

GEOM90007 Assignment 2 Design Summary

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The dashboard created for this assignment aims to provide *an overview of school shooting incidents in the United States since the 1999 Columbine High Massacre*, including the geographical location and severity of these incidents, number of incidents and casualties throughout the timeline, shooter's source of weapon and shooting intention, and what type of schools were commonly involved in gun violence.

Home Page

The four value boxes at the top of the home page displays general information of the dataset, namely the number of incidents to date, total number of students enrolled in the school during the incidents, total number of fatalities and injuries caused by the shooting. Symbols/Icons were utilise in each value box to make the user instantly notice the displayed information in a pre-attentive way.

Below the value box is the map for visualising the incident locations and the number of casualties for each incidents. The shape file used for visualisation is a distorted United States map at administrative state level, which shows *Alaska* and *Hawaii* in close proximity to the rest of the states for a better view. Incident locations were represented by bubbles, and the size of the bubbles were determined by the casualties of each incidents. And a one-hue sequential colour scheme were used on the bubbles, where dark red indicates high casualties while light pink represents low casualties, to form a better visualisation. In addition, a set filters, such as state, school type, and time period filter, were placed on the left side of the map to allow user to select which set of data they would like to visualise. Finally, tool-tips on hover displays a brief summary of each incident, such as the school name, school type, location, incident date, and casualties.

An Alarming Timeline Page

A multi-axis plot comprises of line chart and bar chart were utilised to display the number of casualties and incidents in each year between 1999 and 2022, which effectively allows the user to compare the incidents and casualties in each year at a glance. On top of that, hue were used to differentiate the plots that shares the same X-axis. Additionally, tool-tips were shared among the three charts, which allows for easier comparison when hovering.

Shooter and Intention Page

The circular item chart here were used to shown the age distribution of the shooters, where each dot represents a shooter. Their age were classified into six groups, and different groups were distinguished by hue, which effectively allows the user to observe which group has the most number of shooters. From the circular item chart, we can see most of the shooters were between the age of 10 and 19. Therefore, the donut chart on the right were used to analyse the weapon source of these two age groups. Again, the categories were differentiated by hue, and size of the slice emphasizes that a large portion of the weapon source were shooters' relatives.

The last plot of this page is a multi-axis plot consists of bar and line chart depicting the number of incidents under different shooting intention and the number of casualties under each intention. Applying the Gestalt Law Continuity, the number of incident were sorted in ascending order to make things easier to read. While the line chart shows that although targeted shooting has the most incidents, but indiscriminate firing leads to the most casualties.

School Page

The last page focuses on comparing the type of school involved in shootings. The donut chart compares the number of incidents in public school against private school, the two groups were separated by hue. While the bar chart on the right illustrates which type of school were more commonly endangered by gun violence; the frequency of each school type were sorted in ascending order to improve visualisation, where we can see that high school ranked first by a wide margin.

Source Reference

- **Data Source:** The Washington Post's GitHub Repository
<https://github.com/washingtonpost/data-school-shootings>
- **Shiny Extension Package:** shinydashboard
<https://rstudio.github.io/shinydashboard/>
- **Shapefile Source:** Highmaps - Map Collection
<https://code.highcharts.com/mapdata/countries/us/us-all.geo.json>
- **Chart and Map Package:** Highcharter, a R wrapper for Highcharts
<https://jkunst.com/highcharter/>
- **Dashboard Theme Design:** dashboardThemeDesigner
<https://nik01010.shinyapps.io/dashboardThemeDesigner/>
- **Dashboard Icons:** Font Awesome
<https://fontawesome.com>

Appendix

- The dataset used for the dashboard were obtain from *the Washington Post*'s GitHub repository, which contains shooting incident records during school hours since the Columbine High massacre on April 20, 1999.
- Dashboard design uses the *shinydashboard* package, which is an extension for *R Shiny*, which allows me to create a minimal dashboard design that includes a sidebar, header and body. The dashboard theme were created using the function *shinyDashboardThemeDIY* from the package *dashboardtheme*.
- All the charts, including map, in the dashboard were created using *Highcharter*, which is a R wrapper for Highcharts. It's quite handy as it comes with charting functions for map and a collection of shape-files for different countries' polygon.
- Icons used in the dashboard were from the *Font Awesome* Package, which allows me to bring essential content to the point, such as highlight value boxes and sidebar tab. It grab the viewer's attention when they interact with the dashboard.