Data analyses reveal that marginalized ethnic and gender identity groups in Ward 2 face significantly elevated risks of becoming victims of hate bias crimes.

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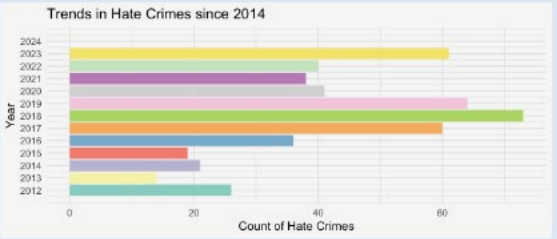
Introduction/Context

- Our project examines bias-related crimes across Washington D.C's 8 Wards from 2012 to present
- Questions of interest:
  - Regression: What is the expected number of hate crimes in a ward in a month?
  - Classification: What is the expected type of hate crime in a ward?
- Examining the presence of bias-related crime is necessary for mitigating social biases, as well developing support mechanisms for affected communities.

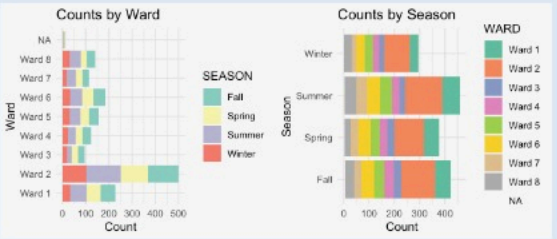


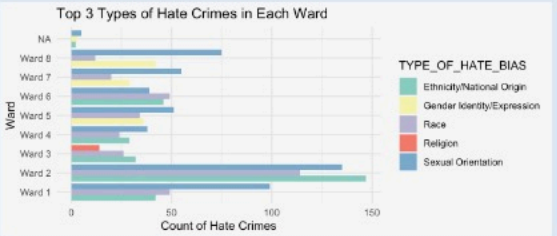
Approach

- Clean the data so variables reflect question of interest.
- Decided which Classification and Regression Methods would best interpret our data.
- Combine the results of our analysis to make a comprehensive

Data

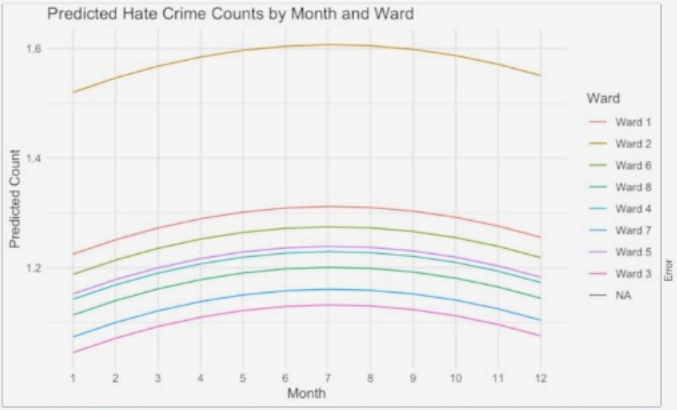
- Source: Open Data DC – Open Government Data for the District of Columbia
- Size/Scale: 1563 Observations, 25 Variables
- Challenges: Mostly categorical variables



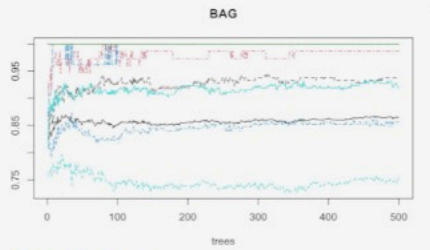


Most Important Findings

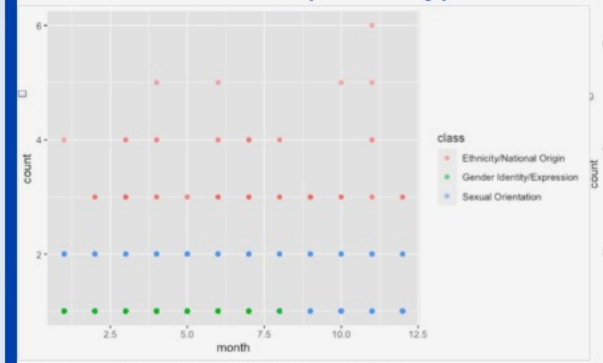
Prediction of the expected number of hate crimes in wards



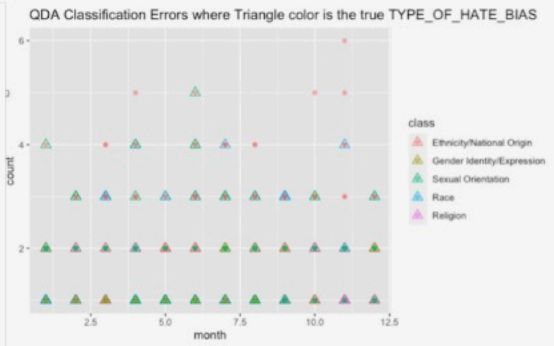
← polynomial regression shows that Ward 2 has the highest count of the hate crime throughout the year.



Prediction of the expected type of a hate crime in a ward



↑ QDA analysis performed the best, showing the top three most prevalent "Type of Hate Bias" experiences. Among these, Ethnicity/National Origin was the most frequent.



↑ QDA plotted with the Classification Error rates to show the true variables suggest that Sexual Orientation was reported significantly more than the other variable

Results

Table 1: Comparison of Regression Models

Model	Squared_Error	R_squared
Linear Regression	98.32350	0.2103411
Polynomial Regression	88.69971	0.2876320
Ridge Regression	98.50062	0.2103411
Lasso Regression	99.68047	0.2074742

- We would recommend the Polynomial Regression because the low squared error and high r-squared values suggest the Polynomial model provides better predictions and explains more deviance in the data compared to other models.

Table 2: Comparison of Classification Models

Model	Accuracy
QDA	74.19
LDA	80.85

- We would recommend the LDA model because it produces the best classification rate

Considerations/ Implications

- Data Source: It is important to understand the representativeness and reliability of the data. Bias in the data can lead to bias in the predictions. For example, under reporting of hate crimes by marginalized groups may skew the analysis results.
- Data Structure: Collapsing hate crime categories into broader categories can also simplify analysis, but should consider balancing simplicity with accuracy and fairness
- Data Utilization: Ensure predictions are used for preventative measures and intervention rather than profiling or targeting specific communities.
- Stakeholders
  - Government Agencies: Law enforcement agencies, government bodies, and policy makers could be interested in predicting hate crime occurrences to better allocate resources and implement preventative measures.
  - Community Organizations: Non-profit organizations and advocacy groups that work on social justice issues may use the predictions to raise awareness, support victims, and advocate for policy changes.
  - The public: Residents of DC have a stake in understanding hate crime trends to promote community safety and awareness.

References

"Open Data DC." https://opendata.dc.gov/datasets?q=crime.

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