

EE382V - Final Project Proposal

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Introduction:

The city of Austin has a high resident turnaround due to the college/government floating population and high tech entrepreneur young professionals. Such variety and dynamism may result in events that require the attention and service of law enforcement personnel. The aim of this project is to analyze past data collected from 311 incident calls made in the Austin city area, and relate them to weather conditions, city festivals and sports events. The result of this study may help the staffing and allow for anticipatory distribution of law enforcement groups and community service personnel during particular times and events. The distribution of the different crime categories during the calendar year, as well as their location and migration over the past years will be analyzed in this project. The potential effect of crime proliferation on residential house prices will be also considered based on their frequency as well as category.

Goal:

One of the purposes of this study is to correlate crime events to city social/entertainment events. In that way we could predict the probability of specific incidents that can occur in coming weeks at certain locations so law enforcement groups can plan ahead countermeasures and be well prepared. Another aspect of this project is to look at the list of crime events to determine their impact into residential home prices. This work requires the merging crime data, city events and property appraisal databases to derive insights into housing market trends. This study will benefit the future planning of law enforcement personnel in time as well as location. It will also determine the potential government investment return of reducing crime in Austin based on the indirect effect of revenue generated from property taxes.

Data:

The data will be sourced from multiple data sets. The plan is to combine incident calls for Austin City and neighboring counties with various other data. The datasets are made available in the following websites:

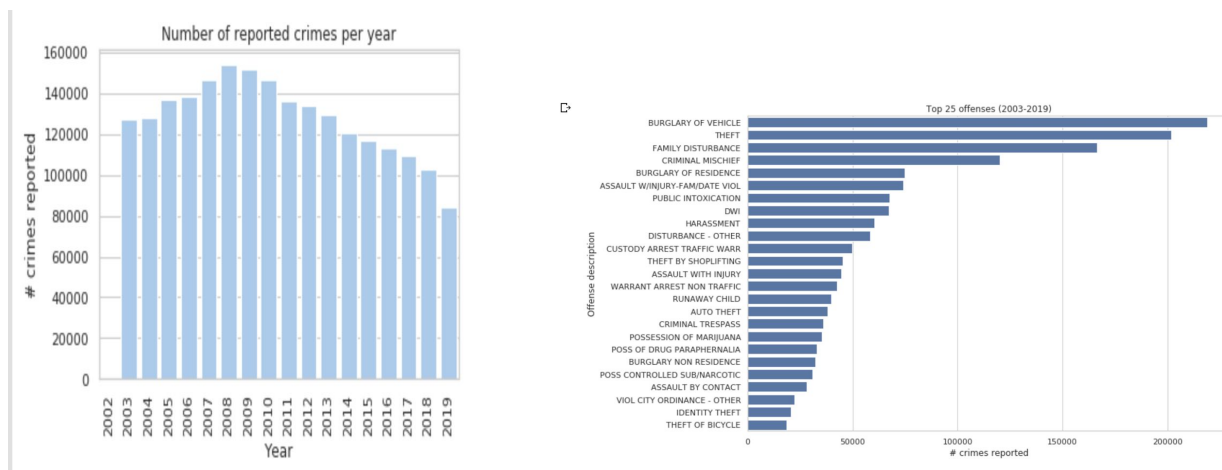
1. Crime / Incident Reports - <https://data.austintexas.gov/City-Government/311-Unified-Data-Test-Site-2019/i26j-ai4z/data>
2. Global Events - like Major Holidays, F1 Race, ACL, Football - <https://fbschedules.com/ncaa-2017/team/texas>
3. Weather - <https://www.kaggle.com/grubenm/austin-weather>
4. Housing data (Prices, Incomes, etc) - <https://data.austintexas.gov/Building-and-Development/2014-Housing-Market-Analysis-Data-by-Zip-Code/hcnj-rei3> and Scrape data from Zillow and Redfin.

Incident Number	int64
Highest Offense Description	object
Highest Offense Code	int64
Family Violence	object
Occurred Date Time	object
Occurred Date	object
Occurred Time	float64
Report Date Time	object
Report Date	object
Report Time	float64
Location Type	object
Address	object
Zip Code	float64
Council District	float64
APD Sector	object
APD District	object
PRA	object
Census Tract	float64
Clearance Status	object
Clearance Date	object
UCR Category	object
Category Description	object
X-coordinate	float64
Y-coordinate	float64
Latitude	float64
Longitude	float64
Location	object
dtype:	object

Crime/Incident Data Features.

Preliminary Investigations:

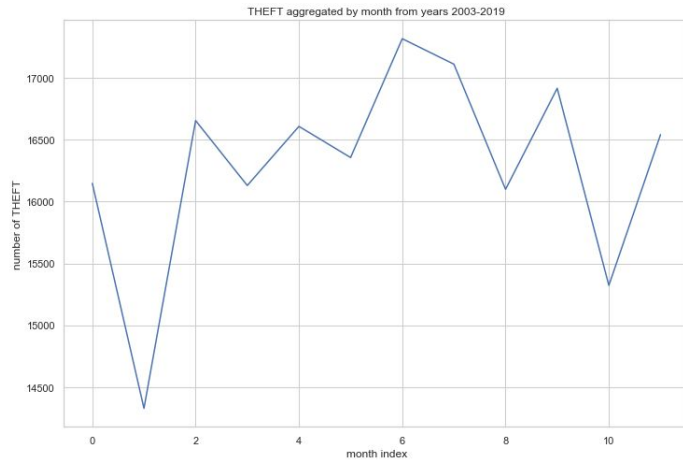
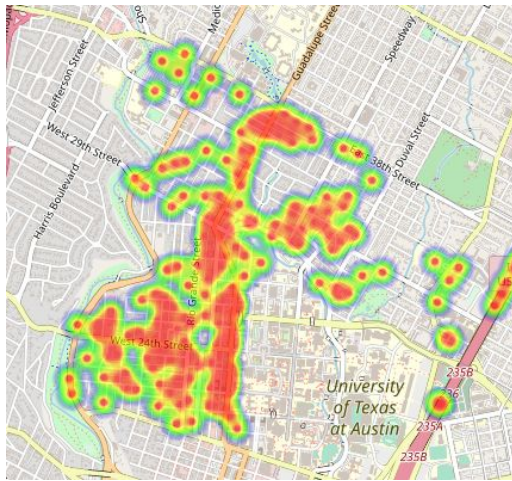
- Left plot below demonstrates the number of reported crimes per year in the city of Austin. This plot demonstrates that crime data reported varies every year, and has been consistently decreasing over the past seven years. Right plot below shows the frequency of the different crime categories committed in Austin. Vehicle crimes ranks as number one crime reported in Austin.



Data provided by the city of Austin Government, 311 incident calls. Left: Reported crimes per year in Austin. Right: Incident frequency distribution based on its classification.

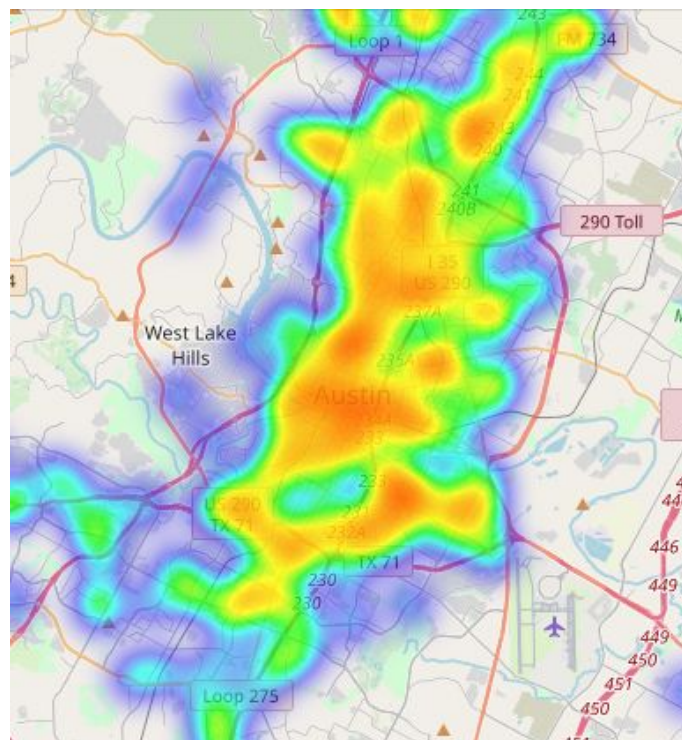
- The pictures below demonstrate the distribution of bike theft incidents across the city (left), and during the different months of the year (right). As it is illustrated below, bike thefts are more frequent in the

university west campus, especially during the summer.



Data provided by the city of Austin Government, 311 incident calls. Left: Bike theft incident distribution, heat map. Right: Bike theft incident per month.

- Previous work and reports have been focused on defining high crime concentration areas in the city. The picture below demonstrates work developed in the following kaggle notebook: <https://www.kaggle.com/tsaustin/peek-into-the-austin-crime-data-set>.



Crime concentration areas in Austin (2002-2019)