1. Basic Info

- Title: Trend for State Crime
- Students:
    - Name: Alec Hsu
        - Email: ahsu6@usfca.edu
        - UID: 20404849
    - Name: Fu Tan
        - Email: ftan3@usfca.edu
        - UID: 20446073
- Link to repo: https://github.com/hsu022210/DataVizFinalProject
- Link to previous repo: https://github.com/hsu022210/hsu022210.github.io
- Link to website: https://hsu022210.github.io/DataVizFinalProject/


2. Background and Motivation

Crime is a threat to our safety and well being. Catching individual criminals can improve our society but it does not solve the problem from its root. Therefore, we want to find a way to understand what background-- the economy, education, incidents and general environment would result in some certain trends of certain kind of crime rates. In order to do that, we want to visualize the crime data so we can find out if there is any notable trends or phenomena that can help the researchers or ourselves to read into the data and research for the reasons behind them. That way, we will have better ideas on how to lower the crime rates and improve our society.

3. Related Work

Crime in Context

This work is part of the inspiration for us to do this work. There are special trends we can see. And there is also a random button that we can see random trends of violent crimes in a city. This work provides a good reference for people to research the reasons behind the trends.
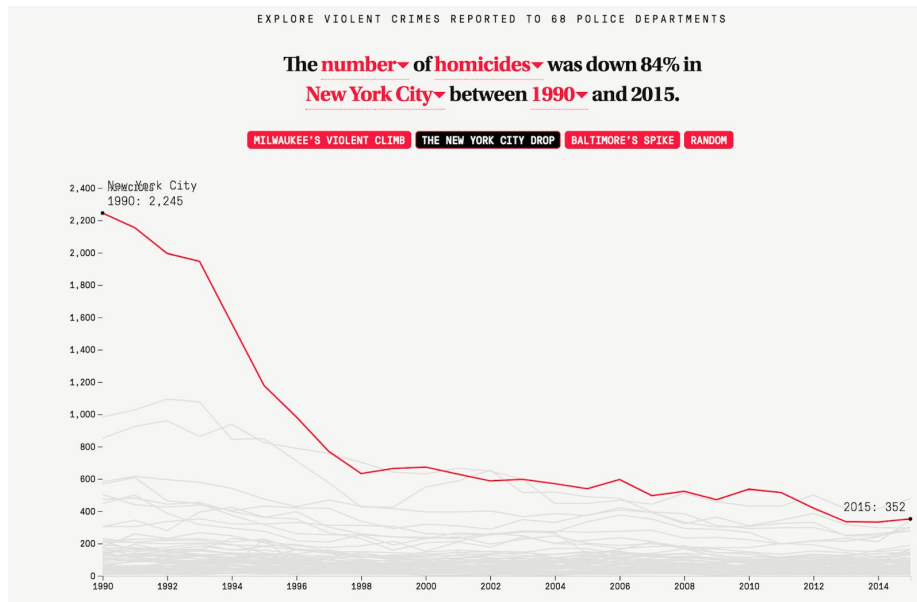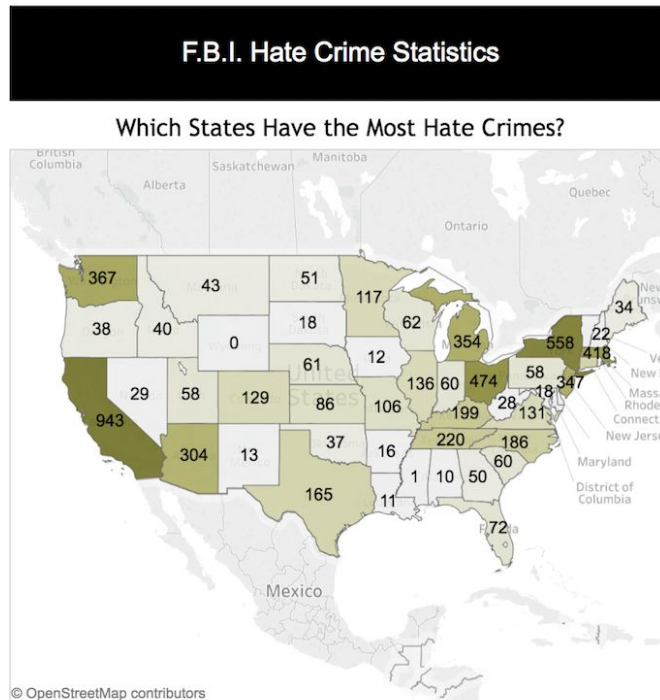
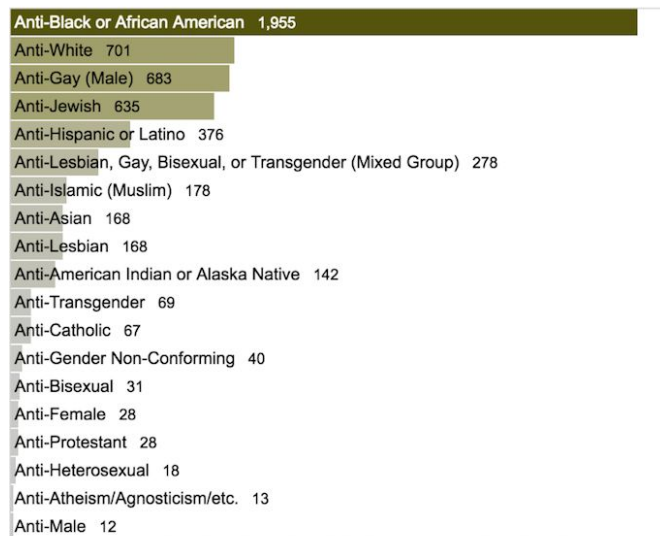A significant drop of homicide crime rate in New York City from 1990 to 2015
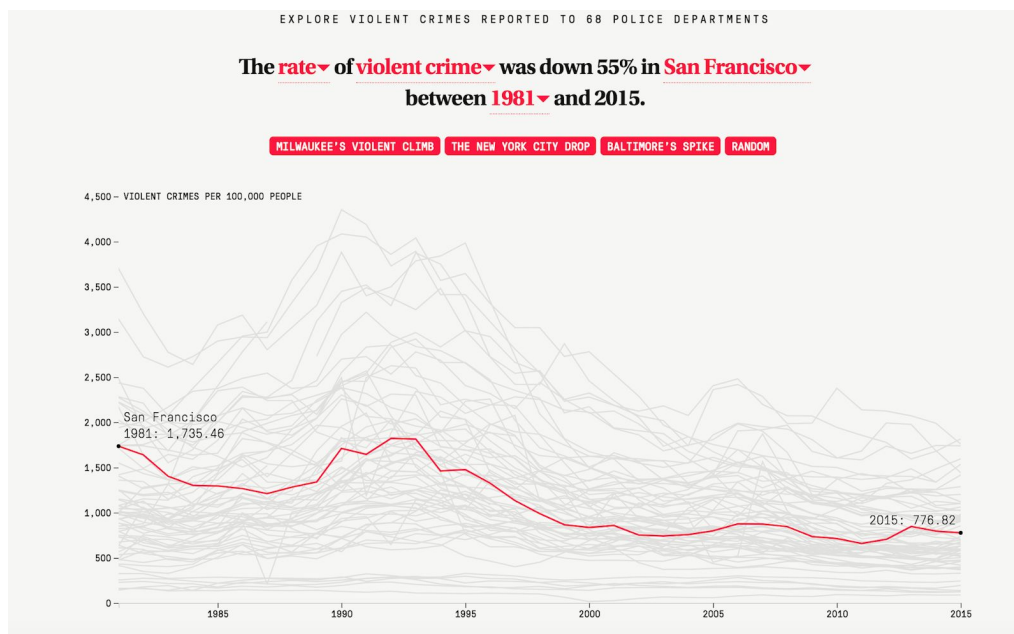
A random trend showing the drop of violent crime from 1981 to 2015 in San Francisco

Hate Crime

This work shows a map and a bar chart to see the crime rate information. This gave us an inspiration that we can use a map and reference graphs.

F.B.I. Hate Crime Statistics

Which States Have the Most Hate Crimes?

© OpenStreetMap contributors

What is the Most Common Type of Hate Crime?

Anti-Black or African American	1,955
Anti-White	701
Anti-Gay (Male)	683
Anti-Jewish	635
Anti-Hispanic or Latino	376
Anti-Lesbian, Gay, Bisexual, or Transgender (Mixed Group)	278
Anti-Islamic (Muslim)	178
Anti-Asian	168
Anti-Lesbian	168
Anti-American Indian or Alaska Native	142
Anti-Transgender	69
Anti-Catholic	67
Anti-Gender Non-Conforming	40
Anti-Bisexual	31
Anti-Female	28
Anti-Protestant	28
Anti-Heterosexual	18
Anti-Atheism/Agnosticism/etc.	13
Anti-Male	12

What are the Specific Hate Crimes in Each State?

4. Project Objectives

Questions
- What are the trends of crimes throughout the years?
- What are the trends of crimes in different states?
- How are the crime rates compared with each state?
- Is there any sharp increase or decrease for the crime rate?
- What are the crime rates for different kind of crime compared to each other?
- What may be the reasons behind them?

Benefit

- Learn to use modern Data Visualization technique
- Set up Github web page
- Front end development
- Basic UI/UX design

5. Data

From the Unified Crime Reporting Statistics and under the collaboration of the U.S. Department of Justice and the Federal Bureau of Investigation information crime statistics are available for public review. The data set has information on the crime rates and totals for states across the United States for a wide range of years. The crime reports are divided into two main categories: property and violent crime. Property crime refers to burglary, larceny, and motor related crime while violent crime refers to assault, murder, rape, and robbery. These reports go from 1960 to 2012.

Dataset Website: [CORGIS Dataset Project](#).
Data Source Link: https://think.cs.vt.edu/corgis/csv/state_crime/state_crime.html

6. Data Processing

There are several variables we are going to use for our data visualization, listed below:
- Rates.Property.Burglary
- Rates.Property.Larceny
- Rates.Property.Motor

- Rates.Violent.Assault
- Rates.Violent.Murder
- Rates.Violent.Rape
- Rates.Violent.Robbery
- State
- Year

Each line of data shows the number and rate of crimes in one state in one year (ex: 1960 California)

7. Visualization Design

At first, we thought about what graphs we need, what graphs that would show crucial information we want to know. We decided to use line chart to see the trends of different kinds of crime over the years, and a stacked bar chart to see the portion of different crime rates every year. We also want the users to be able to see the graphs of different states so we added a dropdown to select a state.

This is the initial design:
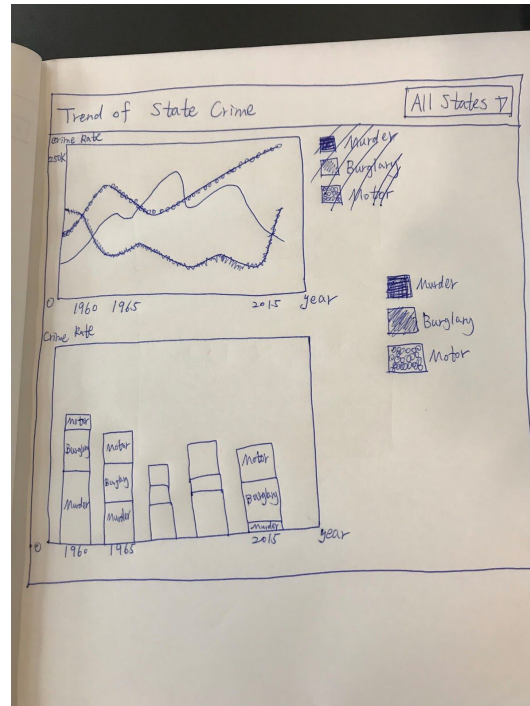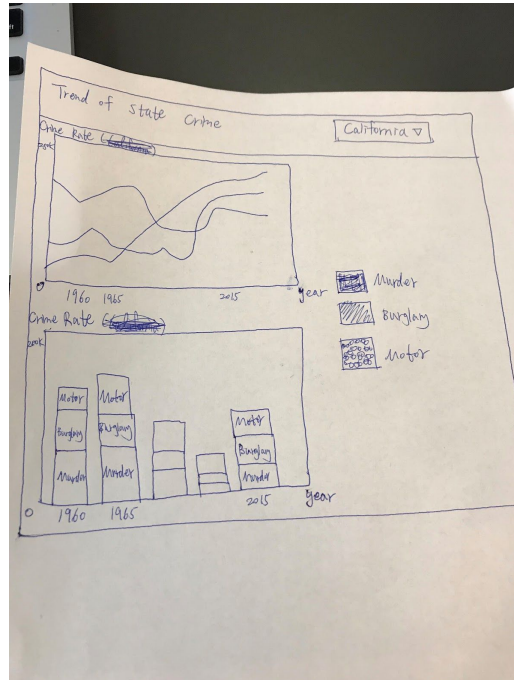
We also want the users to see one specific crime rate over the years for each state, so we added another line chart that shows the crime trend of every state(filterable).
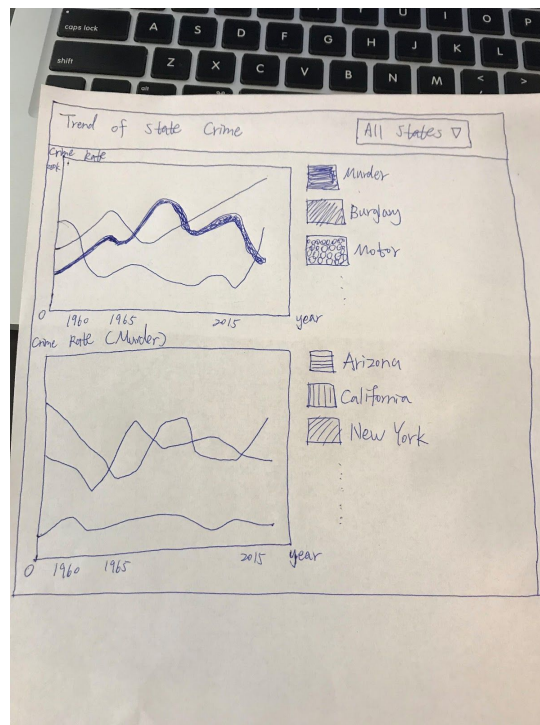
Review for initial design:

 We learned that instead of having a dropdown to select state, it would be much more informative and prettier to have a choropleth map and that we can add a slide bar to slide through the years to see the changes. We also realized having a line chart that shows 50 lines for 50 states would be way too messy even with brushing and filtering so we decided to remove that chart.

 Here is the website we made:
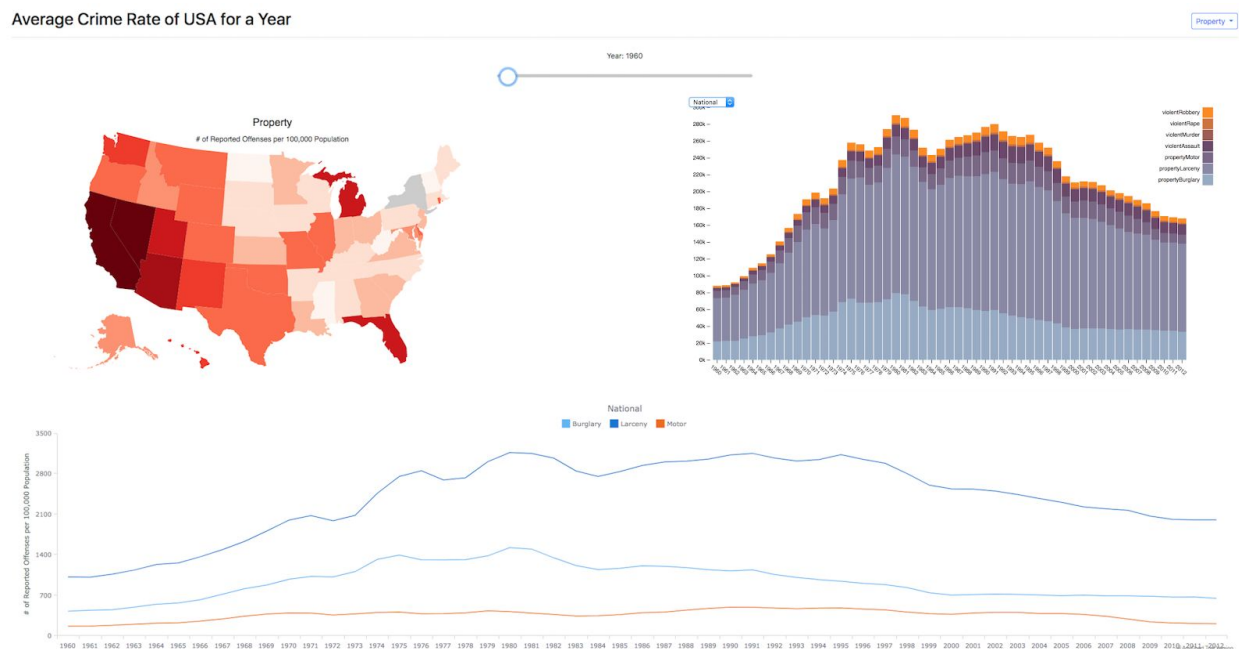
 At this point we realized that stacked bar chart does not show too much valuable information and it is not very straight forward and it is actually quite messy. Therefore, for our initial intention that is to see the portion of each crime of every year, we decided to use a pie chart.

The webpage with pie chart:
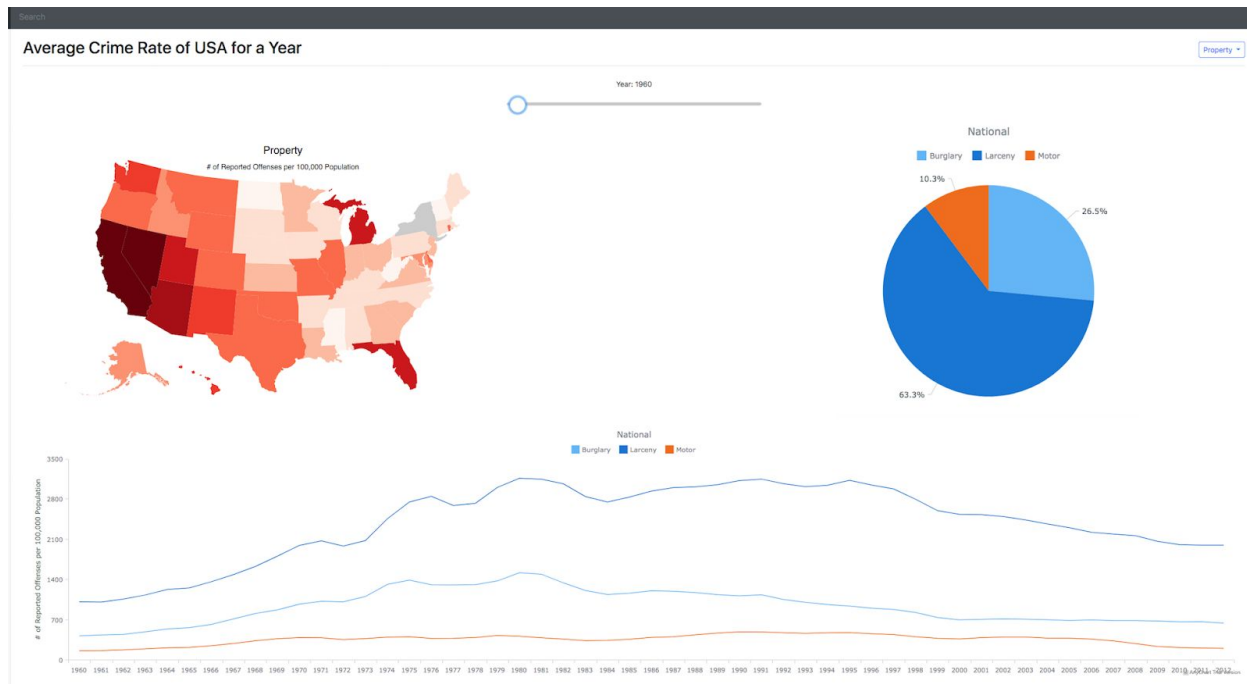
After we made this, we got critics about the usage of the pie chart and we realized it would be better to just use a bar chart to show the crime rate of different crimes.

And for the choropleth map, although we thought that the colors were intuitive for people to understand but we still decided to add a legend and add information about which color represent what range of crime rates.
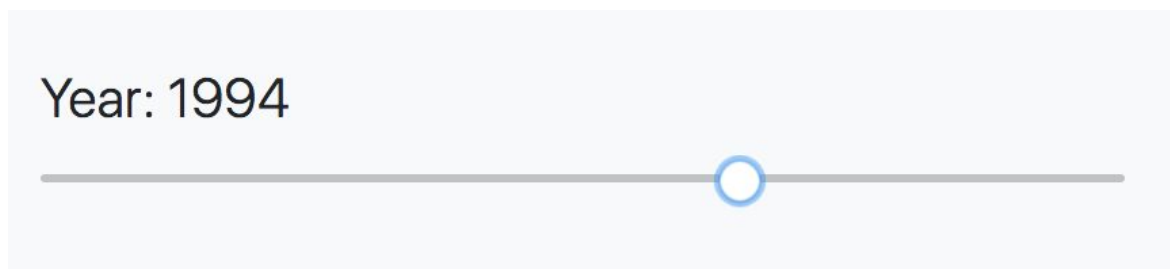
And finally, we wanted to improve our UI.

This is our final design:
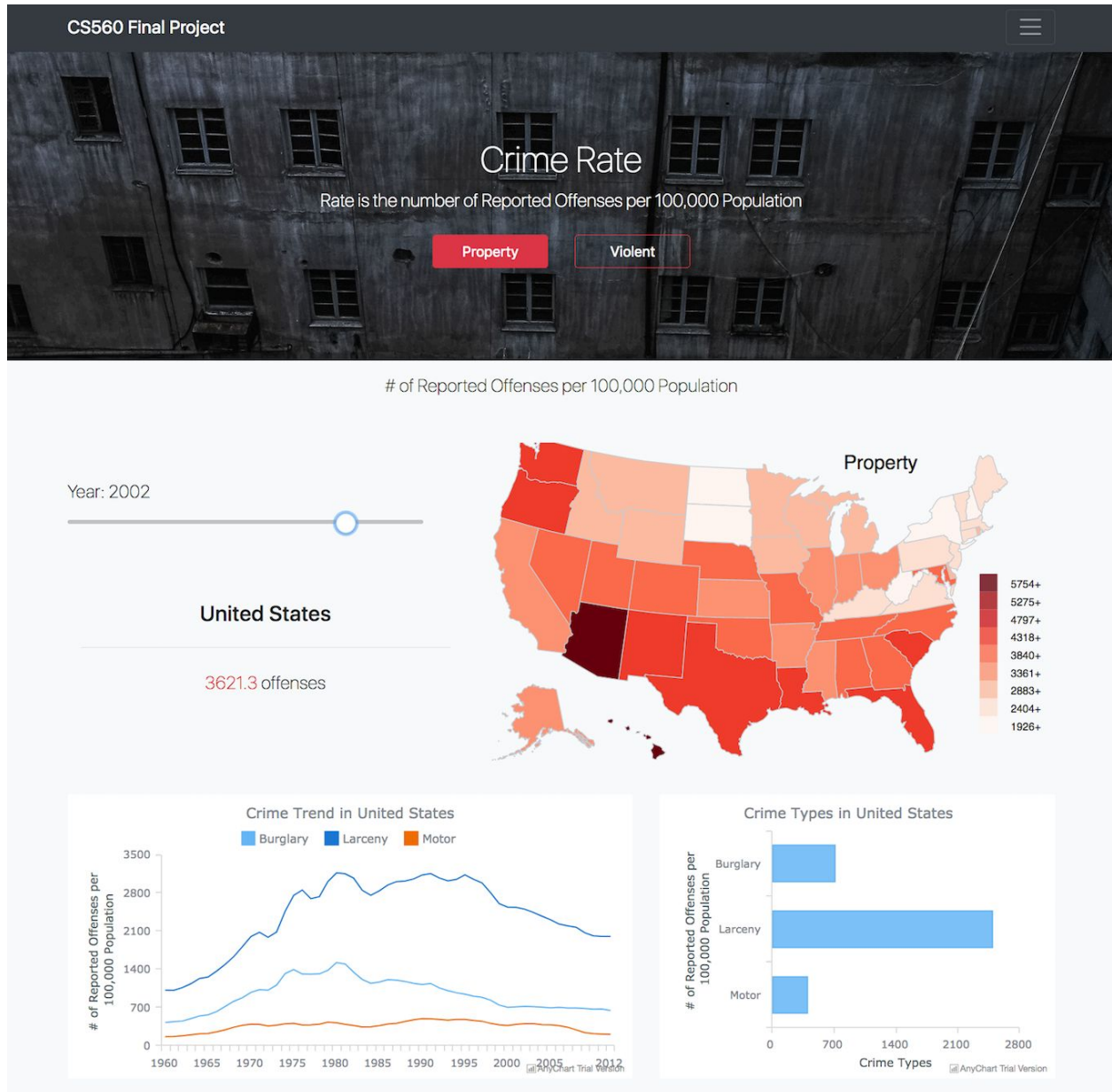
8. Implementation

Crime Category Selection:

This is for user to select the category of crime they want to check.

Year Slide Bar:

This allow the users to slide through the years and see the differences shown in the choropleth map and the bar chart.

Choropleth Map:
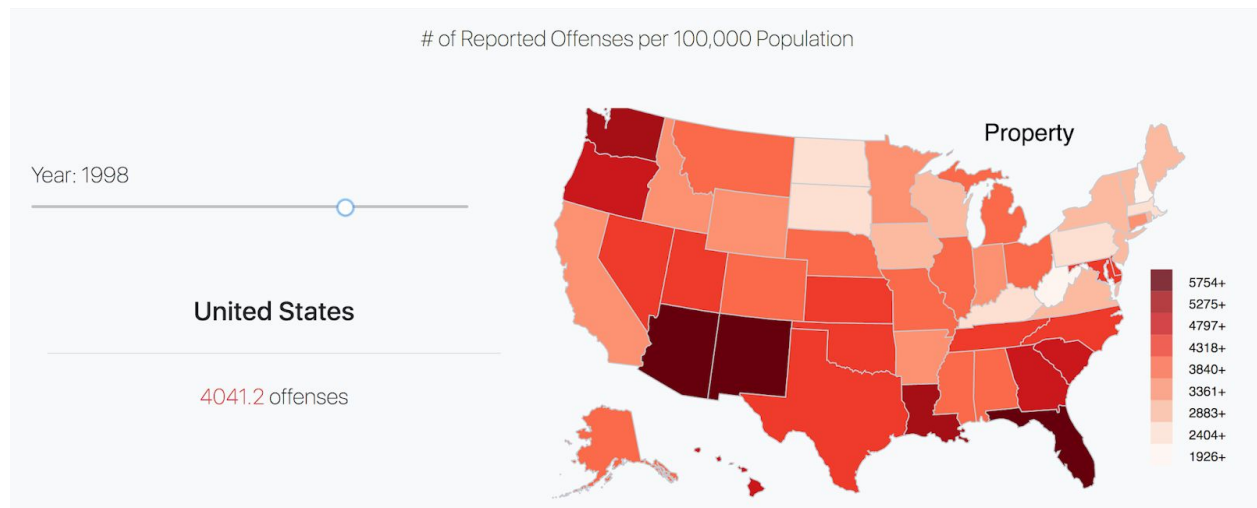
We implemented the choropleth map wanting to give an overview for the users to see at that specific year, which states have higher and lower crime rates. We also use the map as a navigator-- it allows users to select different states to see the trends(line chart) and comparison of different crimes(bar chart) of the selected state.
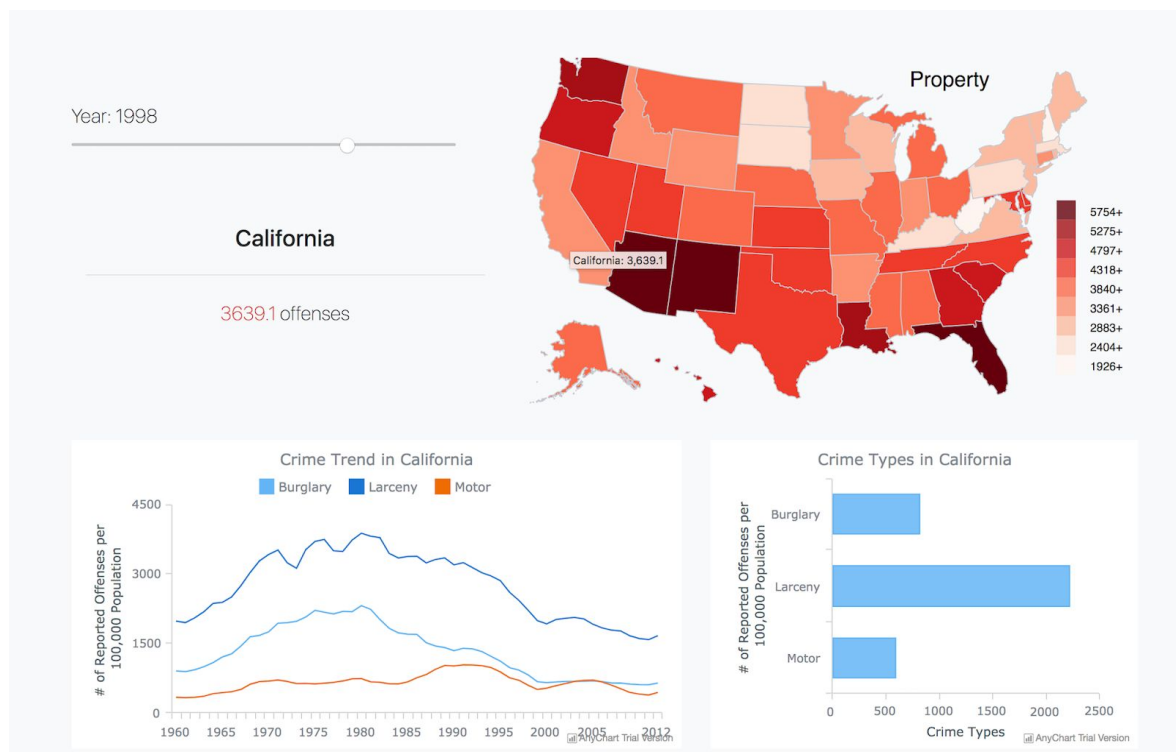
When the mouse hover over each state, it shows the information of the state name and average crime rate (either property or violent depends on what the user chooses).
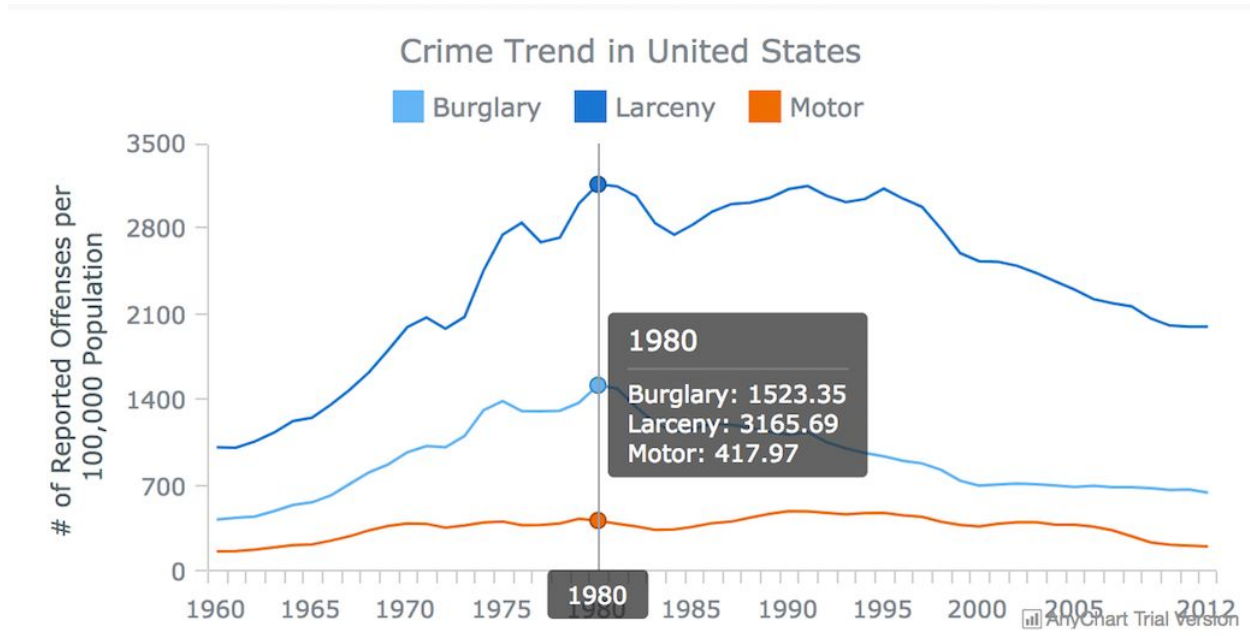
Bar Chart:
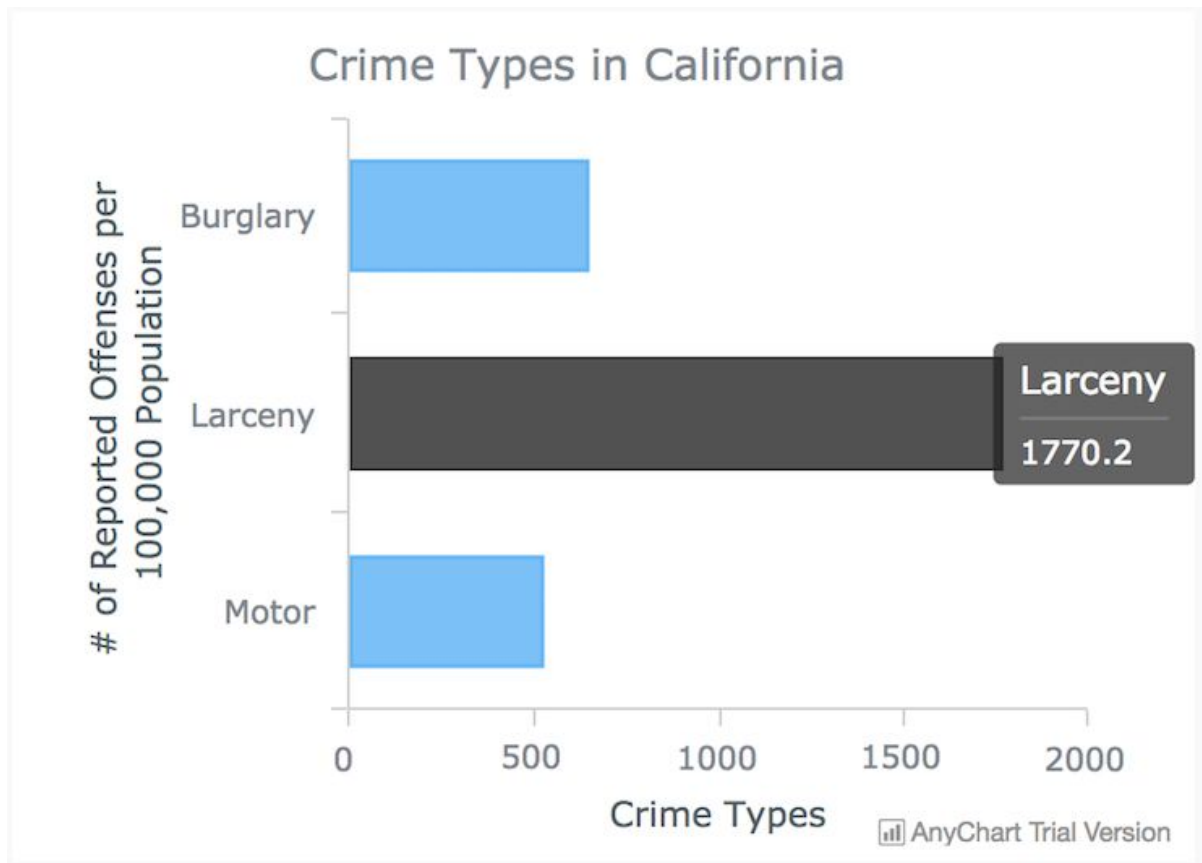
We implemented a bar chart so we can easily compare the crime rates between different crimes of the year of the country or a selected state. We allow the user to hover over the bar and see the crime rate and click it to darken the color.

Line Chart:

Crime Trend in California
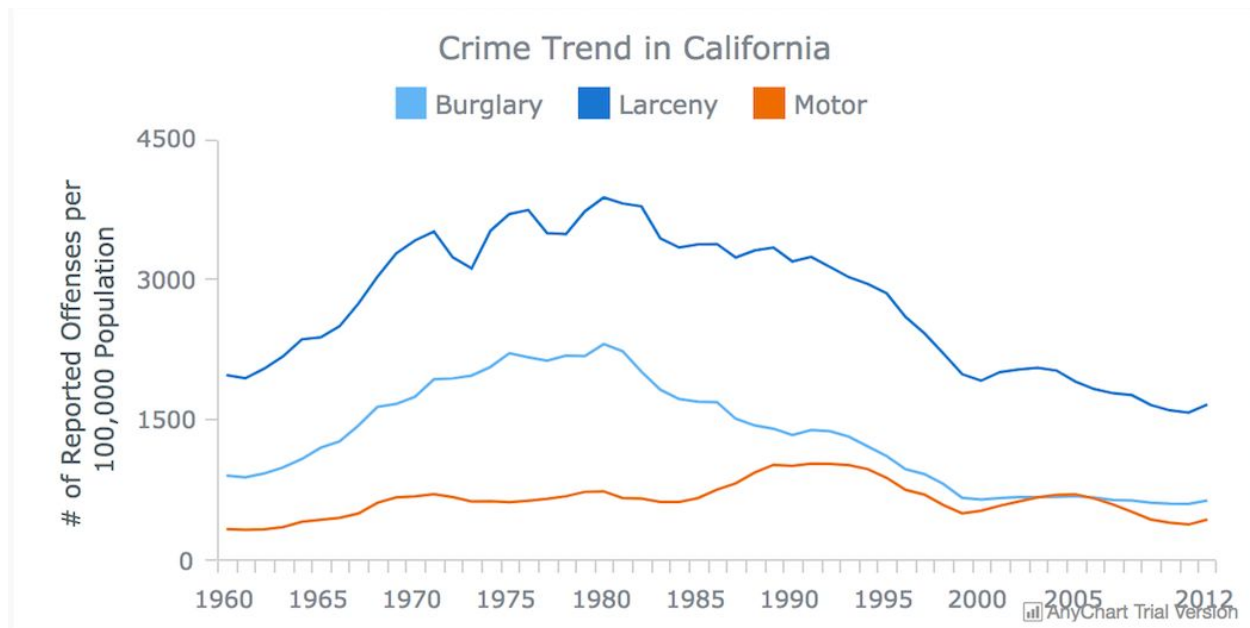
We used the line chart to show the trends of different crimes over the years.

Crime Trend in United States

1980
Burglary: 1523.35
Larceny: 3165.69
Motor: 417.97

While hover over the line, we use a vertical line and dots to indicate the positions of that year. We also shows the information-- year and the crime rates of each crime.

Crime Trend in California
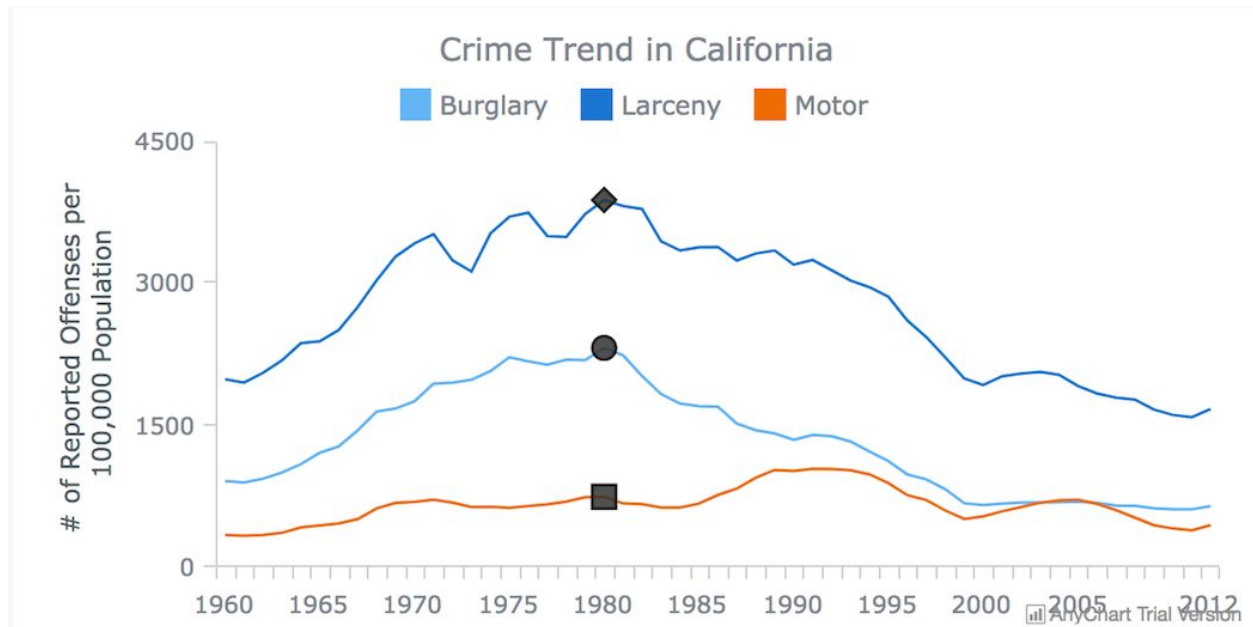
We allow the users to mark a specific year if they just want to see that year without the hover over details.

Crime Trend in California

Crime Trend in California
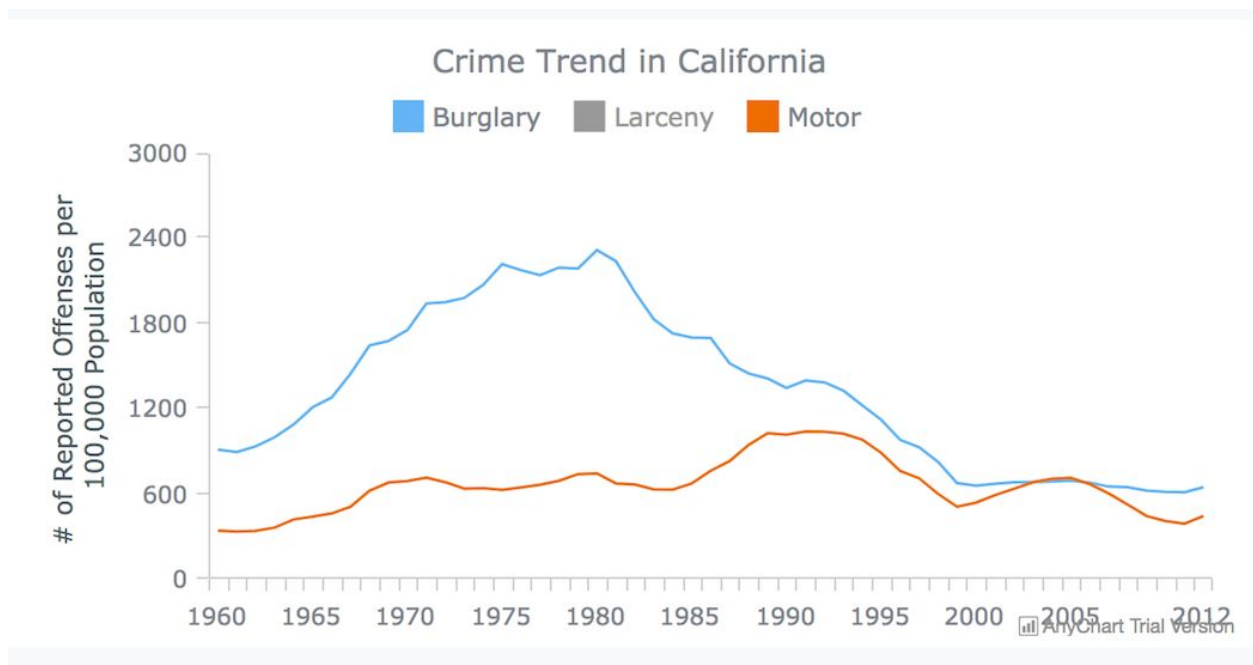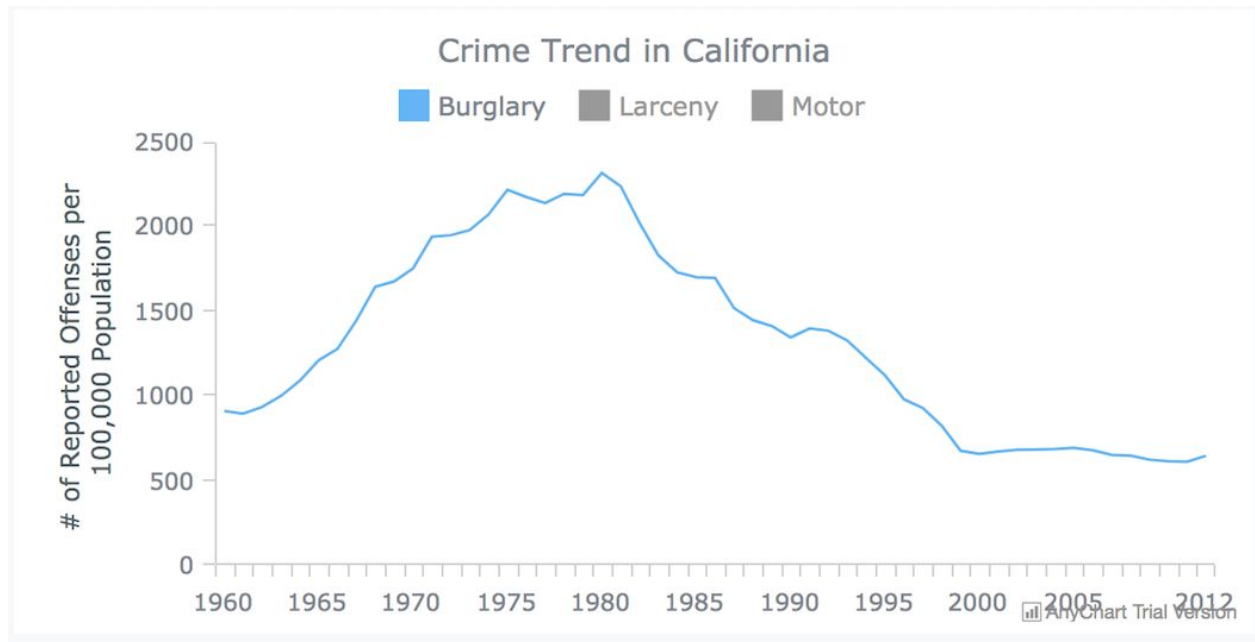
We made an interaction that allows the user to click on the legend to show or hide the line of the crime so users can only inspect the kind of crimes they want to inspect.

9. Evaluation

We played around with our visualization work and did some background research and had some interesting discoveries:

The sharp rise of assault starting mid-80s:

Crime Trend in United States
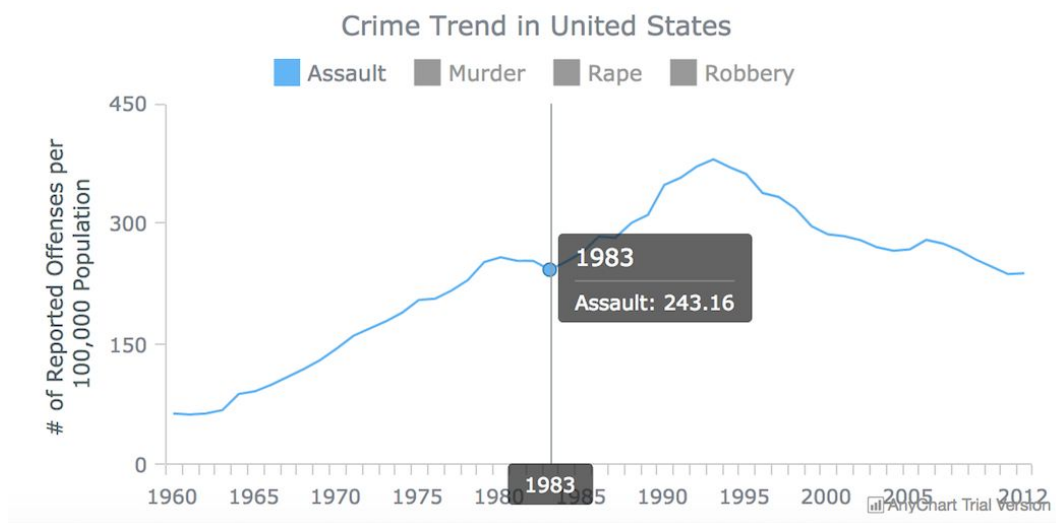
After we did some research, we found that it may be caused by the so called "crack-cocaine epidemic". During that time, the amount of people who used cocaine increased and there are more drug dealers doing drug business. We determine the usage of the drug and the drug dealings are the cause of the sharp rise of assault crime.

The drop of crime rate around 1990:
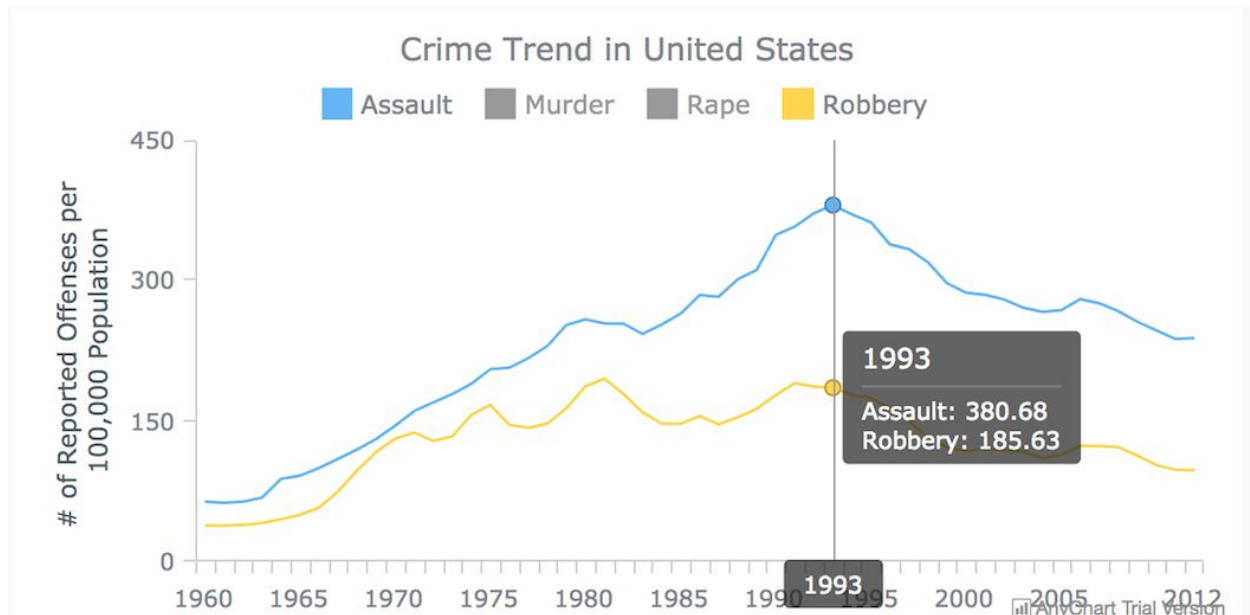
At 1990, due to the sharp increase of crime rate during the 80s the politicians embraced tough-on-crime platforms and enacted harshly punitive policies. We believe that is the reason the crime rate dropped sharply around 1990.

States with higher violent crime rate:

Selected violent crime and slide through the year bar we found there are some states that constantly have higher violent crime rate.

The states are-- California, Nevada, New Mexico, Illinois, Michigan, New York, Maryland, Tennessee, Louisiana, South Carolina and Florida.
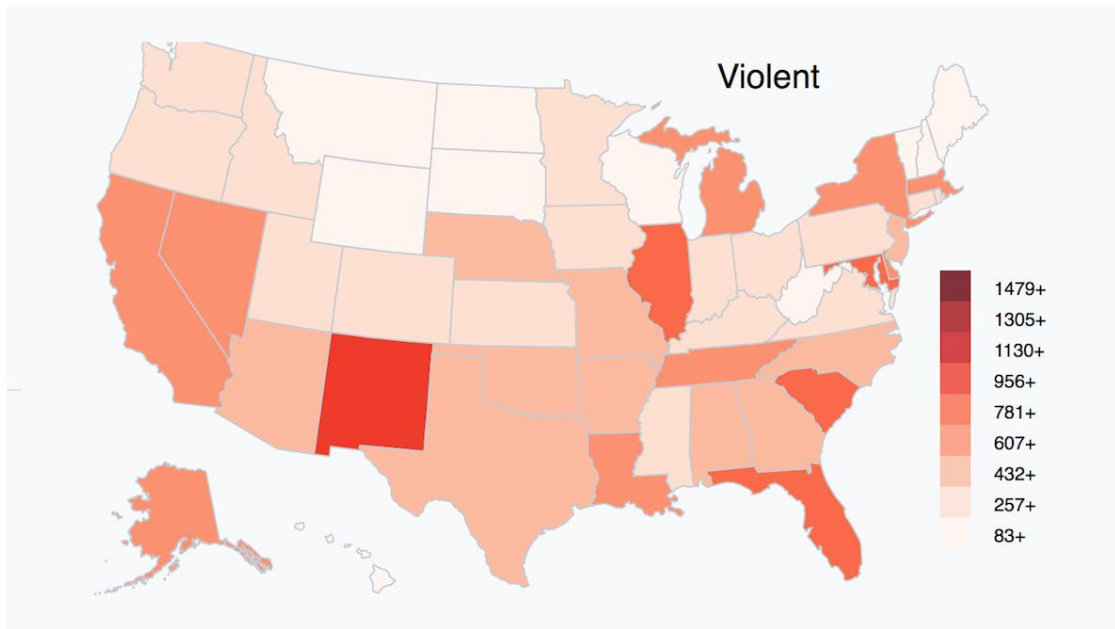
Overall, we found out visualization works to be clear and easy to interact. And our UI looks good and easy to understand. For future work, we would like to obtain the crime data for each city if possible and make the choropleth map to be zoomable to see and select the cities.