Characterizing terrorist groups

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1 Dataset

Our work will revolve around the extensively studied and impressively rich Global Terrorism Database (GTD). This publicly available dataset was collected and is still maintained by the National Consortium for the Study of Terrorism and Responses to Terrorism (START) at the University of Maryland in the United States. The GTD includes data on over 200,000 international terrorist attacks since 1970. Described as "the most comprehensive unclassified database on terrorist events in the world" [1], the GTD contains information on over 100 features for each terrorist attack, including the location, date, attacker(s), target(s), weapons used, casualties and terrorist organization.

We aim to direct our analysis at the group behavior of terrorist organizations. To do so, we pair the GTD with another complementary dataset by START, called the Profiles of Perpetrators of Terrorism in the United States (PPT-US). This database describes 145 terrorist organizations having engaged in terrorist activity in the United States between 1970 and 2016. From their own description, each organization's "terrorist attacks, its history and base of operations, its ideology and goals, its engagement in political and criminal activities (other than terrorism), its alliances, its network and structure, and its financial resources." A confidence indicator (*high*/*medium*/*low*) is included for each information to reflect the reliability of each information.

The information contained in GTD and PPT-US was analyzed by a large number of researchers (see Section 3 for examples). Both of these datasets are well-established and reliable source of informations and the quality of the data they contain has been reviewed and used by well-known organizations, including the Institute for Economics and Peace. Our analysis therefore requires little data cleaning or pre-processing.

2 Problematic

What are the defining characteristics of terrorist groups?

Our main goal is to gain understanding of the differences between terrorist groups, including their respective span of attacks, strategies employed, ideologies, goals and targets. We aim to visualize our findings by clustering terrorist organizations based on their defining characteristics to extract common patterns of attacks using both GTD and PPT-US datasets.

2.1 What are geographical differences between terrorist groups?

Religious, cultural, and political differences among countries across the world are undoubtedly reflected in the characteristics of terrorist groups from different regions. To visualize these differences,

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we plan to create an interactive map that displays prominent terrorist groups for each country and their respective targeted attacks.

2.2 How have terrorist groups evolved over time?

We will also investigate the evolution of terrorist groups over time. In this regard, we aim to analyze the visualize trends and patterns of terrorist groups' behavior over time. We can track changes in the frequency and severity of attacks, as well as the strategies, weapons, locations chosen by different organization clusters. We will visualize this evolution with line charts and heat maps and highlight significant events that have affected the behavior of terrorist groups.

2.3 Do terrorist groups with different ideologies use different strategies?

Our final analysis focuses on identifying links between terrorist groups' strategies and their guiding ideology. For instance, we can investigate whether religious reasons lead to the use of different kinds of weapons or target types. We plan to use a bubble chart to show the relationship between motives and strategies. To make it more interactive, users can select a single motive or strategy and see how the plot changes in response. This will help us gain a better understanding of the correlation between the reason for the attack and the type of attack.

3 Related Works

The GTD was introduced by a paper by Gary LaFree and Laura Dugan [2], in which they carried exploratory analysis and extracted general trends on terrorism. The same authors then published the book 'Putting Terrorism into Context' [3] offering an interpretation guide for terrorism data and their own analysis on so-called black swan events, which are unpredictable events with an enormous worldwide impact, and how they relate to the context of thousands of less famous attacks happening each year. The authors provide a "comprehensive empirical overview of the nature and evolution of both modern international and domestic terrorism" and describe how "a very small number of terrorist attacks have had an outsized effect on attitudes and policies toward terrorism."

Kaggle also hosts hundreds of notebooks with Exploratory Data Analysis. We will conduct our own so as to align it with our chosen problematic by focusing on group dynamics.

Visualization-oriented research has also been carried out on the GTD. Here are a few examples that inspired us:

1. **GTD WebGL Globe**: A global view of terrorism attacks per country per year around the globe for each year.
2. **A World of Terror** by Periscopic: A visual analysis of terrorist organizations and their respective casualties over time.
3. **Overall Terrorism Index Score** by Vision of Humanity: A simple yet beautiful map of the overall terrorism index per country. **Here** is their related publication.
4. **Hate by the Numbers** by Jigsaw: A beautiful interactive visualisation of white supremacy attacks. This is our principal visual inspiration for our project.
5. **Terrorism** by Our World in Data: An extensive and wide analysis of terrorism attacks around the world.

Our approach is original in that it pairs the event-based GTD with the organization-based PPT-US to focus on terrorist organizations rather than terrorist attacks. We will also strive to produce a simple, aesthetic and clear dashboard to convey key insights. The only example of visual project with the same goal was the one by Jigsaw, but their analysis was restricted to attacks carried out by white supremacists, whereas we want to analyze all terrorist organizations.

4 Exploratory Data Analysis

4.1 Number of attacks

Let us begin by considering the development of the number of terrorist attacks over the years. Figure 1 shows that over the past 50 years, we can observe two waves of terrorism. A first wave arises around 1990 and a second larger wave hits around 2015. Furthermore, we can see that for several years, the data set does not have information on terrorist attacks.

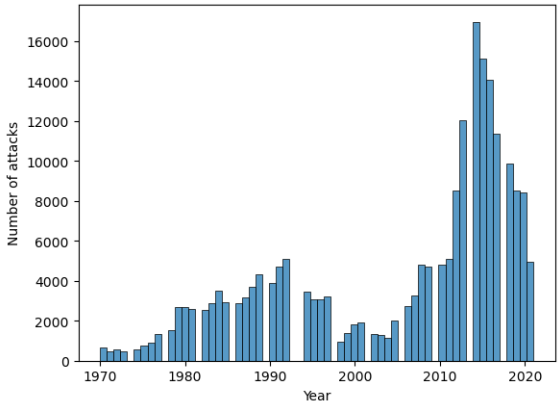

Figure 1: The number of terrorist attacks over the years

4.2 Location of attacks

Next, we consider the location of terrorist attacks. Figure 2 shows the top 10 countries with the highest number of terrorist attacks and the top 10 countries with the fewest terrorist attacks. We see that Afghanistan and Iraq have the highest number of terrorist attacks, which can be explained by the presence of the Taliban in Afghanistan and the Islamic State of Iraq and the Levant in Iraq.

On the other hand, we see that the lowest number of terrorist attacks take place in smaller countries. However, one can also note that there is only 1 terrorist attack in North Korea. Since it is difficult from outsiders to get information regarding events happening in North Korea, one may wonder about the completeness of this information.

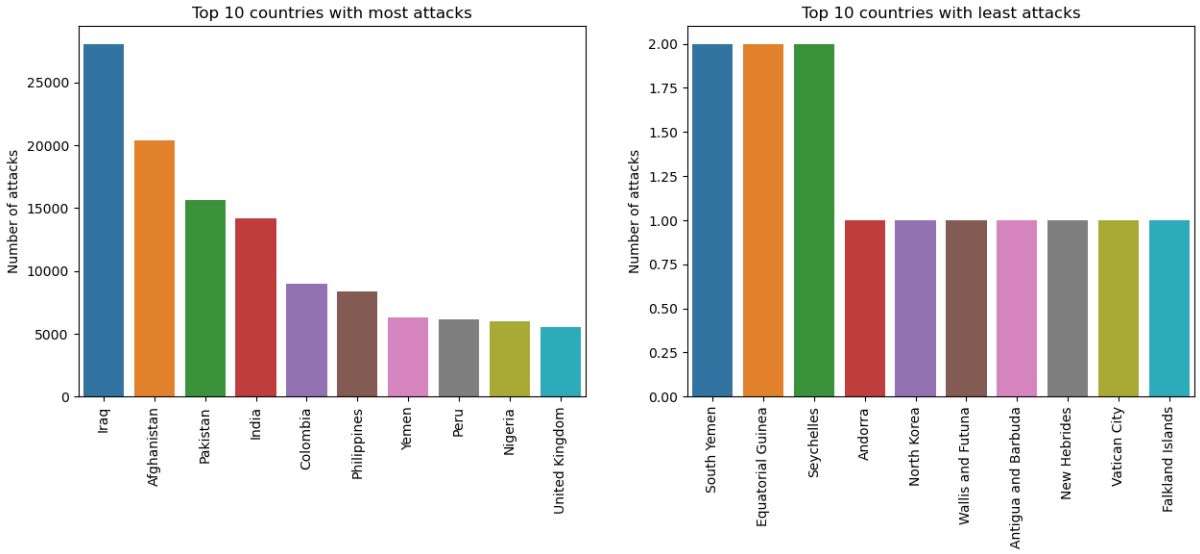

Figure 2: Top 10 countries with the most attacks and top 10 countries with the least attacks

4.3 Weapon types

As a final part of the general analysis, we consider the different types of attacks. Figure 3 shows the evolution of the usage of five different weapons. In this Figure, we consider the five weapons that are used most overall. One can see that during the last 20 years, the usage of explosives has increased and the usage of firearms first decreased and then stagnated.

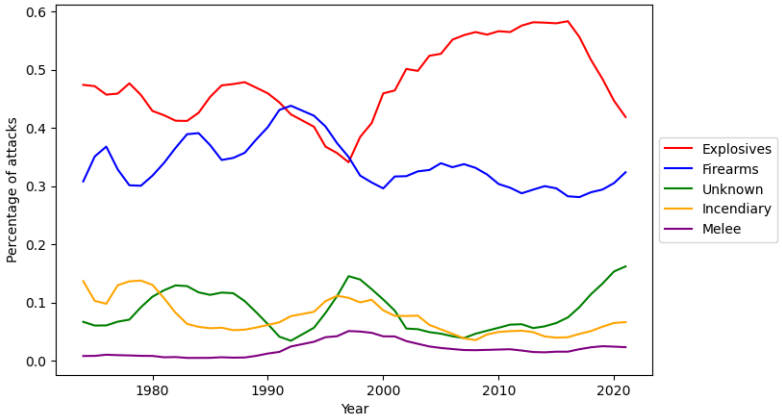

Figure 3: Evolution of the usage of five types of weapons over the years. A rolling mean of 5 years is applied.

4.4 Group attacks

Figure 4 shows the relationship between the number of groups and the number of attacks a group has. One can see that there is a large number of groups with relatively few attacks, while there is a small number of groups with a large number of attacks. Further inspection shows that the largest group is the Taliban, followed by ISIL and Shining Path.

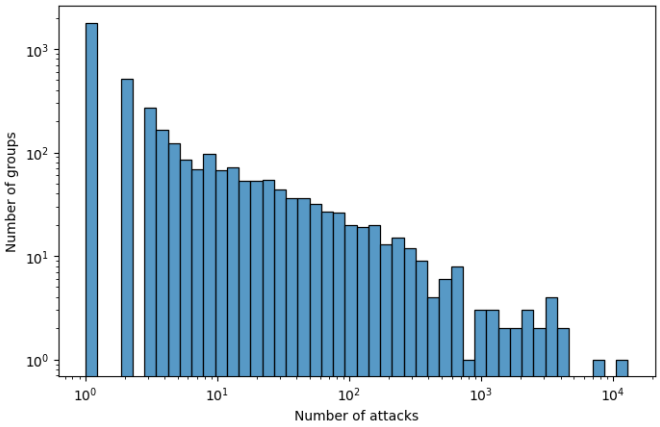

Figure 4: Distribution of the number of attacks per group

References

[1] *GReVD: Global Terrorism Database*. https://grevd.org/consortium/partner/gtd. Accessed: 2023-03-27.

[2] Gary LaFree and Laura Dugan. "Introducing the Global Terrorism Database". In: *Terrorism and Political Violence* 19.2 (2007), pp. 181–204. DOI: 10.1080/09546550701246817. eprint: https://doi.org/10.1080/09546550701246817. URL: https://doi.org/10.1080/09546550701246817.

[3] G. LaFree, L. Dugan, and E. Miller. *Putting Terrorism in Context: Lessons from the Global Terrorism Database*. Contemporary Terrorism Studies. Taylor & Francis, 2014. ISBN: 9781134712410. URL: https://books.google.fr/books?id=%5C_TGLBQAAQBAJ.