An Analysis of Houston Police Department Officer-Involved Shootings

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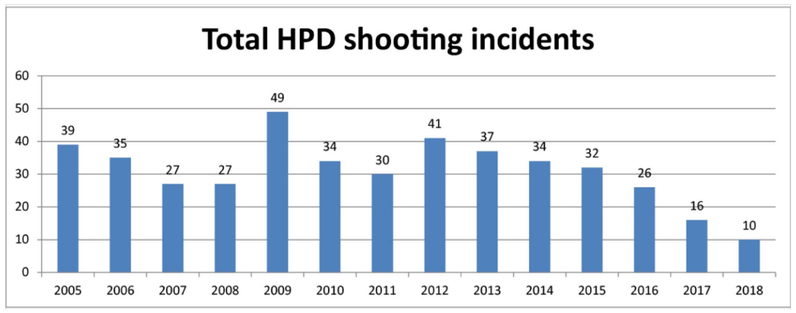
Background

- Officer-involved shootings (OIS) have been an issue since the establishment of the first American police department in Boston in 1838
- Nationwide attention escalated following incidents such as the death of Michael Brown in Ferguson, MO

- Texas State Legislature passed Art. 2.139 of the Texas Code of Criminal Procedure on 9/1/2015, which requires law enforcement agencies to report details of all officer-involved shootings
- Since then, OIS per year in Houston has been monotonically decreasing



Dataset & Previous Literature

- HPD maintains open records of all OIS in Houston
- A previous study by researchers at Northwestern University analyzed trends in the Houston OIS dataset from 2005 to 2013

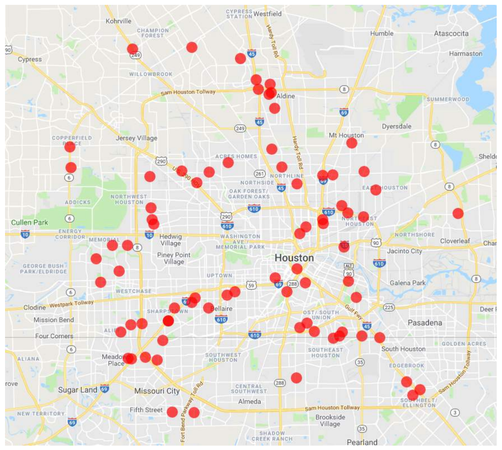
Questions

- How much of the decrease in Houston OIS can be attributed to Article 2.139?
- How do the trends of this data relate to the trends found in the previous study?
- What are some new trends, if any, in this data?
- What are the factors in a suspect being injured or killed in an encounter?

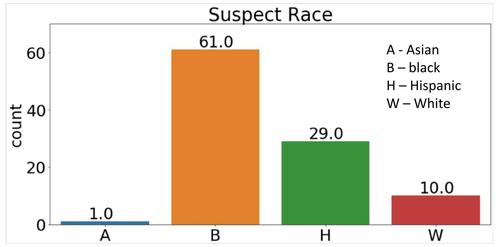
Features Considered & Tools Used

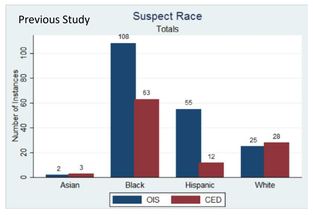
- Suspect/officer sex, race, age, injury
- Suspect weapon, officer on duty, # of officers, and response type
- Used Python, Pandas, matplotlib, Seaborn plots

Geocoding the Data

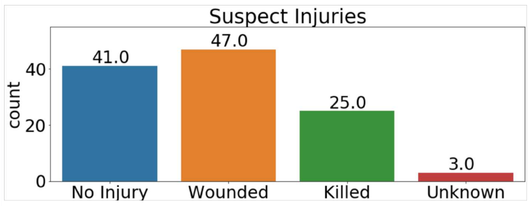


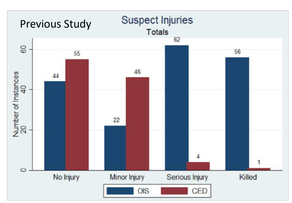
Suspect Statistics



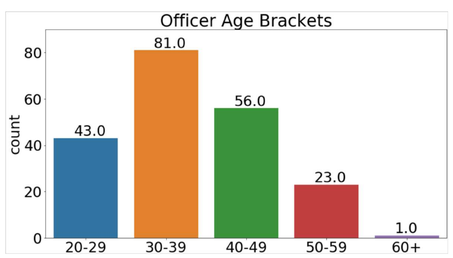


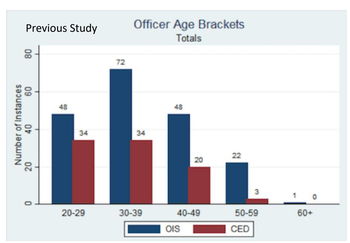
- In both graphs, Black suspects make up 55-60% of OIS and Hispanic suspects around 28%
- White suspects only make up 9-13%



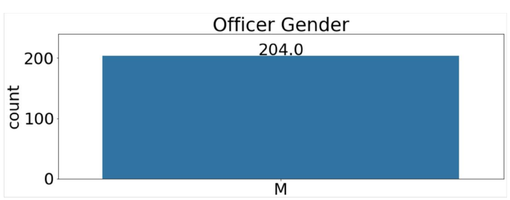


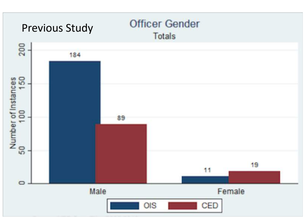
Officer Statistics





- Both graphs have peaks at 30-39 years

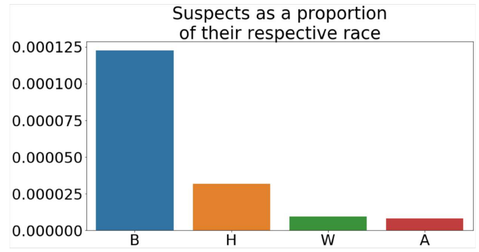




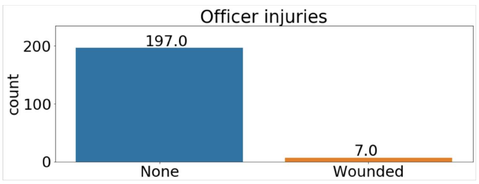
- Current data – 100% male officers
- Previous study – 94% male officers
- Male-dominated officer force

Additional Statistics

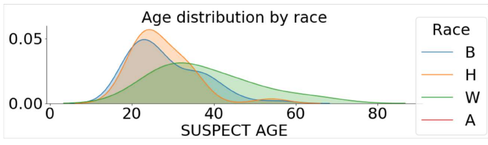
- Blacks are killed at a disproportionate number with respect to the population size of each race in Houston



- 96.6% of officers in OIS sustain no injuries



- White suspects are on average around 10 years older than Black and Hispanic suspects
- Insufficient data on Asian suspects



Average age of victims:

Black – 28.1	White – 37.9
Hispanic – 27.4	Asian – 21.0

Models

- Tried different models to predict suspect injury
- Decision Tree Classifier yielded a 91.67% accuracy score
- Decision Tree first divides the population by suspect age with a pivot point of 23.5 years
- Younger suspects are then divided by suspect weapon, and older suspects are divided by suspect age of 36.5 years
- Decision Tree contains 7 layers and is divided by 11 different variables

Findings

- No significant differences between the graphs of this data and those of the previous study
- Lack of change adds evidence that the Act did in fact cause the sharp decline in police shootings
  - Could not have been caused by race, gender, etc. because those features did not change
- Corroborate national police shooting trends such as evidence of racial bias, non-white suspects killed at younger age, and officers rarely injured

Future Steps

- The results of this study may be shared with the HPD, which could be useful when deciding future policies