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DATA VISUALIZATION: CRITICAL ANALYSIS ESSAY

Brad Simbizi, 2438270

INTRODUCTION

Raw data can be difficult to interpret, especially at a moment's notice. Users often zoom through websites at such a pace that encountering a set of data, displayed as is, mid-scroll can throw the user off, and run the risk of stirring them away from the main message the data tried to convey. This is worse when it is data the developer desperately needs the user to engage with. If the data is too confusing for the user to engage with, it will most likely push them away.

There needed to be a way to represent data in a more accessible way. This is where data visualization techniques come in. Providing a much-needed compact representation of complex data. The use of data visualization techniques can go either way. They could either effectively and efficiently represent data, or they could make the already complicated data even harder to interpret. Understanding and analysing why is the main aim of this paper. Investigating how these techniques work to convey the information presented in a case study; data-driven journalism piece.

THEORY OF DATA VISUALIZATION

Before analysing the visual representation, I feel it is important to set a foundational understanding of what data visualization is, with the help of a few scholarly sources. This will make analysing the case study a bit easier.

Like many other concepts, data visualization is grounded by a few theories. For example, Jenny Kidd's theory of representation and visual communication (2015: 26), which will provide a basis for understanding the effectiveness of visual representations in relation to web journalism. Something important to mention is the significance of semiotics within visual representation. Particularly the connotations associated with images. Jenny Kidd citing Machin and Mayr's suggestions on the connotative implication of visual signs and how they convey meaning to the viewer.

The most important point made being: “Third, that what an image connotes may, in some contexts, be a matter of free association, but that for the most part, where image makers need to get a specific idea across, they will rely on established connotators which they feel confident their target audiences will understand” (Machin et al., 2012: 50–51, cited in Jenny Kidd, 2015: 27).

I find this interesting because of how images are used to convey meaning. For instance, when a graphic uses this symbol (figure 1), most assume it is about an individual because of its connotation. Place multiple together, highlight a few, and add some context as to what they are referring to and you have effectively used semiotics to represent data in the form of visual signs (figure 2). Context is very important in this instance. Context and an already established assumption about what the signs represent.

Figure 1: symbol of a man (freeiconspng, no date).

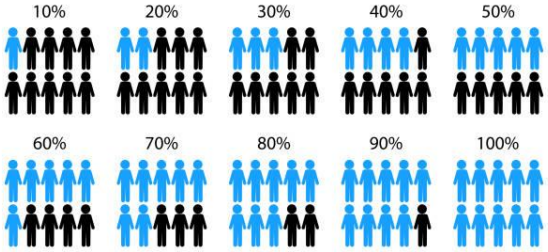

Figure 2: symbols used for data visualization, with percentages (, no date).

The last theory I would like to look at before analysing the case study is Qi Li’s (2020) chapter on data visualization. In this reading, Li touches on the origins of data visualization, and quotes the definitions proposed by a few other scholars (Qi Li, 2020: 19). These definitions follow the same logic. The definition I derived from the reading is: data visualization as the process of transforming and conveying data into graphical format, which allows for an easier intake of information and an easier process of interpretation and comprehension.

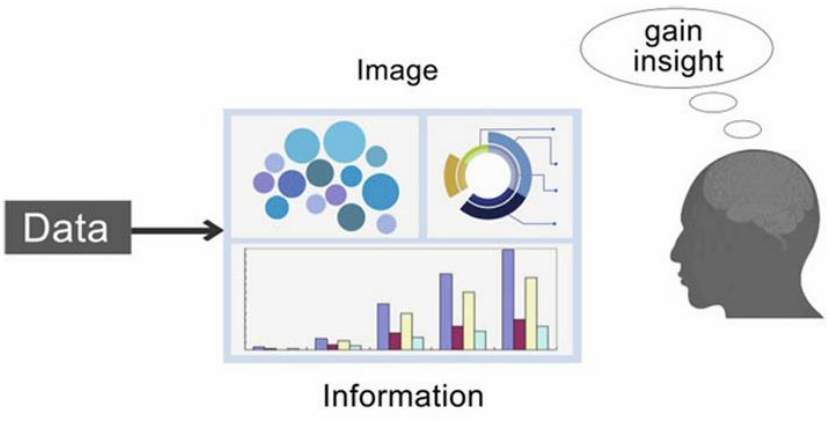

Figure 3: *The process of data visualization, illustrated* by Yaqin Fu, cited in Li, 2020, 20.

DATA VISUALIZATION ANALYSIS: A CASE STUDY

To take this discussion further, I will analyse the effectiveness of the data visualization of a chosen data-driven journalism project, in relation to several key points. The project I have chosen to analyse is **INFOAMAZONIA**'s 2023 report on the illegal activities in and around the amazon (https://infoamazonia.org/en/2023/08/03/welcome-to-the-amazon-underworld/).

- **Project Overview**

This journalism project was published on the 3rd of August 2023. Its main aim was to investigate the way the Amazon is exploited. Not only is it used as a crucial transit point for criminal organizations, but it also suffers from resource theft and deforestation, as a result of the ever-expanding control these organizations have. The thick overgrowth of the Amazon, coupled with its geography, provides almost unpoliced passage, which these criminal organizations take full advantage of.

- **Data Visualization Techniques**

When looking at the effectiveness of visualization techniques used in the article, turning to Cole Nussbaumer Knaflic's chapter on choosing an effective visual. The article uses a combination of visualization techniques. The first, and most used technique is a heatmap.

The heatmap in the project (figure 4) is different to the heatmap (data put into a table) listed in Knaflic's chapter (2015: 36). However, the heatmaps in the journalism project employs highlighted sections of the map of South America to represent a covered area in relation to a whole (figure 4 vs figure 5). It also helps with representing scale. This heatmap is made more effective with the aid of the sidebar giving context as to why the area is highlighted. This heatmap is perfect for the information convey because it represents the data (60% of the territory contains organizations either locked in conflict, or co-existing), compared to the whole Amazon. Viewers are able to look at the heatmap of the whole Amazon, and piece together, in relative size, the areas controlled by certain groups, or areas with organizations fighting for territory. This heatmap requires both parts to fully understand the scale.

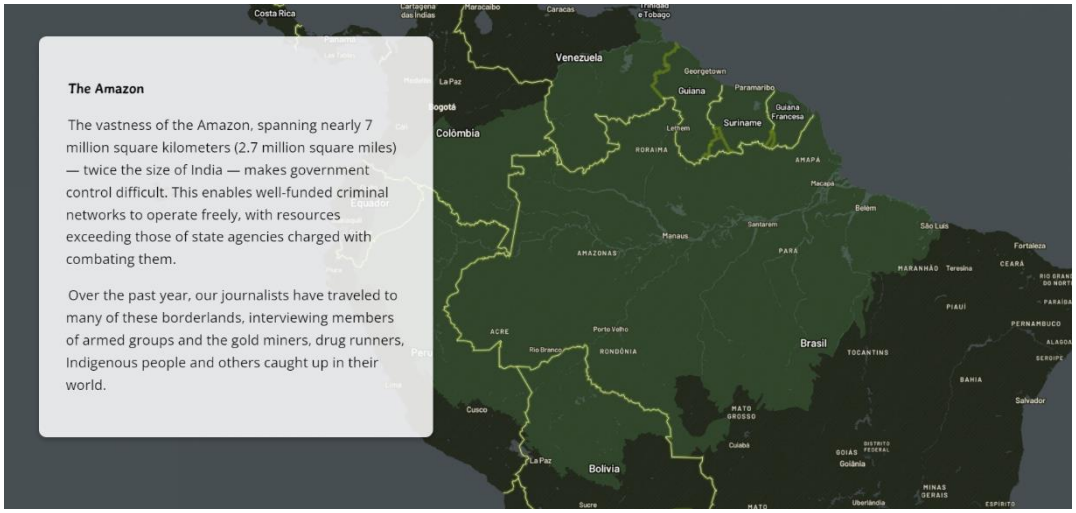

Figure 4: Screenshot of heatmap representing the Amazon.

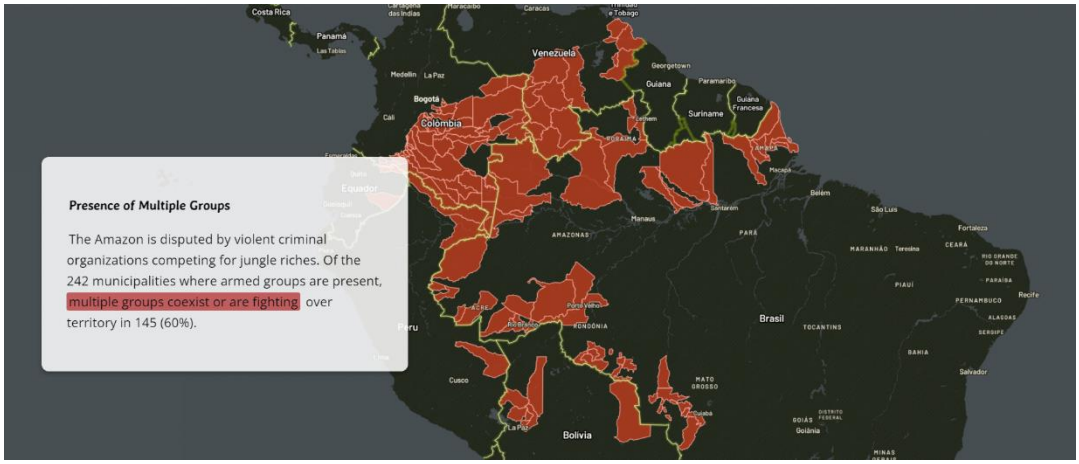

Figure 5: Screenshot of heatmap representing cartel control in the Amazon.

The project also employs a few graphs to represent data. For example, the project mentions the death rate of a department in Colombia (figure 6). This graph is also very effective in representing the data for a few reasons. The graph simply represents the number of victims over a period of 4 years. A bar graph would have done enough to represent the data. But what makes this particular graph more effective is that it also represents a trend. The viewer can see spikes, and trough, but it also paints a stark representation of the trend in deaths throughout the years. The heatmap is a bit difficult to interpret, however. My immediate assumption is that it represents the areas within the departments where these victims lost their lives, but it is not really mentioned.

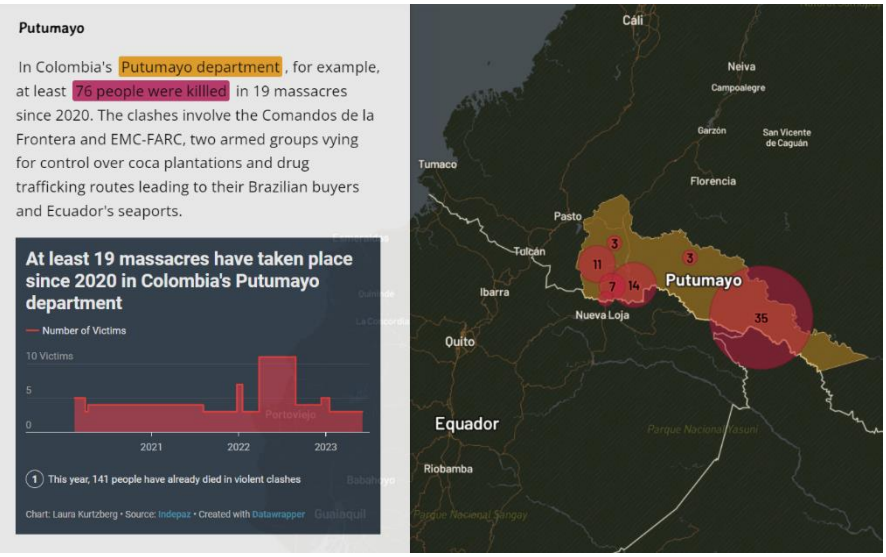

Figure 6: Screenshot of heatmap and graph presenting deaths in a Colombian department.

The final data visualization I want to mention is the usage of a donut graph (figure 7), which Knaflic (2015: 65) vehemently dislikes. The main reason for this hatred is because of the difficulty of interpreting segment in a pie graph. The only exception I could see from this graph was that it represented one piece of data, so it made understanding the graph easier. However, the data represented feels too little to use a donut graph. Simple text would have worked as effectively.

Figure 7: Screenshot of donut graph representing percentage of armed groups in municipalities.

It is also apparent that this project did not employ too many signs and symbols to represent placeholders. So, I couldn't really utilize Jenny Kidd's semiotic approach to analyse aspects of the project.

- **Interactivity and User Engagement**

The journalism project fails slightly in this department. The only real interaction the viewer has with the project is scrolling down through the information given, and an interactive map (figure 8) that can be found further down the page. The viewer is given a map that displays information when they hover over an area. This map provides different information on the groups controlling the region and what illegal activity they partake in the most.

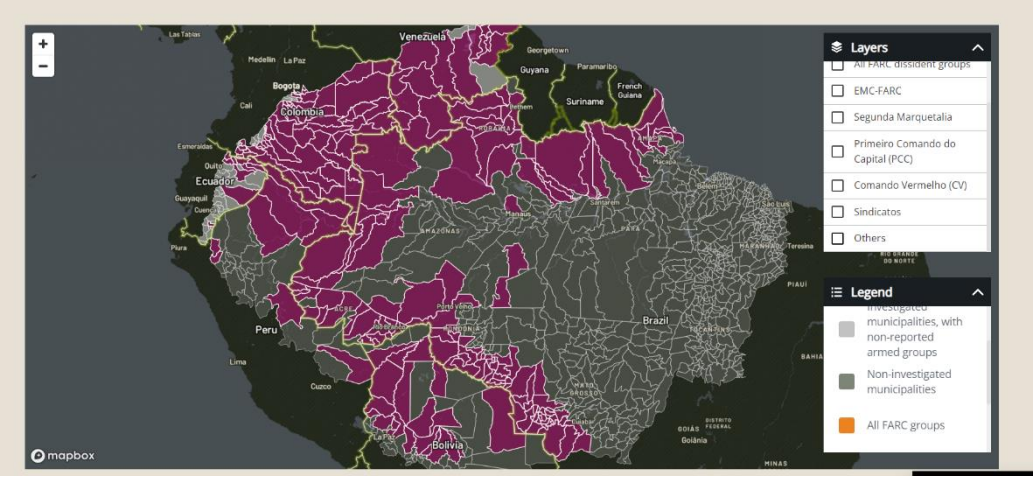

Figure 8: Screenshot of interactive map.

- **UI/UX Design Principles**

The project was effective in this department. The website's UI design is relatively clean and easy to understand. The user experience also allowed for a better understanding of the data as information was clearly labelled, there was minimal cluttering. The map of the Amazon would also zoom in to locations that were relevant to the information given. The information was also given in a concise manner. None of it felt too overwhelming to look at, despite the weight of the data it was representing. The text that accompanied the data made it easier to make the connection and provide context for what I was looking at and attempting to understand.

- **Data-driven storytelling**

When trying to understand how the project incorporates data-driven storytelling, a scholar I felt would help ground my understanding was Barbara Tversky's Implications for Data Storytelling (). At first, the idea of storytelling in relation to data visualization seemed slightly foreign to me. Its apparent that a good "narrative" is required to fully articulate the finer points the data is conveying. A data-driven projects requires a "story" in order to fully perceive and understand the events the data is representing. It is about a retelling of events which the case study does very well. It provides a steady flow of events that really help to shape the context around the data. The cartels and criminal organization's infighting. Their use of the Amazon. How the illegal activity affects the natural environment.

- **Emotional Impact**

As I mentioned earlier, the graph (figure 6) representing the victims killed over a four-year period paints a grim image. It is very difficult to look at statistics about death, and not feel some kind of emotional reaction. The use of red to highlight the areas controlled by these organizations contrasts with the warmer colours in the background, and really gives alarming feel (figure 9).

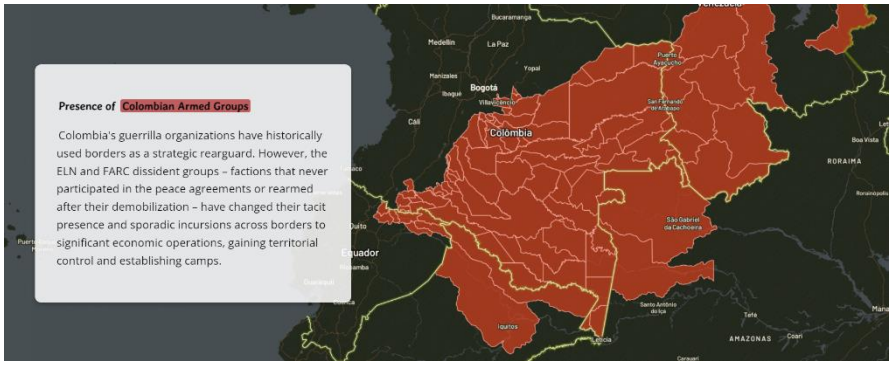

Figure 9: Screenshot of highlighted map area showing armed group's control.

Through the process of writing this essay, I have learned a lot about data visualization. I do not think data visualization exists as a way to spoon feed to the user. Rather, it provides a non-overwhelming alternative to simply dumping the numbers on the page and calling it a day. Most people do not have the tools to interpret data a moment's notice. There needs to be a bridge to close the gap between data and interpretable information. This is why good usage of data visualization techniques are so important.

BIBLIOGRAPHY

Tversky, B., 2018. Storytelling in the wild: Implications for data storytelling. In *Data-driven storytelling* (pp. 17-57). AK Peters/CRC Press.

Kidd, J., 2015. *Representation*. Routledge.

Knaflic, C., N. 2015. Chapter 2: Choosing an effective visual. *Storytelling with Data: A Data Visualization Guide for Business Professionals*. John Wiley & Sons, pp. 35-70.

Li, Q. 2020. Chapter 2: Overview of Data Visualization. *Embodying Data*. Shanghai Jiao Tong University Press, pp. 17- 47

No author. 2023. *infoamazonia.org*. Welcome to the Amazon underworld. Url: https://infoamazonia.org/en/2023/08/03/welcome-to-the-amazon-underworld/ (Accessed: 2 September 2024)