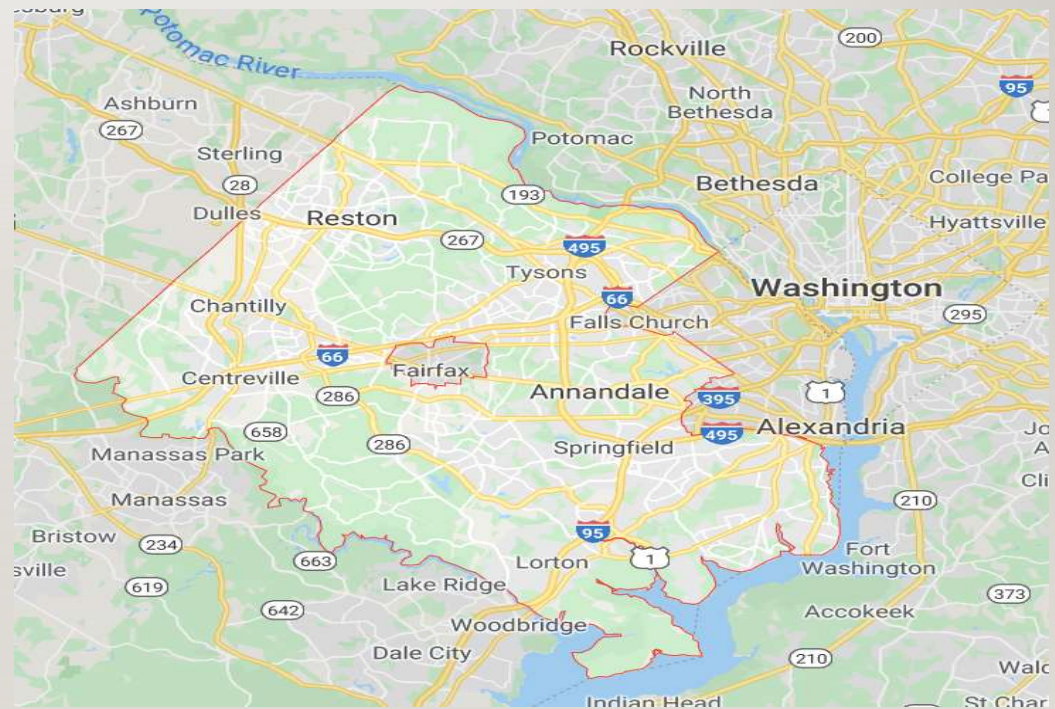


CRIME INVESTIGATION IN FAIRFAX COUNTY,VIRGINIA, UNITED STATES

TZU-CHUN KUO

INTRODUCTION

- Population: 1,150,795
- Borders both the City of Alexandria and Arlington County and forms part of the suburban ring of Washington, D.C



INTRODUCTION (CONT'D)

- With the new development of Amazon HQ2 and Virginia Tech. The population of Fairfax County is expected to increase.
- When people look for the new place to live, crime information is one of the important factors for them to consider.
- This project investigates the crime information using the weekly crime report from April 23rd to April 30th, 2020.

DATA

- Weekly report from Fairfax County website
<https://www.fairfaxcounty.gov/police/downloadcenter>
- Records which had missing information was dropped
- Extract the crime category from Crime (e.g., Use DESTR for DEST-290-2; use SUSP for SUSP-I)

- 1367 records

Crime	Description	Date	Neighborhood	State	Zip_code
DEST-290-2	DESTRUCTION - PRIVATE PROPERTY	2020-04-24	FALLS CHURCH	VA	22043
SUSP-1	SUSPICIOUS - EVENT	2020-04-24	SPRINGFIELD	VA	22150
FRAUD-26C-1	FRAUD - IMPERSONATION	2020-04-25	ALEXANDRIA	VA	22309
FRAUD-26C-1	FRAUD - IMPERSONATION	2020-04-25	FAIRFAX	VA	22032
DRUG-35A-4	DRUGS - MARIJUANA POSSESSION	2020-04-25	ALEXANDRIA	VA	22309

DATA (CONT'D)

- Population data were collected from World Population Review
<https://worldpopulationreview.com/zipcodes/virginia>
- The data include all zip codes in the state of Virginia. Only the zip codes in the crime data were merged.

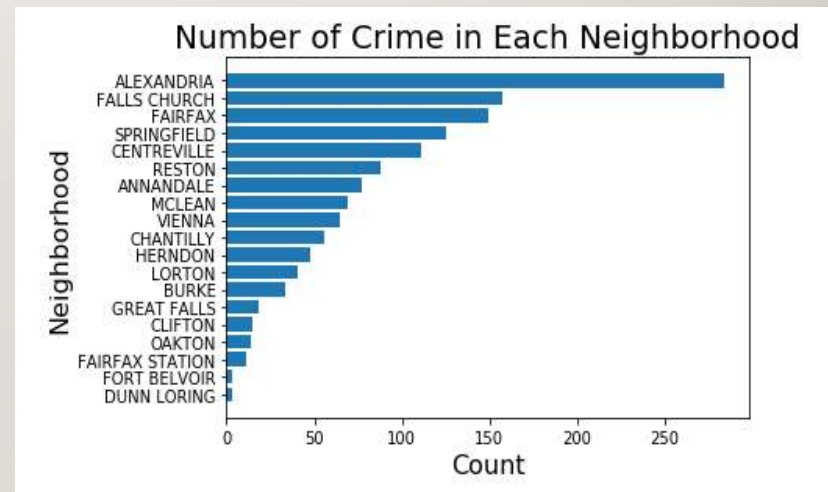
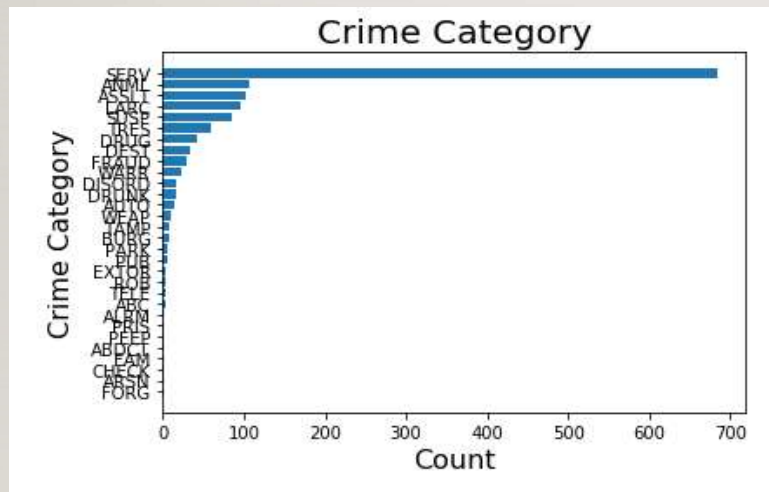
City	Population	Zip_code
Virginia Beach	62321	23464
Woodbridge	60216	22193
Chesapeake	51229	23322
Virginia Beach	50900	23454
Virginia Beach	49874	23452

METHODOLOGY

- Descriptive statistics:
 - Frequency tables – by crime type, by neighborhood, and by date
 - Folium map to show the crime map
 - Scatter plot, correlation and regression between population and number of crimes
- Use Foursquare to further explore the venues from the crime data

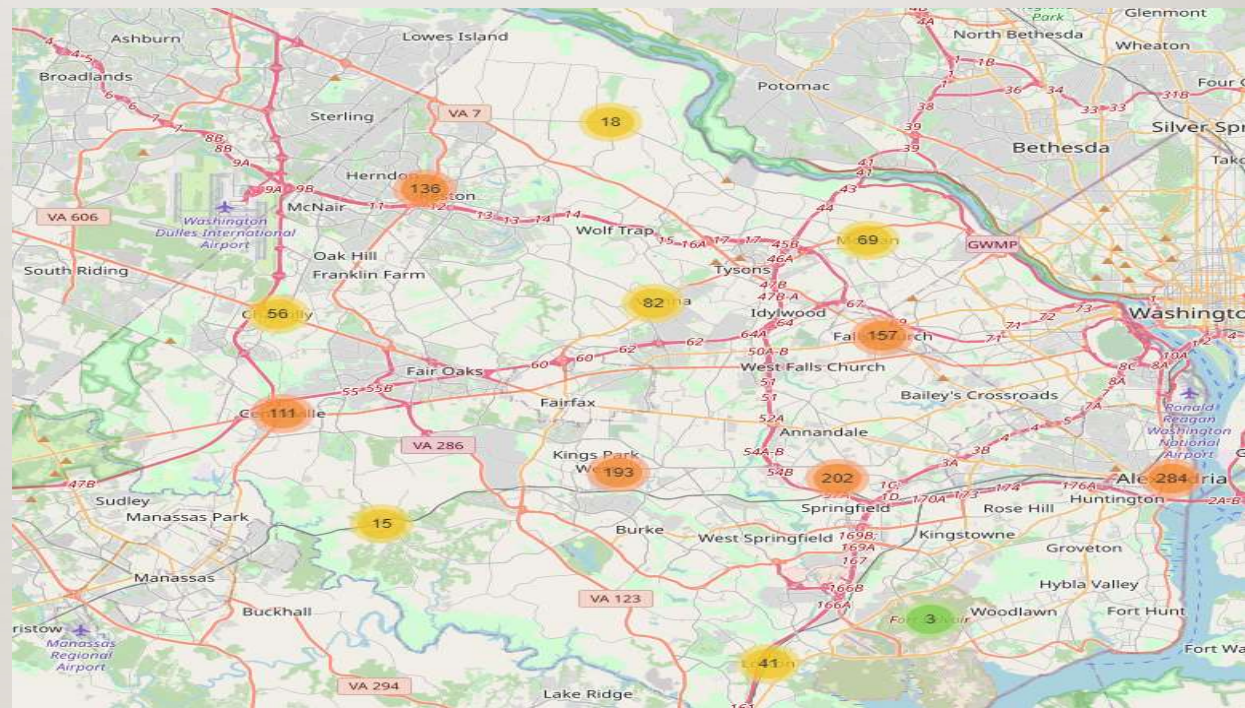
RESULTS

- Frequencies



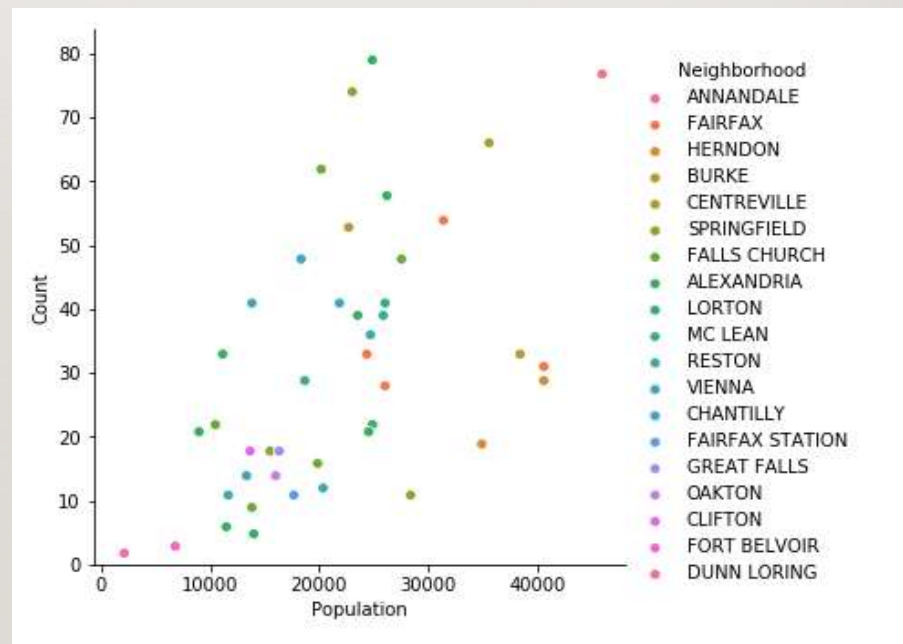
RESULTS (CONT'D)

- Crime map



RESULTS (CONT'D)

- Scatter plot



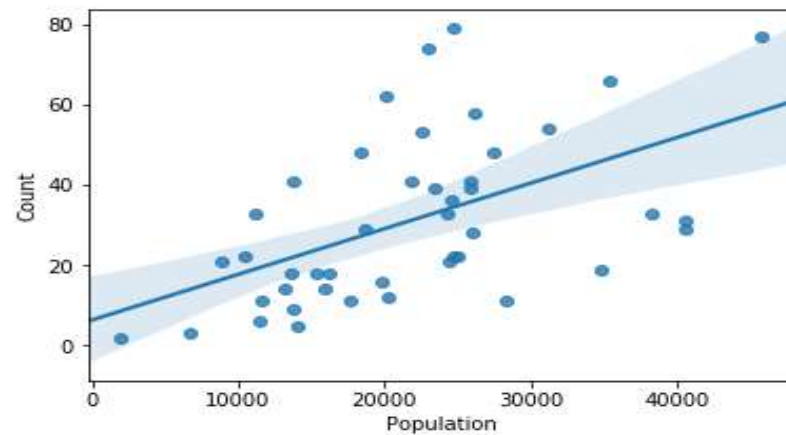
RESULTS (CONT'D)

- Correlation and Regression

	Count	Population
Count	1.000000	0.528677
Population	0.528677	1.000000

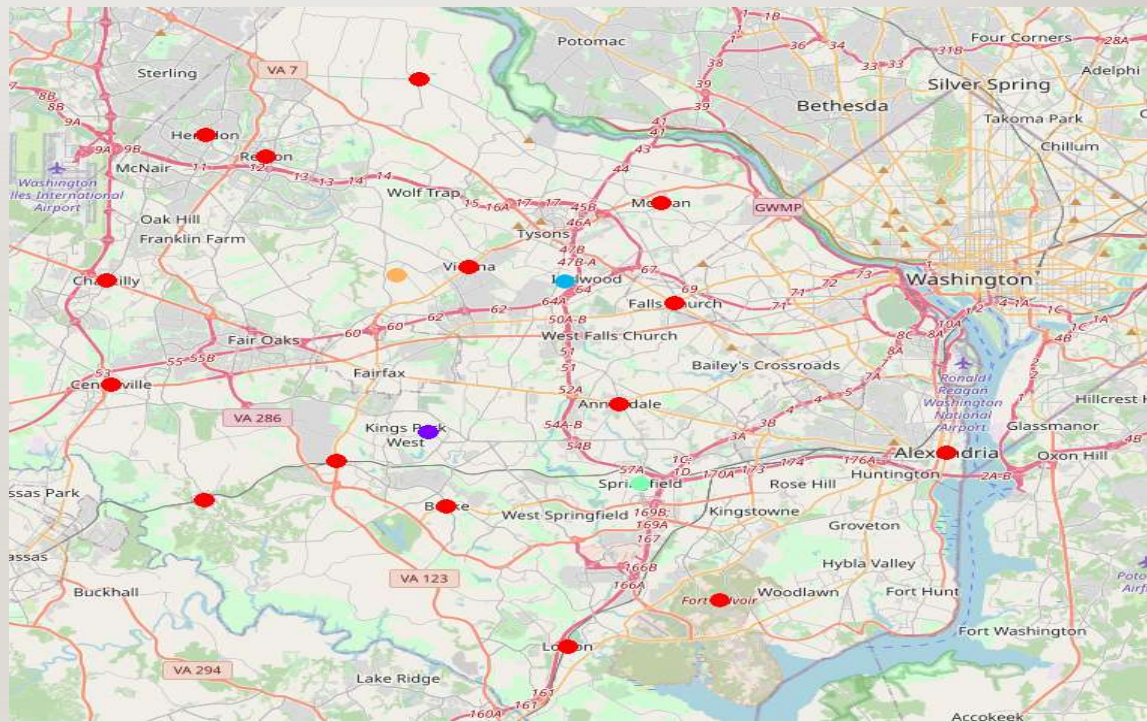
The intercept is 6.358745986751504
The slope is [0.00113532]

<matplotlib.axes._subplots.AxesSubplot at 0x7fbec5f04fd0>



RESULTS (CONT'D)

- Five clusters from Foursquare API
- 1076 in red; 149 in orange; 3 in blue; 125 in green; 14 in purple



DISCUSSION

- Service type crime (ex. Police report) occurred in most of the incidents, followed by animal type (ex. Animal bite)
- Alexandria neighborhood had the highest frequency of crimes, follow by Falls Church neighborhood
- Population has moderate positive correlation with the number of crimes
- From the Foursquare API, restaurants and entertainment business have higher number of crimes (1076 out of 1367 records).

CONCLUSION

- From the cluster analysis in Foursquare, restaurants and entertainment stores have more crimes, which explains Alexandria neighborhood has the highest number of crimes, although its population is not the largest in Fairfax County. Moreover, Alexandria neighborhood is more metro accessible and closer to Washington DC, which bring more people to this neighborhood.
- More variables can be considered into the regression model, such as distance to Washington DC, metro accessibility, and school rating.
- A regression model with more essential variables can benefit current and potential residents find a neighborhood they would like to move in