Exploring the Global Terrorism

- **Introduction**

  This visualization is to explore the worldwide terrorism from four dimensions, which separately are the distribution of terrorist incidents, death and injury rate, attack types and weapon utilized from 1997 to 2017. Besides, anti-terrorist organizations may be interested in this visualization as it can help them better understand terrorism through visualized data, allowing them to actively embrace countermeasures to reduce the occurrence of terrorist incidents and the psychological and physical effects of terrorist incidents on urban residents.

- **What**

  Dataset about global terrorism used in this visualization downloaded from Kaggle website whose author is Aditya Agarwal (Terrorism Data 1970to2017, 2020). The procedure of processing this dataset contains calculation and aggregation. For aggregation, daily amount needs to be sum up to obtain the total number of incidents. In addition, calculation is to generate the casualty rate, and for acquiring normalized value, the dataset about world population is also used (World Population 1960–2018, 2020). Moreover, the based layer of world map came from website named natural earth to build a choropleth map (Natural Earth - Free Vector and Raster Map Data at 1:10m, 1:50m, and 1:110m Scales, 2021). To maintain name consistency, the names in the based layer of map have been modified to match the nation names in the terrorism data.
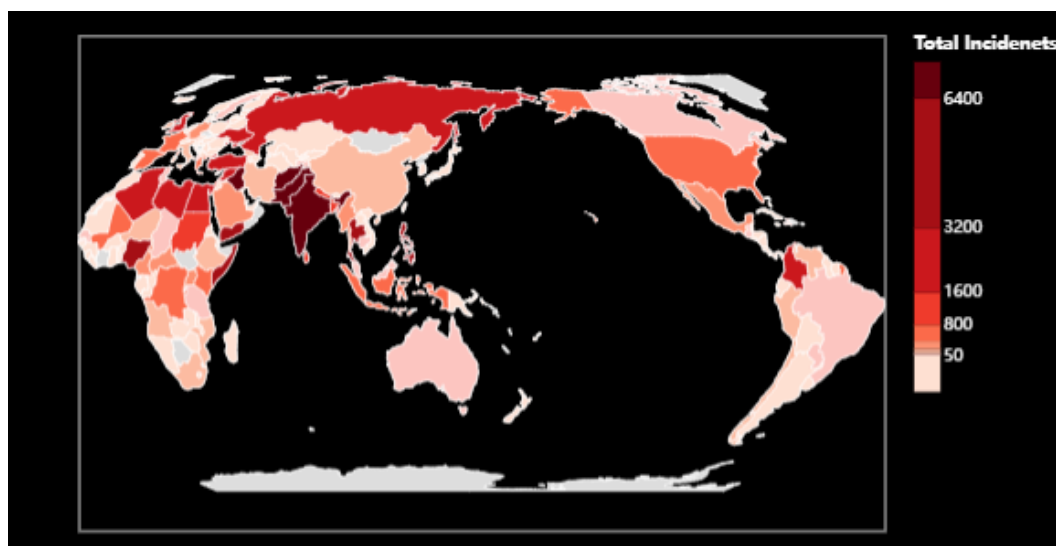
- **Why+ How**

Figure 1. Global Distribution of Total Terrorist Incidents in 1997-2017 (choropleth map)

According to Figure 1, the world map centered on Australia depicts the total number of terrorist incidents from 1997 to 2017. The reason for selecting choropleth map is that different shapes and size of area with color luminance can display the number

of terrorist occurrences in each country in a more intuitive manner, with the darker the hue indicating a larger number. Furthermore, identifying outliers is considerably simpler. In addition, this map can be filtered by the bar chart below to monitor the specific period.
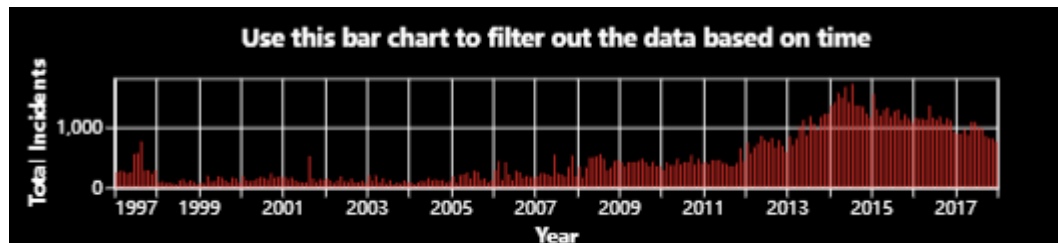

Figure 2. Number of Terrorist Incidents Distributed Over Time (bar chart)

The purpose of Figure 2 is to compare the number of terrorist incidents and tendency over the last 20 years and within each individual year, so that lines with positions could be the best option. What's more, this diagram can interact with the world map.
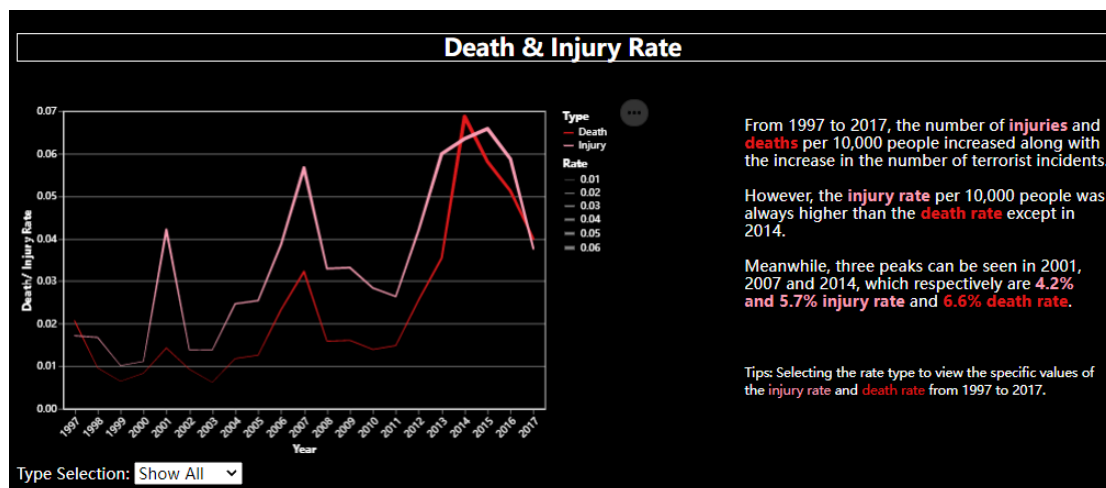

Figure 3. Death and Injury Rate in 1997-2017 (line chart)

Since line chart not only can express quantitative values through vertical position but also be able to indicate the trend and peaks, this visualization in Figue3 utilizes points with line connections to reflect the tendency and peaks of mortality and injury rates during these 20 years. Besides, color hue is a good performance of distinguishing and comparing two types of rates and the thickness of the line shows the change of trend with a more prominent method. What is fascinating is that audiences can pick whatever sort of rate by clicking the button on the bottom of the chart, and the value in each year appear simultaneously.
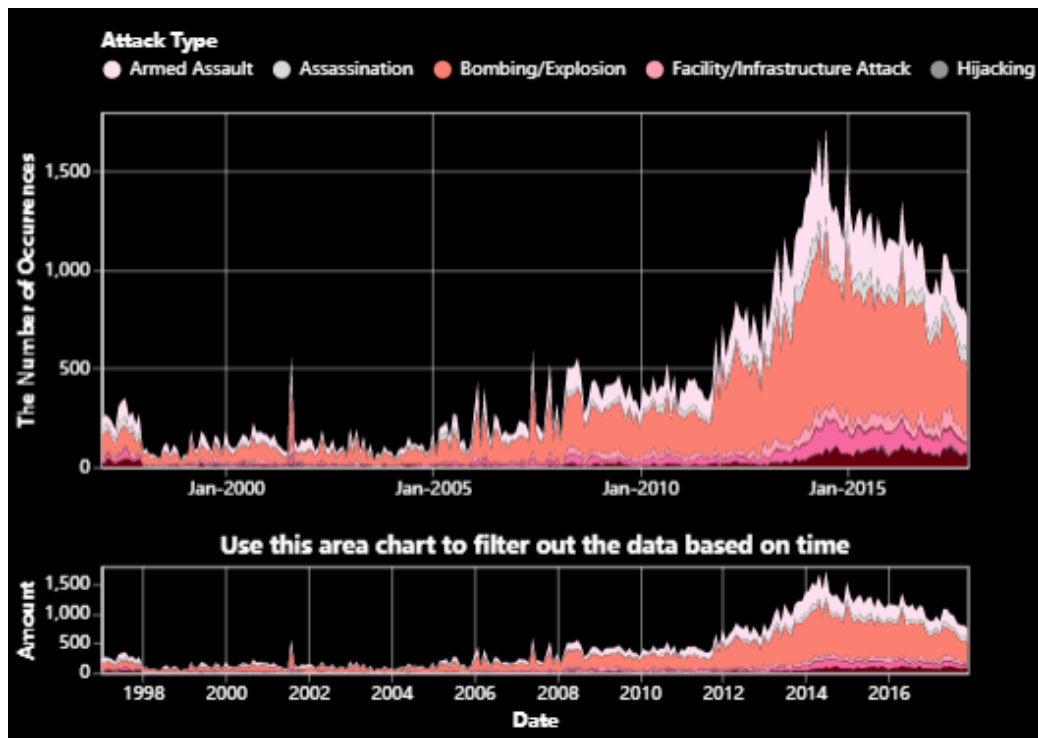
Figure 4. The Number of Times Different Attack Types Occurred in 1997-2017 (stacked area chart)

According to Figure 4, using stacked area chart with color hue to analyze the number of times different attack types occurred makes it much easier to show the hierarchical part-to-whole relationship, which means it is a good performance to determine which type of attack occurred most frequently through observing the height of areas. In addition, stacked area chart features x-axes with continuous scales that can show correct date interval as well as the trend throughout this period. It is worth noting that the small, stacked area chart below can be used as a selector if the audience are interested in the assault situation at a certain moment.
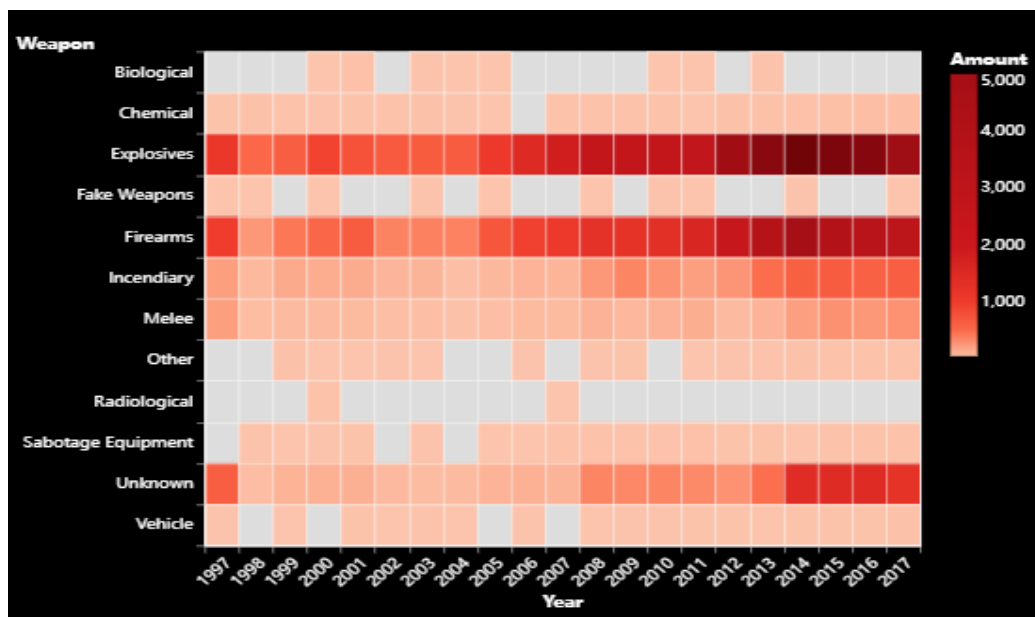

Figure 5. The Number of Times the Weapon Used in Terrorist Incidents (heat map)

The advantage of heatmap is that it can perform precisive quantity with temporal

pattern, thus in Figure 5, it utilizes the varied brightness of red of areas corresponding to the weapons and year to reflect the number of weapons used in terrorist events. Furthermore, color hue in this visualization mainly focus on the usage of gray to indicate that no data is available.

- **The Overall Composition**
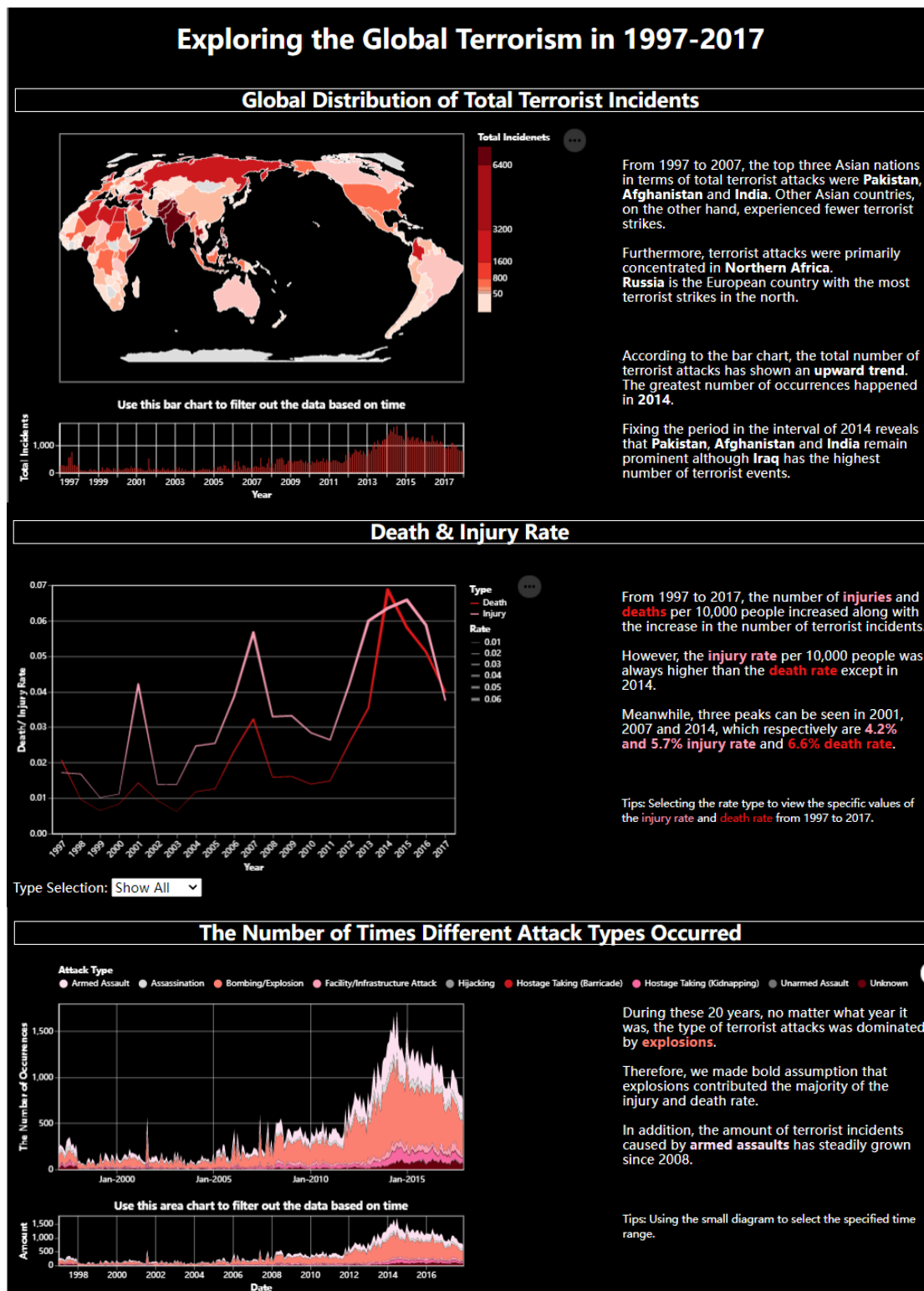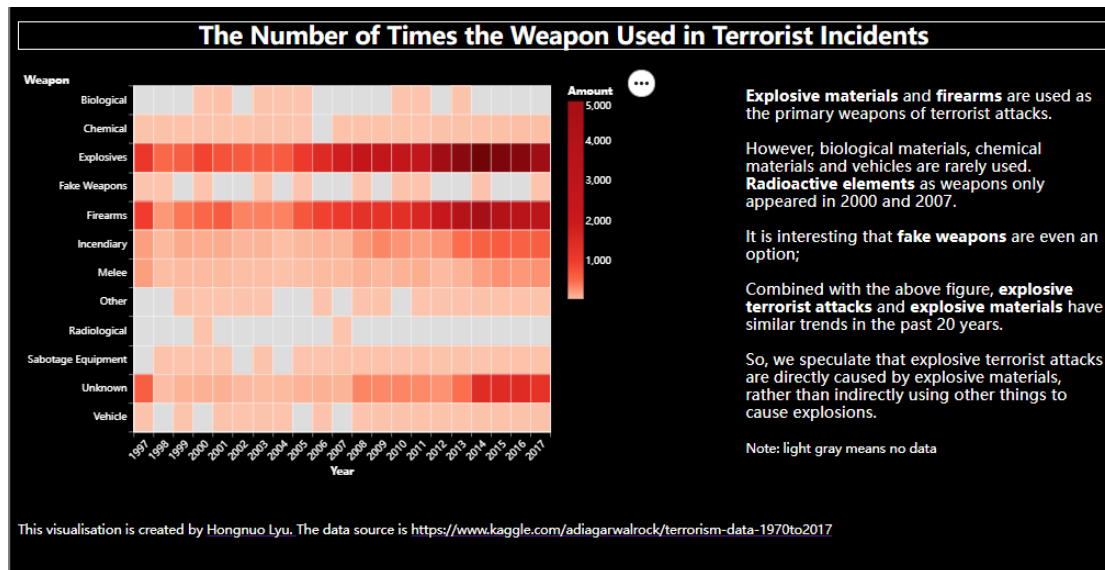
● Design

This visualization uses three columns and four rows layout, where all diagrams occupy two columns and text part stands in one column, which adheres to the visual guide structure, from top to bottom, from left to right. Moreover, the clarity of the context structure is achieved by adding a border to the area where the subtitle is located. In addition, the theme color used is red because it is associated with blood. To highlight the visualization, it uses gray as background of page and black as background of the main body. White, which contrasts with the color of main body, is therefore used as the main color for text and annotations. Furthermore, to demonstrate the hierarchical relationship, the headline is bold and enlarged, and the subtitle is in a lower font size than the headline. In annotations and tips, it is also appropriate to bold or change the color of some words to enhance the relevance between text and diagrams. The usage of overall typography is "Robot", one style of sans serif, which is neat and readable. In the end of the visualization, to protect the copyright, the author's name and source of resource are illustrated.
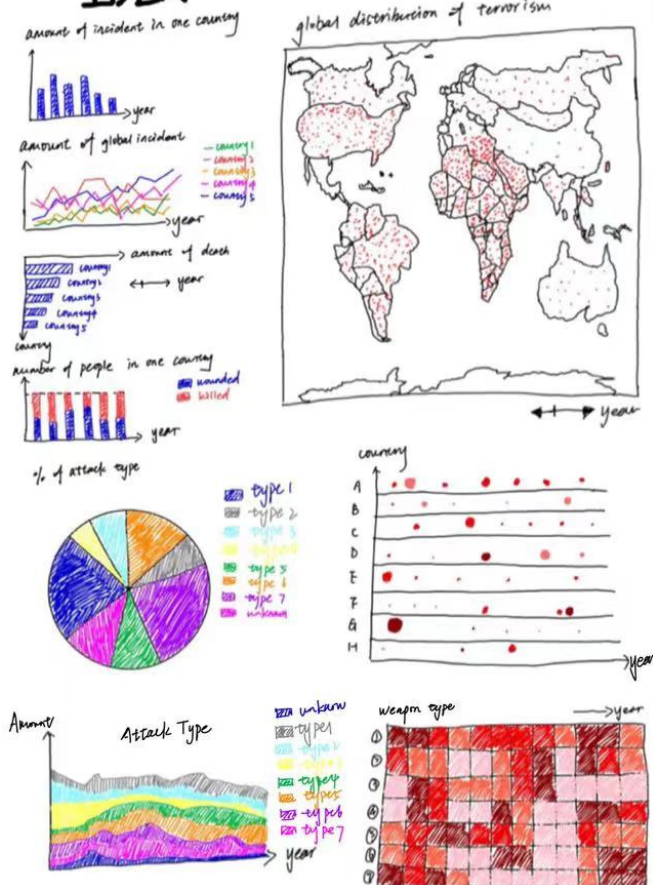
Reference

Agarwal, A. (2020). *Terrorism Data 1970 to 2017*. Retrieved from
https://www.kaggle.com/adiagarwalrock/terrorism-data-1970to2017

Devakumar, K.P. (2020). *World Population 1960-2018*. Retrieved from
https://www.kaggle.com/imdevskp/world-population-19602018

Natural Earth - Free vector and raster map data at 1:10m, 1:50m, and 1:110m scales.
(2021). Natural Earth. Retrieved from https://www.naturalearthdata.com/
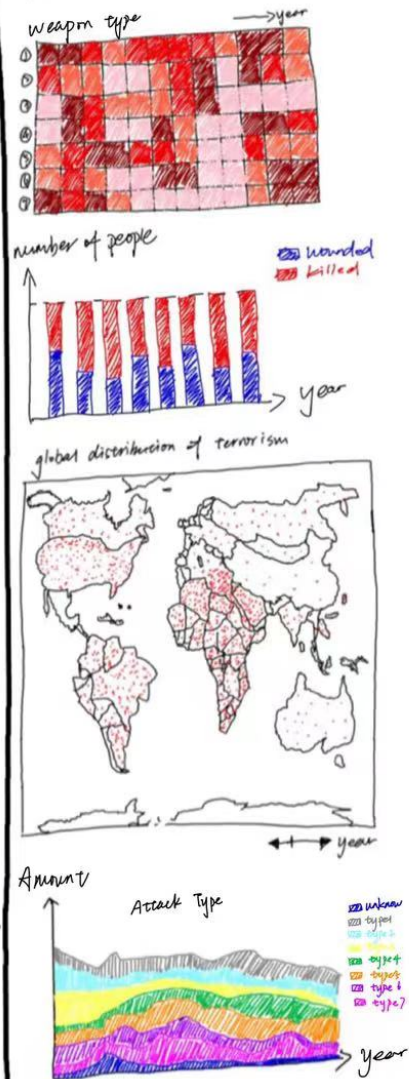
Appendix

FIVE DESIGN SHEET #1

IDEA

amount of incident in one country

amount of global incident
- country 1
- country 2
- country 3
- country 4
- country 5

amount of death / year
- country 1
- country 2
- country 3
- country 4
- country 5

number of people in one country
- wounded
- killed

% of attack type
- type 1
- type 2
- type 3
- type 4
- type 5
- type 6
- type 7
- unknown

global distribution of terrorism

country A B C D E F G H / year

Amount — Attack Type / year
- unknown
- type 1
- type 2
- type 3
- type 4
- type 5
- type 6
- type 7

weapon type / year

FILTER

weapon type / year

number of people / year
- wounded
- killed

global distribution of terrorism / year

Amount — Attack Type / year
- unknown
- type 1
- type 2
- type 3
- type 4
- type 5
- type 6
- type 7

COMBINE + REFINE

Each diagram is independent so there is no need to merge.

QUESTION

① whether I should explore the situation of terrorism in a particular country. eg> United State or Afghanistan
② colour used is not good enough
③ whether I should add other interactivity

CATEGORIZE

① year
② country
③ weapon type
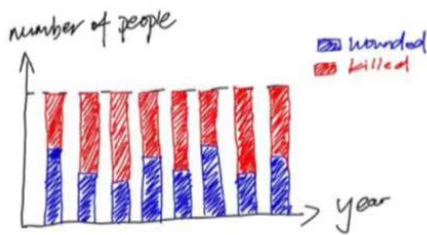④ people type (killed / wounded)
⑤ attack type
⑥ target type

FIVE DESIGN SHEET #2

LAYOUT

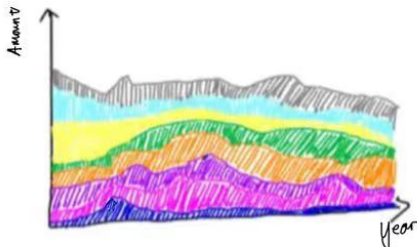| The Development of Terrorism |

| people who are killed and wounded |

| global distribution of terrorism |

| Different Attack Type During 20 years |

OPERATION

year selection ←——→ year

country selection menu

| ✔ Show All |
| United States |
| India |
| Australia |
| Canada |

FOCUS

① find the dataset of world population because the number of people who are killed and wound need to be normalized.

② make an overall layout

③ choosing the type of interactivity

DISCUSS

① using the stacked bar chart to show the number of people who are wounded and dead is not good enough. because not only these people need to normalize but also it doesn't show different country.

② using the dot map to present the distribution may be not effective enough. changing this into choropleth map may be better with color luminance.
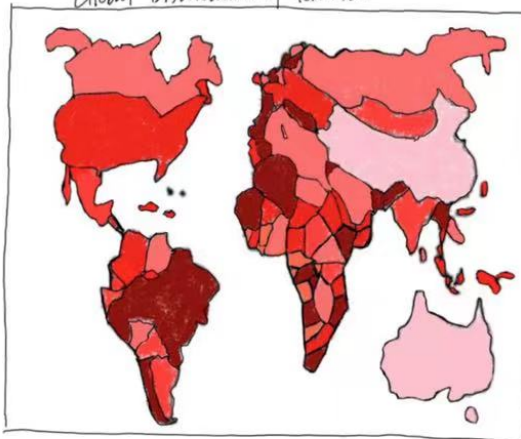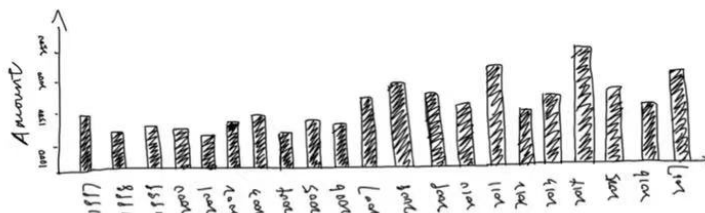
FIVE DESIGN SHEET #3

LAYOUT

①
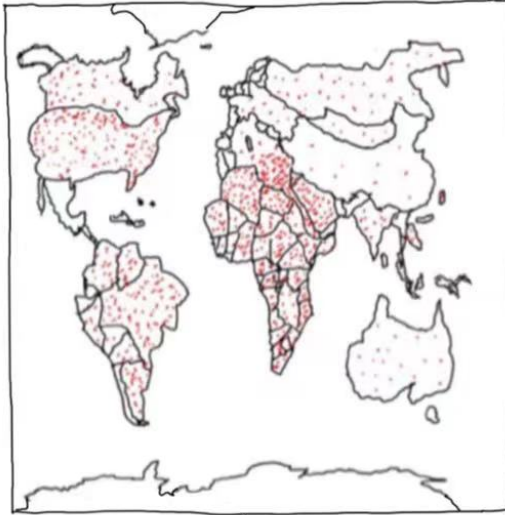
Global Distribution of terrorism

← |——→ Year

②

Total Number of Terrorism Incidents

OPERATION

Year : ____
Country : ____
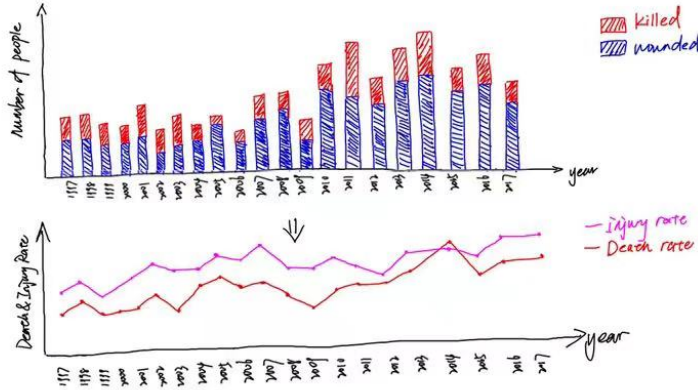The number of : ____
terrorist incidents

DISCUSS

① the color used in the total number of terrorist incidents need to consist with what color used in the visualisation about distribution of terrorism incidents.

② After adding a new visualisation and changing idom, the structure is disordered, so it needs to improved

③ About the distribution of terrorism the storytelling is not completed maybe I need to add some new visualisations.

FOCUS

① Adding a new visualisation

② changing the idom used in the distribution of terrorist incidents

③ Reorder the visualisation, making them follow a storytelling order

④ make the tooltips for all visualisation

⑤ Changing color used in every visualisation
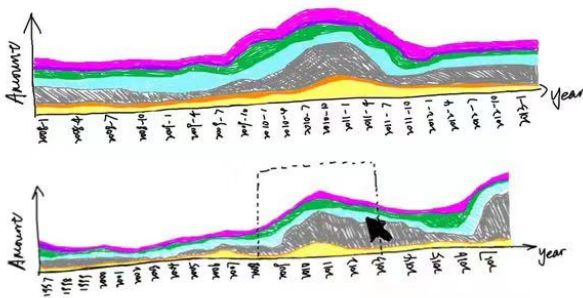
FIVE DESIGN SHEET #4

FOCUS

number of people / year

killed
wounded

Death & Injury Rate / year

injury rate
Death rate
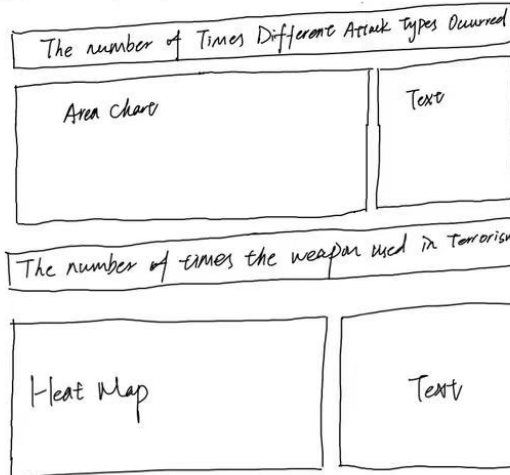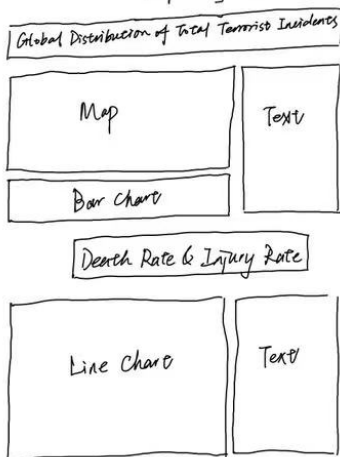
OPERATION

Amount / Year

Amount / year

DISCUSSION

① The domain is about terrorist incidents, so which scale of color I need to use "reds" or "oranges"

② After changing the idiom and add new visualisation, should I reorder the structure I used to use?

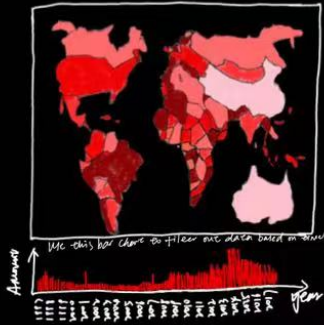## LAYOUT

Exploring the Global Terrorism in 1997 - 2017

Global Distribution of Total Terrorist Incidents	
Map	Text
Bar chart	

Death Rate & Injury Rate

Line Chart	Text

The number of Times Different Attack Types Occurred	
Area chart	Text

The number of times the weapon used in Terrorism Incidents

Heat Map	Text

FIVE DESIGN SHEET #5
LAYOUT

Exploring the Global Terrorism in 1997-2017
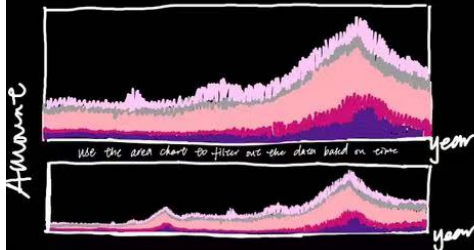
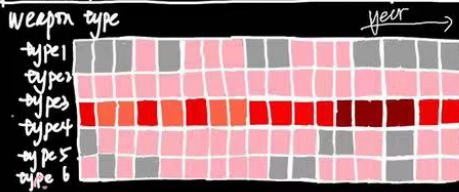#### Global Distribution of Total Terrorist Incidents

Use this bar chart to filter out data based on time

Amount / Year

Text

Death and Injury Rate

Death & Injury Rate / Year | Show All

Text

The Number of Times Different Attack Types Occurred

use the area chart to filter out the data based on time

Amount / Year

Text

The Number of Times the Weapon Used in Terrorism Incidents

Weapon type | Year →

type1
type2
type3
type4
type5
type6

Text

OPERATION

country: _____
Total Incidences: _____
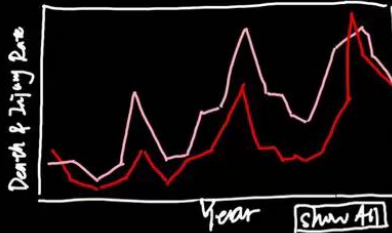
✔ Show All
Death Rate
Injury Rate

Amount / Year

Amount / Year
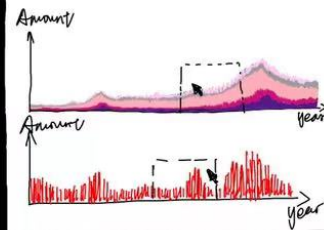
DETAIL

⇒ Data from kaggle.com

⇒ only using desktop is enough

⇒ Some detail about how to use code need to search on website or refer to the tutorial document

⇒ the whole visualisation need to take two weeks to complete and another ten days to learn how to use the code

⇒ original data need to be aggregate & calculate