Info 474 Terrorism Data Visualization

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ABSTRACT

In today's society, terrorism has become a very prevalent and socially charged word. While many data visualizations do address terrorism, they tend to do so in a way that allows users to distance themselves from the data – and thus the problem. Our goal as a team was to approach terrorism not as a dataset to encode in a visualization, but rather as a means to show users the tragedies happening in our world. That is, we view this topic as a story that is enhanced by data visualizations, and not the other way around. With this guided experience, we hope to provide an informational story while steering away from sensitive and personal data.

INTRODUCTION

Terrorism, defined by Merriam-Webster as 'The systematic use of terror especially as a means of coercion,' isn't a new word in any millennial student's vocabulary. Having lived through the terrors of 9/11 and events such as the Boston Marathon bombing and the shooting at Sandy Hook Elementary School, terrorism has been a prevalent and reoccurring tragedy in our lives. That was the motivation – to try and visualize an issue that every member in my group (not to mention countless others) has interacted with either directly or indirectly. Stemming from this motivation, we began to look at what resources were already publically available. Out of all the terrorism-related data visualizations we found, only a few provided interactive graphs that the user could directly interact with and manipulate. None of the visualizations, however, provided a 'human' aspect to the terrorism data. While we understand that terrorism may be a very delicate and sensitive topic, and we understand that may be why other groups choose to distance themselves as much as they can from the data, we personally believe this doesn't do the data and the victims justice. By allowing users to distance themselves from reality, these other organizations do provide models that successfully show large amounts of data. However, we believe the nature and source of this data means that it cannot be handled like most other data. Thus, we aim to tell a story that is not only interactive and allows the user to explore the data, but also attempts to delve deeper into the tragedies that make up the data.

RELATED WORKS

Many of the related works are online data visualizations on terrorism. Websites like Periscopic[8] have made some very interesting data visualizations on terrorism, but these seem largely restricted to identifying the organization behind the attacks, and doesn't speak at any length about the types of attacks. Many other data visualizations regarding the Global Terrorism Database involve a heat map with some form of concentration/intensity encoding regarding terrorism[2].

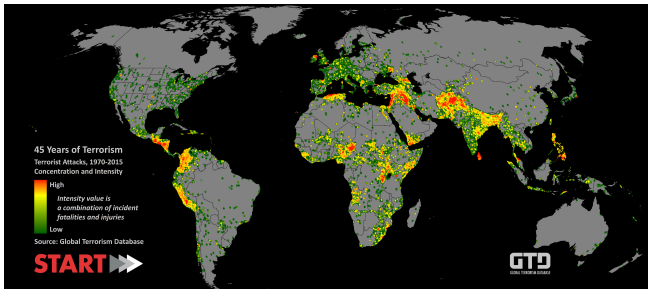

Figure 1. Example of a heat map from the Global Terrorism Database. While they did include a 'Start' button, the available heat map is a .jpg image, so the button is not 'clickable.'

Dawn's data visualization[5] was well made, but focuses specifically on middle eastern countries (more specifically, Pakistan), and doesn't provide the broad oversight we are looking to provide to our users (Figure 1). There were several other data visualizations[7] that were very informative, but similar to Dawn's visualization, they mainly focused on specific areas or themes instead of terrorism as a whole. Out of all the data visualizations we found, Our World in Data[6] and Poushali Banerjee's[3] were the some of the few that provided interactive graphs that the user could manipulate, and also looked into terrorism on a broad scale.

METHODS

For our data source, we decided to use the Global Terrorism Database (GTD) aggregated by the University of Maryland[4]. This database was the most comprehensive data set we could find, with data that spans 35 years, 150+ columns of data, and 150,000+ attacks. This data sets accounts for attributes such as the nature of the attack, number of affected victims, and weapons used. What really drew our attention to this database was the seemingly unbiased approach used to collect the data.

After analyzing this data, we reduced it to 33 columns in order to reduce unnecessary data. The removed columns were typically minute details such as 'Secondary Weapons Used,' or attributes chronologically earlier attacks didn't collect data on. We also tried to go through the data set and reduce any duplicates or redundancy. By working with a much smaller data set, we hoped to speed up the process – especially the amount of time needed to load in the data set. This would help the user's experience as they would have

to wait a lot less time in order to view the data visualization.

As we will discuss more under 'Results,' the visualizations we created are a bar graph, pie chart, and map.

Our goal was to 'humanize' the data through our visualizations in a way such that our users could begin to connect with the data on a deeper level. As such, we began to think about how exactly we should present the data. This proved to be problematic, as we wanted to show the victims behind the terrorism data, but didn't want overstep our bounds and trespass into the realm of sensitive and personal data. Not only would that have been highly unprofessional, but it would also deter and estrange our users.

RESULTS

Our final webpage ended with seven different views. All our data visualizations were built using Data-Driven-Documents (D3), a JavaScript library intended for building interactive and responsive data visualizations. While using this webpage, we disabled the scroll function on trackpads and mice. We did this because we thought the state of being in transition between two views that both required becoming completely shown detracted from the experience. Instead, we created a view selector on the side screen that allowed users to select the view they want. Not only does this give the user complete control over how they progress through the website, but it also allows them to completely skip over sections at their own discretion. Between our visualizations, we provide scripts to act as transitions and to help create a story for our users to follow.

The first view the user sees when they enter the website is a cover photo of candles with a textual introduction to our project (Figure 2). We thought that this would be a great way to set the tone of the story, and also to give the user some sort of expectations as to what they will see in as moving forward.

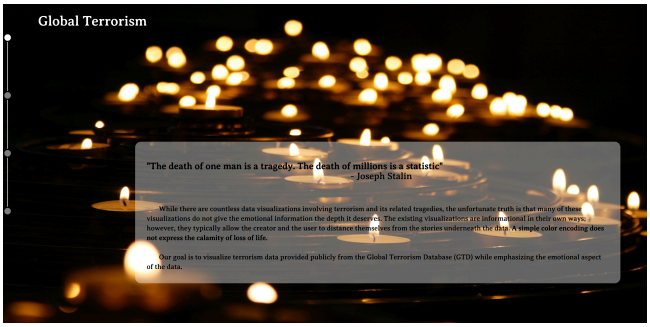

Figure 2. Image of our launch screen with a prototype of the view selector to the left hand side.

After the introduction to our visualization, we wanted to introduce the 'humanizing' aspect of our visualization. We figured the best way to do this was to take numbers that will later appear, and compare them to something tangible[1] so people can connect with the numbers through a more concrete method. For example, '1 person is like you or me,' helps users realize on a more foundational level that attacks that can claim the lives of many people are made up of the deaths of individuals. After that, we introduced a 'dot' object, which we will use in the next visualization to represent 100 people. Since the next visualization involves death, each dot would then represent the tragic loss of 100 lives.

Our first graph is a dotted bar graph that utilizes these dots to show the total number of victims grouped by years. We use transition to emphasize the number of victims. Instead of loading all the dots at once, we first load in individual dots, and then rows to speed up the process. We hope that this will emphasize the number of dots – and therefore victims – to the user.

After a quick introduction, our second visualization is a pie chart that allows users to filter between the type of terrorist attack that's claimed the most lives, or the type of weapon that's claimed the most lives. Hovering over individual components of this pie chart would bring up information on the number of deaths that category has caused.

Our last visualization was a rendering of the Google Maps API, with all attacks for a selected year plotted as pin-drops on the map (Figure 3). The map starts off on a world view to show the number of overall incidents in a particular year. Users are able to change which year's data they view. If there are many events in one particular area, a zoomed out view will have a color encoding with the number of events in that area. Zooming into that area will split up a color encoding into tickers. The color encoding ranges from blue to purple. Clicking on a ticker will bring up a modal that displays event information such as date, city/region, and a description of the event if available.

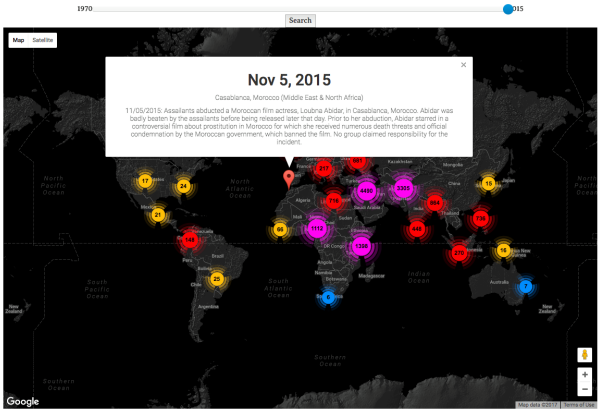

Figure 3. Screenshot of our map visualization, with ticker modal open.

We realize that due to the nature of terrorism attacks, and the fact that the foundation for this data set is human deaths, these visualizations may leave the user with a negative feeling. While we didn't want to sugarcoat any of the data/visualizations, we did leave one last message for users to hopefully mollify this grim feeling.

DISCUSSION

On a superficial level, an audience of our website will find out about information regarding terrorist attacks, such as how the number of terrorism-related deaths has increased over the years, what weapons these assailants are using, and where in the world these attacks have been occurring. Unfortunately, our data and visualizations only shows events that have already happened, and does not act as a predictor for how things will proceed in the future.

We would also like to point out at this time that it is possible that our dataset is not all-encompassing, and there may be many terrorist attacks that were not covered in this database. Even with the data we were provided, many incidents were not able to be encoded because the database lacked important data regarding that attack.

That being said, the big takeaway we hope our users will have been able to interact with this data without distancing themselves the way they would with other visualizations. By being to empathize more with what this data entails, we hope that users will be able to connect more with that is unfortunately happening in the world around us. This isn't something we would be able to show using our visualizations alone. Rather, it is something that must be gained from a combination of our storytelling and visual interpretations of terrorism data.

FUTURE WORK

If given more time, we would have like to done more research into more effective methods of 'humanizing' our data. Having more effective methods of doing so would allow our users to empathize even more with the victims of terrorism attacks and understand the global issue on an even deeper level. This may involve conducting market research in order to see how potential users and personas would like to interact with such data, and to what extent can we personify the data without before crossing the threshold that constitutes unprofessional and insensitive behavior.

On a more technical level, many of the technical issues we had involved the sheer number of data causing the browser to crash in certain instances. If we had more time, we would like to consider making the visualizations a reusable and callable API on a remote server. That way, the browser wouldn't have to undergo the burden of sifting through 150,000+ rows of data, and can simply focus on plotting the data. This would have allowed us to have made our map visualization encompass data from a number of years rather than just one (it turned out that when you try to do a number of years, especially more recent ones, there's so much data to sift through and organize that the browser would crash).

We also considered going through the data itself and deleting even more columns that weren't necessary, and rows that included insufficient data. By decreasing the overall size of the file itself, we could have visualizations that load faster, and thus decrease the wait time for users.

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REFERENCES

1. Mago Torres. 2016. Humanizing Data: Using Numbers AND People. (June 2016). Retrieved June 2, 2017 from http://gijn.org/2016/06/23/humanizing-data-using-numbers-and-people/
2. Anon. *45 Years of Terrorism*, University of Maryland.
3. Poushali Banerjee. Visualizing Global Terrorism over the years with D3. Retrieved June 2, 2017 from http://www-scf.usc.edu/~poushalb/GlobalTerrorViz/#startviz
4. Anon. 2009. Global Terrorism Database. (2009). Retrieved June 2, 2017 from https://www.start.umd.edu/gtd/
5. Dawn.com. 2014. Pakistan ranks third on Global Terrorism Index. (November 2014). Retrieved June 2, 2017 from https://www.dawn.com/news/1145300
6. Anon. Terrorism. Retrieved June 2, 2017 from https://ourworldindata.org/terrorism/
7. Anon. Terrorism in 2015 visualized. Retrieved June 2, 2017 from http://visualoop.com/blog/90631/terrorism-in-2015-visualized
8. Anon. Visualizing Terror: Our Work with the Global Terrorism Database. Retrieved June 2, 2017 from http://www.periscopic.com/content/visualizing-terror/