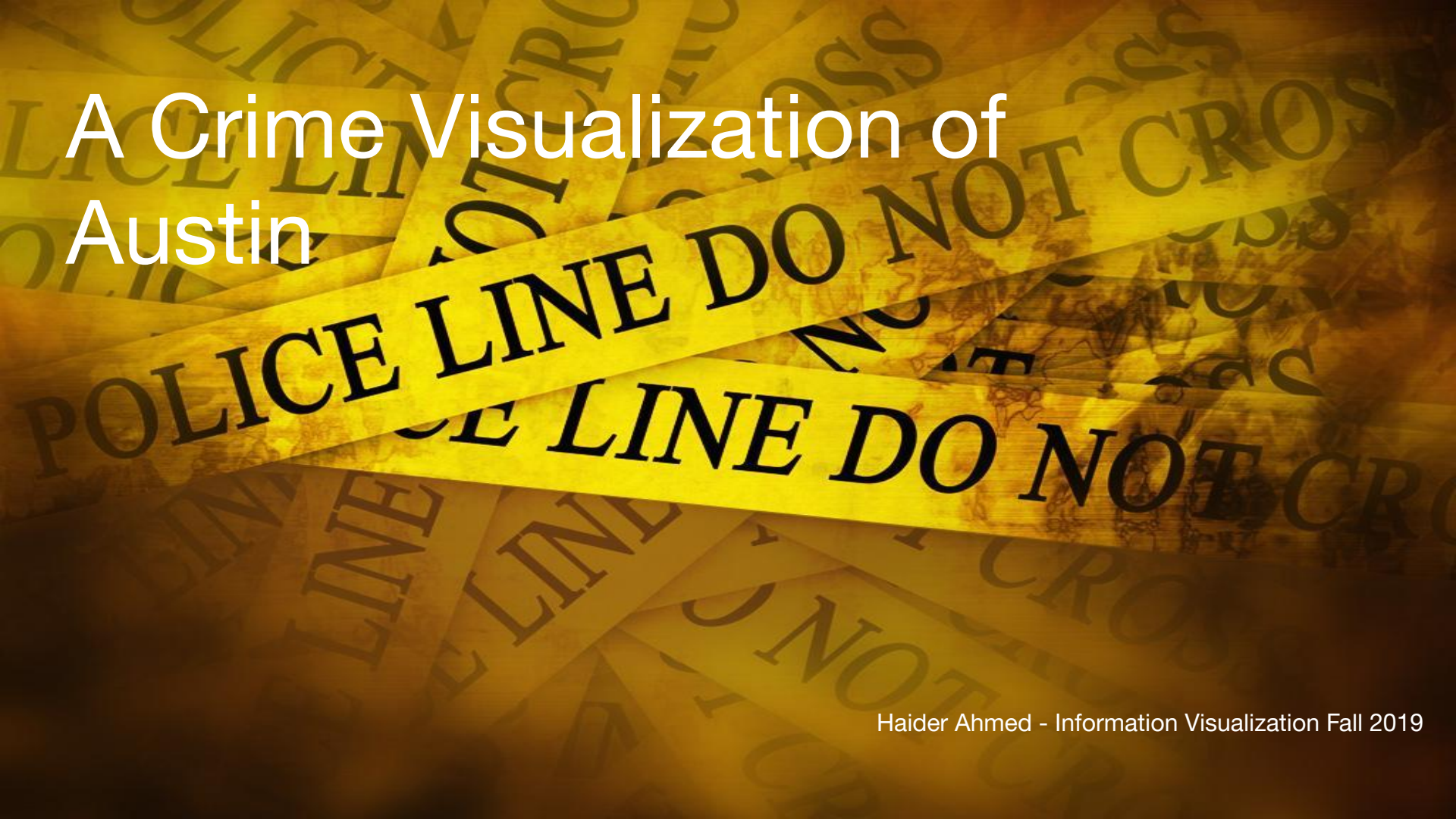
A Crime Visualization of Austin



Haider Ahmed - Information Visualization Fall 2019

Motivation and Tasks

In Austin, TX you have a 1 in 242 chance of becoming a victim of violent crime. Violent crimes include murder, rape, robbery and assault. With regards to property crime, you have a 1 in 32 chance of becoming a victim. Overall, you have a 1 in 28 chance of becoming a victim of crime in Austin, TX (https://www.areavibes.com/austin-tx/crime/)

- Which areas of Austin have the most crime ?
- What type of crimes are prevalent in various localities of Austin ?
- What is the Austin PD's performance in solving these crimes ?

Data Description

- Austin, Texas government's Annual Crime Dataset for 2015 :
- 38.6 K data points with 13 features each
- Features include : 1) A unique key for each crime, 2) Council District, 3) Location Zip, 4) Crime description, 5) Status, 6) Report Date, 7) Clearance Date etc …

Data Preprocessing

- Used Python to remove about 2000 data points corresponding to crimes which have no clearance status, as this would hinder my visualization.
- Created two addition ‘Columns’ in the dataset : 1) Report Day, 2) Clearance Day

MongoDB and Flask

The processed dataset was then imported into a MongoDB database. The reason I decided to do this was because I felt it would be much easier to manipulate and filter the data through queries I make to the database rather than writing javascript code to do the same. I then used flask to create a web application for my visualization.

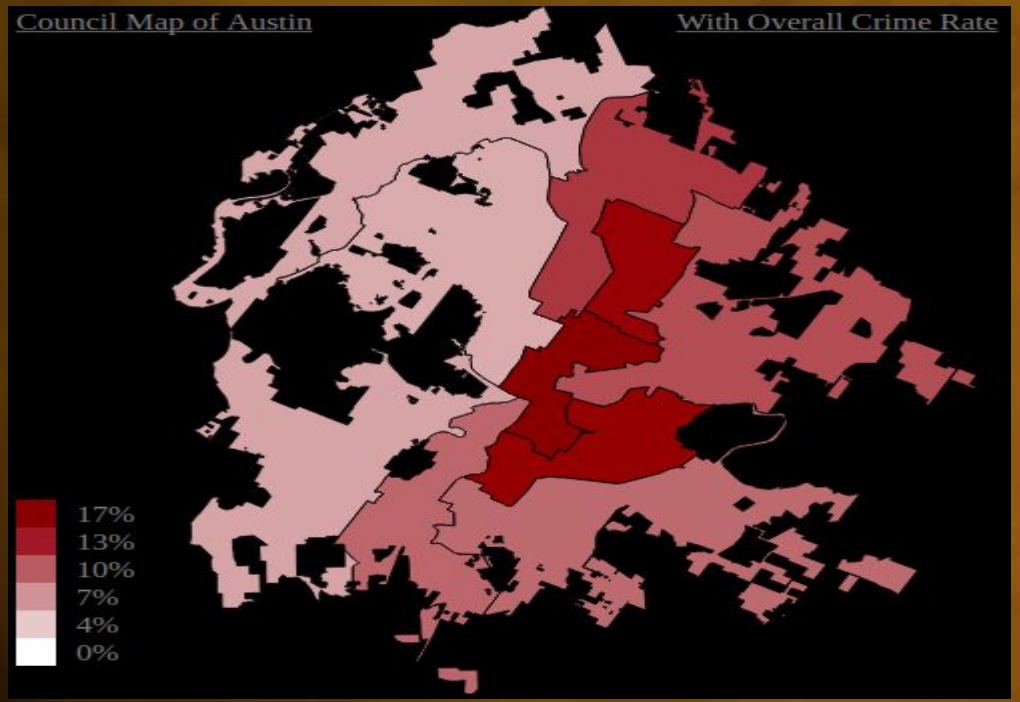
Visualization Overview

The visualization contains 5 designs :

- Interactive Map of Austin
- Grouped Bar Graph
- Bubble Chart
- Brushable Line Chart
- Hierarchical Packing

ICE LINE DO NOT

Interactive Map of Austin



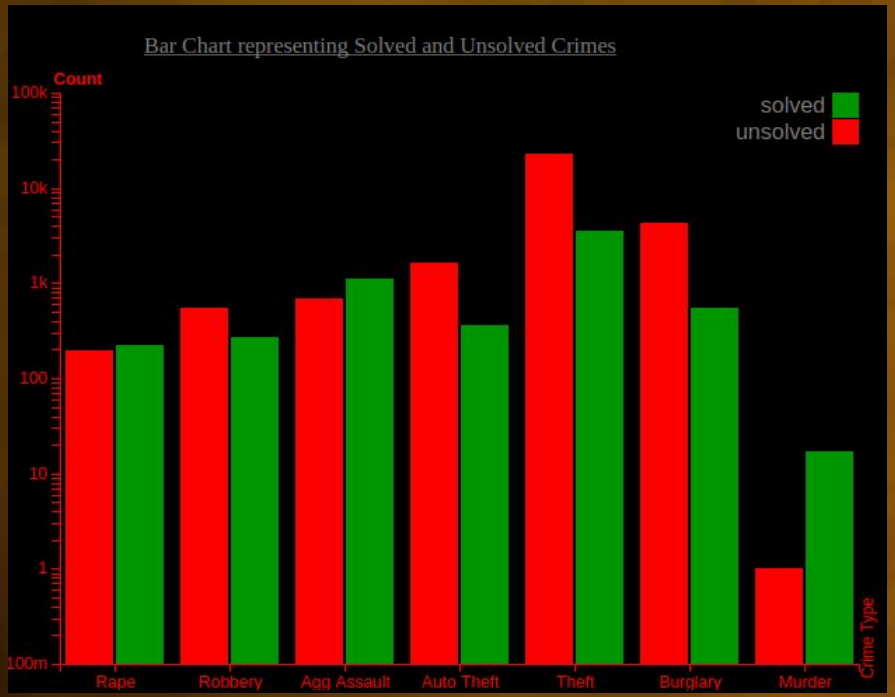
Task :

- Present the geographic information of the city of Austin and provide a high level view of the crime statistics in each 'Council'.
- Serves as the root of the visualization design.

Visual Encoding :

- Color : Crime Rate
- Position : Council District

Grouped Bar Graph - Solved/unsolved crimes



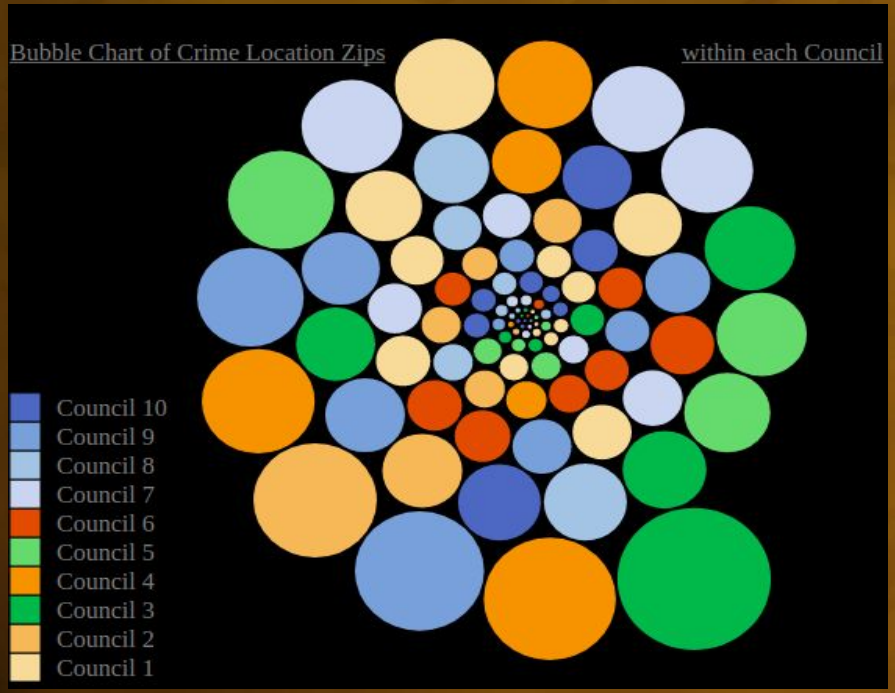
Task :

- Demonstrate the disparity between solved and unsolved crimes for different type of crimes in different council districts of Austin

Visual Encoding :

- Position : positioned according to different crime type
- Color : Status of the crimes
- Length : the number of crimes

Bubble Chart - Pinpointing crime zip codes



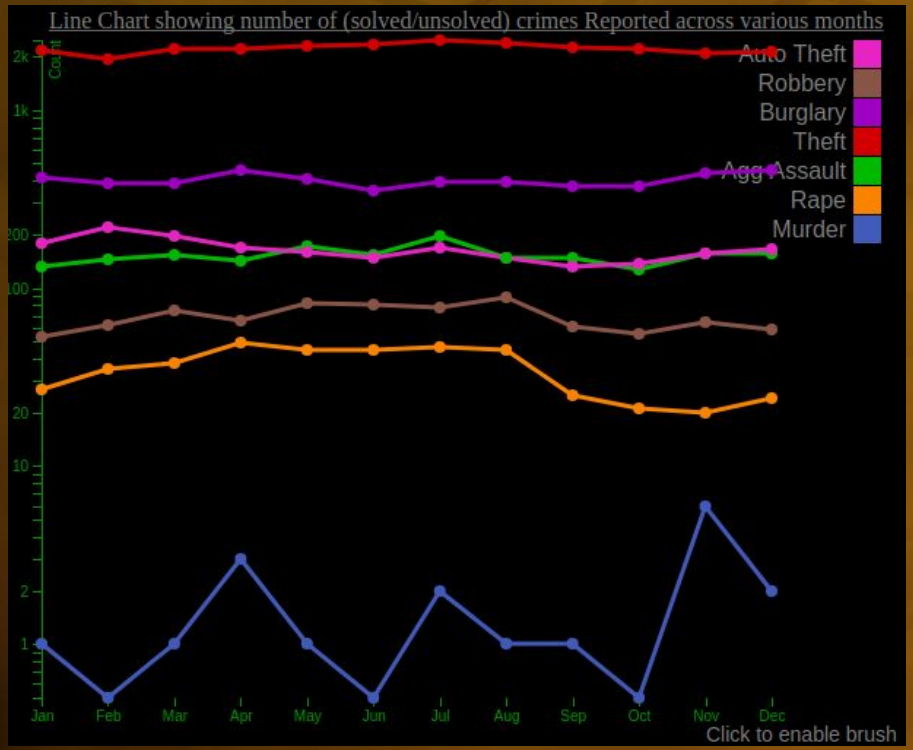
Task :

- Group crimes by zip code
- Highlight patterns for specific crimes in particular zip codes

Visual Encoding :

- Color : Council Number
- Size : Number of Crimes
- Position : Council Number & Location Zip

Line Chart - seasonal relationships between different crimes



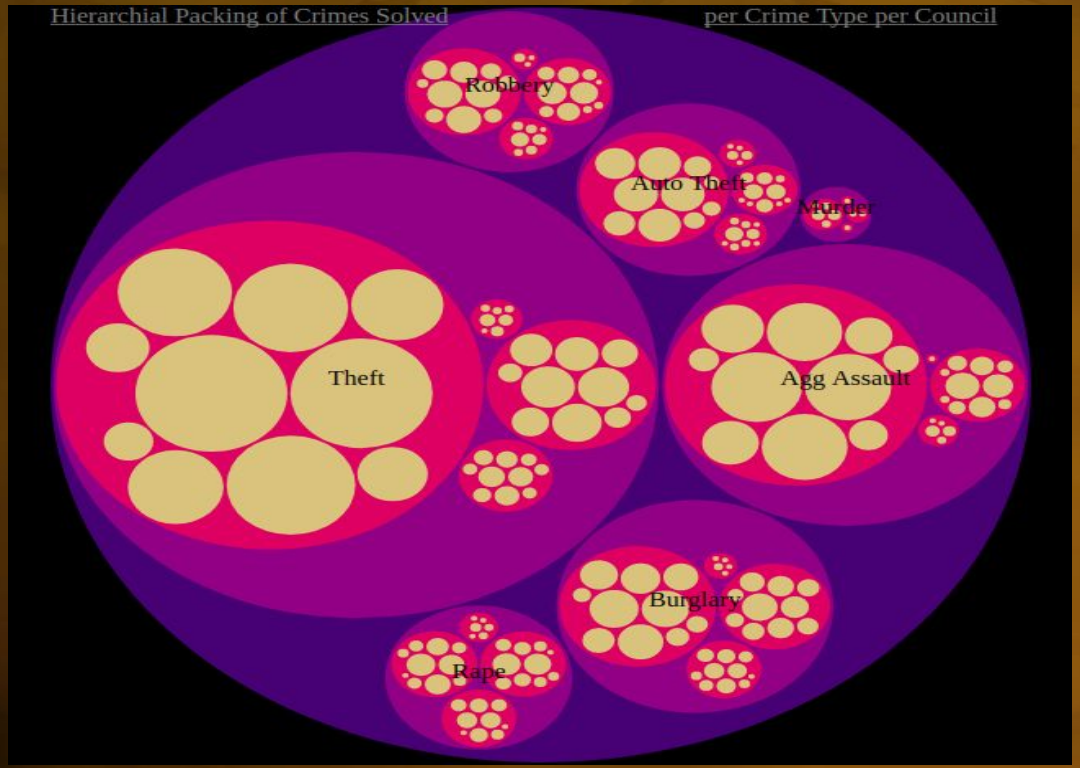
Task :

- Separate crimes by month and type
- Highlight seasonal relationships between different crimes and/or for the same crime

Visual Encoding :

- Color : Crime Type
- Position : Month which crimes occured and number of crimes

Hierarchical Packing - highlight police efforts



Task :

- Highlight number of days taken to solve certain crimes in different councils

Visual Encoding :

- Node Size : Total Number of solved crimes for crime type in all councils
- Parent Size : Days taken to solve crime of certain crime type
- Children size : Number of solved crimes per council

Future Work

- A much needed improvement would be to add a more up-to-date dataset
- It is essential that contemporary data is fed into the visualization system so that we not only have a better understanding of the crime happening today rather we can also gain valuable insights by having visualization designs that compare various types of crimes throughout various years.
- Fix bugs in hierarchical packing visualization

References

- “Interactive Data Visualization with D3.Js, DC.js, Python, and MongoDB.” Interactive Data Visualization with D3.Js, DC.js, Python, and MongoDB // Adil Moujahid // Data Analytics and More, http://adilmoujahid.com/posts/2015/01/interactive-data-visualization-d3-dc-python-mongodb/.
- D3. “Zoomable Circle Packing.” Observable, Observable, 29 Oct. 2019, https://observablehq.com/@d3/zoomable-circle-packing.
- Austin Police Department. “Annual Crime Dataset 2015: Open Data: City of Austin Texas.” Data.austintexas.gov, 28 Nov. 2016, https://data.austintexas.gov/Public-Safety/Annual-Crime-Dataset-2015/spbg-9v94.
- Areavibes. “Austin, TX Crime.” Austin, TX Crime Rates & Crime Map, https://www.areavibes.com/austin-tx/crime/.