Data Description

This dataset depicts the incidents of hate crimes across the United States. It was collected by the Federal Bureau of Investigation and released to the public under the Uniform Crime Reporting (UCR) Program. Statistics prior to 2020 are available on the UCR publication page (https://ucr.fbi.gov/hate-crime) and the latest releases (from 2020 and onward) are posted on the FBI Crime Data Explorer (https://cde.ucr.cjis.gov/LATEST/webapp/#/pages/downloads). The entire dataset consists of 14 tables containing detailed information regarding offenders, victims, bias motivations, offense type, population, and location. For this project, we are focusing on Table 4, Table 12 and Table 13. Table 4 contains the hate crime incidents by bias motivations for each year. Table 13 outlines hate crime incidents across various categories by states, which is the main focus of our visualizations. Table 12 contains the population data by state, which serves as an add-on for Table 13.

In terms of data processing, we combined Table 13 from 2019 to 2022 into one large dataset. We also took the population data from Table 12 and added it to the large dataset. The combined dataset has a total of 51 rows and 33 columns. The 51 rows represent the 50 states and the District of Columbia. The 33 columns contain the state code, hate crime incidents per bias motivation by state, and state population over time. In our project, we focused on three major categories of hate crime bias motivations: Race, Religion, and Sexual Orientation. They are the most prevalent (highest number of hate crime incidents recorded) types of hate crime incidents. We also combine the Table 4 data from 2019 to 2022 to create a JSON file that documents the distribution of hate crime incidents by the various subcategories of bias motivations.

Visual Design Rationale

In this project, our focus is on analyzing the impact of various demographic factors -- specifically, race/ethnicity, religion, and sexual orientation -- on the occurrence of hate crimes across the United States. We aim to delve into the evolving patterns of hate crime distribution across different states from the year 2019 to 2022.

Our design decisions and trade-offs involved a choice between zooming in on a specific state (e.g. California) or considering the entire USA. Due to a lack of clear county-level data, we opted for a comprehensive national approach to present a holistic view of the hate crime landscape. We used a map to demonstrate the distribution of hate crime incidents across different geographical areas in the U.S. The pie chart section zooms into the bias motivation behind these hate crimes and shows the distribution of the three major categories of underlying biases. Lastly, the line graph digs deeper into the major types of bias motivations by showing the quantitative changes in the subcategories under each major type of bias motivation.

In our main map graph, each state is represented by its area on the map. We utilized color to show the hate crime level in different states. The map uses a sequential color scale ranging from light yellow to light green to light blue to dark blue, indicating a spectrum of hate crime levels from low to high. The different hues allow the viewers to compare hate crime levels across different states. The pie chart employs color hues and areas to convey the sub-categories and their proportion, respectively. Each slice of the pie (or arc) represents one major category of bias motivation behind the recorded hate crime incidents. The arc angle (or area of each slice) helps the viewers to compare the portion of hate crime across the different bias motivations. Lastly, the line plot utilizes vertical position to indicate the number of hate crimes, horizontal position for the year, and hue for different categories. It allows the viewers to compare the change in incidents of hate crime under each subcategory of bias motivation over time. This comprehensive approach aims to provide a nuanced and insightful representation of hate crimes and the bias motivation behind them in the United States over time.

Interactive Elements & Their Design Rationale

Users can engage with our visualizations by utilizing the year and hate crime category filters. After the users change the two filters, all four visualizations will change their appearances based on the specified year and category. The default setting presents a view where no specific categories are selected, showcasing the total number of hate crimes. The default year is 2022, as it represents the most updated data available.

We initially considered using separate buttons for filtering, but to make it more interesting, we opted for a slider for the year filter. Although our year data is not continuous monthly, weekly or daily, we chose a slider format since time is a continuous concept. The trade-off of it is that the slider won't function between individual years, making the interaction less smooth.

Given that we are presenting information across three distinct graphs, to make the filter controls more discoverable, we placed them prominently at the top under the title. To avoid confusion with the colorful graphs, the filter controls are presented in gray, while the filtered options are displayed in a darker shade of gray. This design choice ensures that users can efficiently interact with and explore the data without distraction or ambiguity.

We also added an hover effect in the map so that the state is highlighted and the information of number of incidents and population are shown next to it when the user's mouse is in a certain state. In the pie chart, we implemented an hover effect as well which shows the name of the subcategory and the percentage of it in a gray box at the left down corner of the whole chart area. It makes the information more discoverable by showing each one at a time instead of all the information at once which is crowded in our pie chart.

The Story

From the default map configuration, which presents the number of hate crimes from the year 2022 across all categories in the US, it is observed that 12 states are shaded in dark blue, indicating the states that have the highest incidence of hate crimes. Notably, these states encompass the top 10 with the largest populations, such as California, Texas, New York, Illinois, Ohio, and Michigan. Pennsylvania, Florida, Georgia, and North Carolina are predominantly in light blue, signifying the second-largest number of hate crimes. We also notice that the states with the least number of hate crimes, represented by the light green shade on the map, generally have smaller populations. States like Montana, Wyoming, North Dakota, South Dakota, and New Hampshire fall into this category. From these observations, we conclude that the number of crime hate incidents that occurred in each state is somehow related to the population of that state. There are a few exceptions, of course. Florida holds the third-largest population but is colored with a light shade suggesting the number of incidents was relatively low. Alabama, despite being the 24th most populous state, reports the least number of hate crimes.

The pie chart provides insights into the distribution of bias motivation behind the hate crimes. We observed that race/ethnicity/ancestry is the major bias motivation behind all the hate crimes. For all four years, we can see that the arc for race has the greatest area/angle. There is also an increasing trend in the proportion of hate crimes related to race/ethnicity/ancestry. The proportion starts at around 61.11% in 2019 and increases to 63.52% in 2022. It reached its historical high, which is around 69.14%, in the year of 2021. The proportion of bias motivation related to religion decreased throughout the four-year period, while that of sexual orientation fluctuates over time.

The line chart reflects the same trend with the pie chart across 2019 to 2022 which is the category of Race/ethnicity/ancestry consistently stands out as the most prevalent motivation for hate crimes. However, 2022 emerges as the year where this category attains the highest proportion of hate crimes and the lowest in 2019. The line graph also shows an increase in hate crime against Asian between 2019 and 2022. News reports have state that Covid-19 driveen more radcism and violence toward Asian.

It is surprising for us to see that hate crime incidents decrease in the year of 2021. In the map, we can observe that more states are changing into lighter hues. In the line graph, we can see that all three lines dropped between 2020 and 2021. We are surprised to see this decreasing trend during this time period as news reports are saying that hate crimes are increasing in recent years. After some research, we found out that this unusual trend is due to the fact that FBI data from more than one-third of the country's law enforcement agencies when they documented the 2021 data (Ax).

Group Contribution

Stage 1: Research & Design (~ 4 hrs)

- Group members met twice to brainstorm themes, select datasets, and sketch ideas. Each found around two datasets and decided on the topic collectively.
- Chang, Carol added sketches to milestone 1, Ariel and Amy wrote the writeups of the milestone.

Stage 2: Coding Visualization (~ 10 hrs)

- and Carol coded the visualization, while Chang and Ariel provided feedback.
- Carol did the code for the main graph and legend, and Amy is responsible for the subgraph, the title, labels, description of the graph, and debugging.

Stage 3: Written Report (~ 5 hrs)

- Chang and Ariel wrote the final report, while Amy and Carol helped proofread and offered feedback.

Demo Day

- Chang and Amy attended the in-class demo.

Stage 4: Polishing Visualization and Report (~ 1 hrs)

- Everyone revised their part based on feedback from the in-class demo.

Total Amount of Time Spent: 15 hrs

Work Cited

Ax, Joseph. "U.S. Hate Crimes Drop in 2021, FBI Data Finds, but Undercount Likely." Reuters, Thomson Reuters, 12 Dec. 2022,
www.reuters.com/world/us/us-hate-crimes-drop-2021-fbi-data-finds-undercount-likely-022-12-12/.