weight: normal;
  font-size: 2rem;
}

p {
  text-align: center;
  line-height: 1.5;
}
```
JavaScript (eventDrops.js)

var data = [  
// English
{"name":"United States","commits":
[  
{"index":"eng-1","message":"when asked about the match case that he was shocked by a couple of moves during mid game tools as those moves would have been played by human","image":"Common/1/eng.jpg","date":"23 May 2017 00:00:00","common":"chi-1"},
{"index":"eng-2","message":"the long-held belief that machines can't be professional go players due to the games complex and cheated and creative nature","image":"Common/2/eng.jpg","date":"28 May 2017 23:59:00","common":"chi-2"},
{"index":"eng-3","message":"",image": "Common/3/eng.jpg","date":"25 May 2017 21:50:00","common":"chi-3"},
{"index":"eng-4","message":"we used the previous versions of alphago and yet it was able to pull a much higher level to see using much more principled algorithms","image": "Common/4/eng.jpg","date":"30 May 2017 17:07:00","common":"chi-4"},
{"index":"eng-5","message":"Go is an ancient Chinese board game where the opposing players try to capture each other stones on the board","image": "Common/5/eng.jpg","date":"27 May 2017 18:32:20","common":"chi-5"},
{"index":"eng-6","message":"The Philippine Army says it has retaken most of the southern city of Marawi from the ISIS-linked militants. Militants linked to the Islamic State invaded the Filipino city of Marawi more than a week ago, prompting President Rodrigo Duterte to declare martial law and step up the offensive against the rebels. According to the government, more than 100 people have died during the fighting while thousands of civilians have fled to nearby provinces. The civilians who remain are stuck between ruthless Islamic rebels, and a president who openly encourages atrocities against his own people."}];
Go is an ancient, aristocratic Chinese board game that’s reputed to have as many possible moves as there are atoms in the universe. And Google recently trained an artificial intelligence computer to play against one of the best human players in the world. The computer won. At Google’s Future of Go Summit, 19-year-old Chinese Go prodigy Ke Jie was defeated by the AI AlphaGo in a three-match series. AI evangelists are happy with the win, but AI doomsayers are worried it’s coming for our jobs next. And China is just mad that an American company beat the world at a Chinese game. VICE News reports on what the competition really means for AI development.

Loup Ventures Managing Partner Gene Munster on Apple hiring Google's former AI chief.

Artificial Intelligence program AlphaGo defeated the world's top-ranked Go player Ke Jie in the first of three games on Tuesday in Wuzhen of east China's Zhejiang Province. After four-and-a-half hours of play, Ke, playing black, lost by 0.5 points, which is the narrowest margin possible in the game. The game follows Chinese Go rules with black having the advantage of first move, and a set point of 7.5 was later given to white to compensate for this. When asked about the match, Ke said he was shocked by a couple of moves during mid-game talks as those moves wouldn't be played by a human. 'When I first saw it, I thought it was almost an impossible move for human players to come up with, since it is obviously a later step. But afterward, I realized it was really an astonishing move,’ said Ke. With a newly upgraded version of AlphaGo bolstered by reinforcement learning, the founder of DeepMind - the company behind AlphaGo, hopes Ke can help discover potential weaknesses of the program. '(It’s) Especially interesting for us to see in use some of the moves like the three-three move from the master series of games against AlphaGo, and we were very keen to see how AlphaGo will deal with its own strategies,’ said Demis Hassabis, CEO of DeepMind. Ke Jie said AlphaGo has advanced much faster than he thought. 'Compared to last year, AlphaGo's understanding of Go has progressed so much. Last year it played in a human-like way, but this time, it’s almost like the God of Go,’ said Ke. There will be two more matches between Ke Jie and AlphaGo on Thursday and Saturday. AlphaGo gained worldwide fame when it scored a landmark 4-to-1 victory over South Korean Go master Lee Sedol in a five-round showdown last year, overturning the long held belief that machines can't beat professional Go players due to the game's complex, intuitive and creative nature. Ke, 19, became the youngest champion in Go history after winning three world titles within the space of one year between January 2015 and January 2016. The winner will be awarded 1.5 million U.S. dollars while the losing side takes home 300,000 dollars. Artificial intelligence is coming – so how's it going to change our reality? In March of this year, Google’s artificial intelligence, AlphaGo, beat one of the top human intelligences, Lee Sedol, at the strategically mind-boggling board game Go. Experts had thought we were years away, but the computer played elegant, creative moves to outfox a Go master. So are we on the brink of an AI revolution? I asked Dr Peter Bentley, a computer scientist from University College London, for some expert insight: Peter Bentley, a computer scientist at University College London, says “since the beginning of artificial intelligence research, one of the main ways that we have tested the intelligence of our computers is to ask them to play games with us, and the progression towards the recent victory has been a long one.
But in all of these cases playing games is a hugely simple task. “In a game there’s a clear ‘winning’ outcome and it’s a closed environment, so the spectrum of possibilities can be accurately predicted. A Go stone will not suddenly turn into a chess piece, for example, or a sausage. Google wants to transfer AlphaGo to real world situations, like medicine. So how does an AI brought up on boardgames hold up in the real world? “It’s a very pure clean simple problem, playing a game. The rules are precise, there is no fuzziness, you either are allowed to do that or you are not allowed to do it, and actually real intelligence is completely nothing to do with precision. Real intelligence is about surviving in a horrible, complicated, messy world that’s trying to kill you, that’s what intelligence is for! That’s why organisms have intelligence – to survive! So playing a computer game is a neat trick,” says Bentley. Bentley also states, “one of the things that’s coming through now is an increasing use of computers to do creative things, that’s computers composing music, creating artwork, doing exotic special effects in movies – all sorts of really unusual things that we might not think of but a computer does think of it – for a long time there’s been a long debate what is creativity? Could a computer ever be creative? And the news is yes it can be. Not only can it be creative, it can do things that really amaze us and make us think, holy crap I wish I’d thought of that.” Artificial intelligence will change our lives. Already AlphaGo’s first victim says he’s learned to play better by playing against the machine. Imagine what we will learn as AI is unleashed onto our world.

// Common
{"name":"Common","commits":
["index":"common-1","message":"when asked about the match case that he was shocked by a couple of moves during mid game tools as those moves would have been played by human. 所以在不被看好的情况下还立足于拼 就是因为他认为自己还有真正的可能","image":"Eng/5/1.jpg"],
{"index":"common-2","message":"the long-held belief that machines can’t be professional go players due to the games complex and cheated and creative nature. 柯洁在赛后举行的新闻发布会上表示 阿尔法围棋表现的太完美了 没有任何缺陷","image":"Eng/5/2.jpg"],
{"index":"common-3","message":"李世石获得了人机大战第 4 盘较量的胜利 同时这也是人类对尔法狗八连败之后的首次胜利 相信这一场胜利可以让李世石长舒一口气","image":"Eng/5/3.jpg"],
{"index":"common-4","message":"we used the previous versions of alphago and yet it was able to pull a much higher level to see using much more principled algorithms 对于柯洁的落败 谷歌大脑负责人表示 AlphaGo 过去半年已在自我训练方面取得巨大进步","image":"Eng/5/4.jpg"],
{"index":"common-5","message":"Go is an ancient Chinese board game where the opposing players try to capture each other stones on the board. 虽然人工智能在过去的几年中取得了令人印象深刻的进步但对于人工智能而言围棋一直是一个令人生畏的挑战","image":"Eng/5/5.jpg"}]},
所以在他不被看好的情况下还立足于拼，是因为他认为自己还有真正的可能。柯洁在赛后举行的新闻发布会上表示，阿尔法围棋表现的太完美了，没有任何缺陷。阿尔法围棋在八连败之后的首次胜利，相信这一场胜利可以让李世石长舒一口气。对柯洁的落败，谷歌大脑负责人表示，Alphago过去半年已在自我训练方面取得巨大进步。李世石获得了人机大战第 4 盘较量的胜利，同时这也是人类对弈八连败之后的首次胜利。相信这一场胜利可以让李世石长舒一口气。对于人工智能而言围棋一直是一个令人敬畏的挑战，虽然人工智能在过去的几年中取得了令人印象深刻的进步。柯洁在赛后举行的新闻发布会上表示，阿尔法围棋表现的太完美了，没有任何缺陷。阿尔法围棋在八连败之后的首次胜利，相信这一场胜利可以让李世石长舒一口气。
话我会觉得这是说阿尔法围棋下得很轻践自己但是我觉我自己其实也是尽了全力的爱的
这时他下载好了我觉得有很多地方真的是很值得我们去探讨很多的思想还有
对齐的一些理念就是越来越大冲击我们的职业也在改变我们最初的对不起的看法是没有什么其实不可以下载的然后我觉得这样子我也享受啊那个游戏的影响力包括我最近其实之前在人日中我也有很瘦很多啊百度影响就说没有什么其实不可以加载可以大胆去放心大胆去
开拓自己的思维就自由的取下一盘棋吧所以这是一个我很觉得很值得我们学习的然后今天的
我也是想大胆的去开拓自己的这个字因为在我印象中其实阿尔法围棋是非常那个贪恋实际的接受他非常喜欢把戏下载而实际上就是在用就像开局什么点 33 还有很多有意思的近
视吗其实我一直都是想也是贯彻的种叫什么好和大家闺女董啊就是先拉后就先把四川的手
上就把钞票转手上后面那种再说了什么是在说没想到开只有一个地方就是那个角落上返
还是被他拉回时的去了然后我就觉得这题就很难下了因为我一想贯彻落实的没想到办法给我
打破了一处然后变成太狠合适的了以后就完全进入了他的调子中所以这段旗下的阿尔
法围棋下载非常的好我觉得他那时候的这个提根据前的时候完全是两个人了如果他把当然
的话他好像完成这两个人字的时候我觉得他还是很这个心态他的级联系越来越我理解
中的真的是太厉害了所以我希望我尽我的全力去拼没有包括接下来的气候不管是由什么样的
题我觉得很感谢有这样的对头也非常感谢这个慢这个对啊然后能给我这样的一次机会去
跟他进行加 300 级的对决然后希望自己能通过这一次然后给大家带 Whisky 是很好玩的一
个项目给大家带来围棋的快乐谢谢","image": "Chi/3/1.jpg Chi/3/2.jpg","date": "31 May 2017
19:37:00","common": "None" }}

data.forEach(function(d){
    d.commits.forEach(function(c){
        c.date = new Date(c.date);
    })
});
console.log(data);

var n = data.length;
var width = 1400;
var lineHeight = 100;
var nameWidth = 100;
var margin = {left:150,right:100,top:30,bottom:50};
var height = lineHeight*n+margin.top+margin.bottom;
var lineWidth = width - margin.left - margin.right - nameWidth;

var svg = d3.select("#eventdrops-demo")
    .append("svg")
    .attr("width",width)
    .attr("height",height);

var g = svg.append("g")
    .attr("transform","translate("+margin.left+","+margin.top+")");
var min = new Date("Jan 1, 2017"); // Minimum Date
var max = new Date("June 30, 2017"); // Maximum Date

var tScale = d3.scaleTime()
  .domain([min,max])
  .range([0,lineWidth]);
var axis = d3.axisTop()
  .ticks(12);

var gAxis = g.append("g")
  .attr("transform","translate(+nameWidth+,0)");

var dropLines = g.selectAll(".dropLine")
  .data(data)
  .enter()
  .append("g")
  .attr("class","dropLine")
  .attr("transform",(d,i) => "translate(+nameWidth+,+i*lineHeight+)");

var lines = dropLines.append("line")
  .attr("class","separator")
  .attr("x1",0)
  .attr("y1",lineHeight)
  .attr("x2",lineWidth)
  .attr("y2",lineHeight);

var names = dropLines.append("text")
  .attr("x",-20)
  .attr("y",lineHeight/2)
  .attr("text-anchor","end");

var startTime = g.append("text")
  .attr("x",nameWidth)
  .attr("y",lineHeight*n+lineHeight/2)
  .attr("text-anchor","start")
  .attr("font-size","20px");

var endTime = g.append("text")
  .attr("x",nameWidth+lineWidth)
  .attr("y",lineHeight*n+lineHeight/2)
  .attr("text-anchor","end")
  .attr("font-size","20px");

var colors = d3.scaleOrdinal(d3.schemeCategory10);
var tooltip = d3.select(".tooltip")
    .style("opacity",0);

var zoom = d3.zoom()
    .on("zoom",zoomed);

var scale = tScale;

update();
svg.call(zoom);

var clicked = false;
var commonclicked = false;

var currDot = null;

// Slideshow
var imageNames = [];
var slideIndex = 0;
var slideNum = 0;

function zoomed(){
    scale = d3.event.transform.rescaleX(tScale);
    update();
}
}

function update(){
    gAxis.call(axis.scale(scale));

    [start,end] = scale.domain();
    startTime.text(start.toDateString().slice(4));
    endTime.text(end.toDateString().slice(4));

    g.selectAll(".circles")
        .remove();

    svg.selectAll(".path")
        .remove();

    var s = scale(new Date(start.toDateString()));
    var e = scale(new Date(end.toDateString()));

    var counts = [];
    var dots = []
data.forEach(function(d,i){

}}
let commits = d.commits.filter(function(c){return c.date>=start && c.date<=end;});
counts.push(commits.length);

let circles = g.append("g")
  .attr("class","circles")
  .attr("transform","translate("+nameWidth+",0)")
  .selectAll("circle")
  .data(commits)
  .enter()
  .append("circle")
  .attr("cx",d => scale(d.date))
  .attr("cy",d => lineHeight*i+lineHeight/2)
  .attr("r",10)
  .attr("fill",colors(i))
  .attr("id", d => d.index)
  .attr("time", d => d.date)
  .on("click",mouseclicked)
);

d3.selectAll("circle").each(function(d,i) {
  var name = d3.select(this).attr("id");
  var x = d3.select(this).attr("cx");
  var y = d3.select(this).attr("cy");
  var t = d3.select(this).attr("time");
  dots.push([name, x, y, t])
});

line1 = []
line2 = []
line3 = []
line4 = []
line5 = []

for(var i = 0; i < dots.length; i++){
  if(dots[i][0] == "common-1"){
    for(var j = 0; j < dots.length; j++){
      if(dots[j][0] == "eng-1"){
        line1.push([dots[i][1], dots[i][2]]);
        line1.push([dots[j][1], dots[j][2]]);
      }
      if(dots[j][0] == "chi-1"){
        line1.push([dots[i][1], dots[i][2]]);
        line1.push([dots[j][1], dots[j][2]]);
      }
    }
  }
  if(line1.length == 2){
    // Do something with line1
  }
}
line1.push([dots[i][1], dots[i][2]]);
line1.push(['0','50']);
}
}
if(dots[i][0] == "common-2"){
    for(var j = 0; j < dots.length; j++){
        if(dots[j][0] == "eng-2"){
            line2.push([dots[i][1], dots[i][2]]);
            line2.push([dots[j][1], dots[j][2]]);
        }
        if(dots[j][0] == "chi-2"){
            line2.push([dots[i][1], dots[i][2]]);
            line2.push([dots[j][1], dots[j][2]]);
        }
    }
    if(line2.length == 2){
        line2.push([dots[i][1], dots[i][2]]);
        line2.push(['0','50']);
    }
}
if(dots[i][0] == "common-3"){
    for(var j = 0; j < dots.length; j++){
        if(dots[j][0] == "eng-3"){
            line3.push([dots[i][1], dots[i][2]]);
            line3.push([dots[j][1], dots[j][2]]);
        }
        if(dots[j][0] == "chi-3"){
            line3.push([dots[i][1], dots[i][2]]);
            line3.push([dots[j][1], dots[j][2]]);
        }
    }
    if(line3.length == 2){
        line3.push([dots[i][1], dots[i][2]]);
        line3.push(['0','50']);
    }
}
if(dots[i][0] == "common-4"){
    for(var j = 0; j < dots.length; j++){
        if(dots[j][0] == "eng-4"){
            line4.push([dots[i][1], dots[i][2]]);
            line4.push([dots[j][1], dots[j][2]]);
        }
        if(dots[j][0] == "chi-4"){
            line4.push([dots[i][1], dots[i][2]]);
            line4.push([dots[j][1], dots[j][2]]);
        }
    }
if(line4.length == 2){
    line4.push([dots[i][1], dots[i][2]]);
    line4.push(["0","50"]);
}

if(dots[i][0] == "common-5"){
    for(var j = 0; j < dots.length; j++){
        if(dots[j][0] == "eng-5"){
            line5.push([dots[i][1], dots[i][2]]);
            line5.push([dots[j][1], dots[j][2]]);
        }
        if(dots[j][0] == "chi-5"){
            line5.push([dots[i][1], dots[i][2]]);
            line5.push([dots[j][1], dots[j][2]]);
        }
    }
    if(line5.length == 2){
        line5.push([dots[i][1], dots[i][2]]);
        line5.push(["0","50"]);
    }
}

var lineGenerator = d3.line();
var pathData = lineGenerator(l);

if(currDot == "common-1"){
    d3.selectAll("path")
        .attr('d', lineGenerator(line1))
}
if(currDot == "common-2"){
    d3.selectAll("path")
        .attr('d', lineGenerator(line2))
}
if(currDot == "common-3"){
    d3.selectAll("path")
        .attr('d', lineGenerator(line3))
}
if(currDot == "common-4"){
    d3.selectAll("path")
        .attr('d', lineGenerator(line4))
}
if(currDot == "common-5"){
    d3.selectAll("path")
        .attr('d', lineGenerator(line5))
}
names.text((d,i) => d.name+'("'+counts[i]+'")');

d3.select("#numberCommits")
  .html(d3.sum(counts));

d3.select("#startTime")
  .html(start.toString().slice(4,24));
d3.select("#endTime")
  .html(end.toString().slice(4,24));
}

function mouseclicked(d){
  console.log(d.index);

  if (d.index == "common-1"){
    currDot = "common-1";
  }
  else if (d.index == "common-2"){
    currDot = "common-2";
  }
  else if (d.index == "common-3"){
    currDot = "common-3";
  }
  else if (d.index == "common-4"){
    currDot = "common-4";
  }
  else{
    currDot = null;
  }

  if(clicked){
    tooltip.style("opacity",0);
    clicked = false;
    slideIdx = 1;
    currDot = null;
    console.log(currDot);
    return;
  }
  else{
    clicked = true;
    console.log(currDot);
  }
}
update();

d3.select(".text")
  .text(d.text);
d3.select(".date")
  .text(d.date.toString().slice(4,24));
d3.select(".index")
  .text(d.index);

imageNames = d.image.split(" ");
slideNum = imageNames.length;
slideIdx = 0;
var x = document.getElementsByClassName("mySlides");

for (i = 0; i < x.length; i++) {
  x[i].src = imageNames[slideIdx];
  x[i].style.display = "block";
}

if(slideNum == 1){
  var bl = document.getElementsByClassName("w3-button w3-black w3-display-left");
  var br = document.getElementsByClassName("w3-button w3-black w3-display-right");

  for (i = 0; i < bl.length; i++) {
    bl[i].style.display = "none";
  }
  for (i = 0; i < br.length; i++) {
    br[i].style.display = "none";
  }
}
else{
  var bl = document.getElementsByClassName("w3-button w3-black w3-display-left");
  var br = document.getElementsByClassName("w3-button w3-black w3-display-right");

  for (i = 0; i < bl.length; i++) {
    bl[i].style.display = "block";
  }
  for (i = 0; i < br.length; i++) {
    br[i].style.display = "block";
  }
}

$(".Text").text(d.message);

tooltip.style("left", (d3.event.pageX) + "px")
  .style("top", (d3.event.pageY) + "px")
function plusDivs(n) {
    slideIdx = slideIdx + n;
    if (slideIdx >= slideNum) {slideIdx = 0}
    if (slideIdx < 0) {slideIdx = slideNum-1}
    var x = document.getElementsByClassName("mySlides");
    for (i = 0; i < x.length; i++) {
        x[i].src = imageNames[slideIdx];
        x[i].style.display = "block";
    }
}