Predicting Level 2, 3 and 4 Injuries during Use of Force Incidents

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Background

NYPD's Objective and Goals

Objective:

Identify factors that can predict whether or not a non-NYPD subject involved in an incident of force will suffer a level 2, 3, or 4 injury

Goals:

- Reduce the rate of level 2, 3 and 4 injuries among non-NYPD subjects involved in force incidents

- Improve its image and relationship with the communities they serve
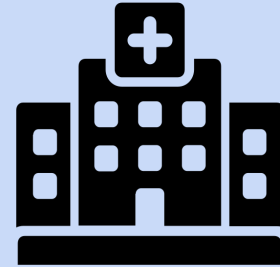
Injury Levels Explained

No Injury

Level 1
Injury

Level 2
Injury

Level 3
Injury

Level 4
Injury

Data

Force incidents

Force type

Basis for encounter

Patrol borough, etc.

Subjects

Force type (if any)

Injury level

Demographics

Members of service

Rank/title

Assignment

Demographics, etc.

Modeling

1. KNN
2. Logistic Regression $\longrightarrow$ Why?
3. Naive Bayes
4. Decision Tree
5. Random Forest
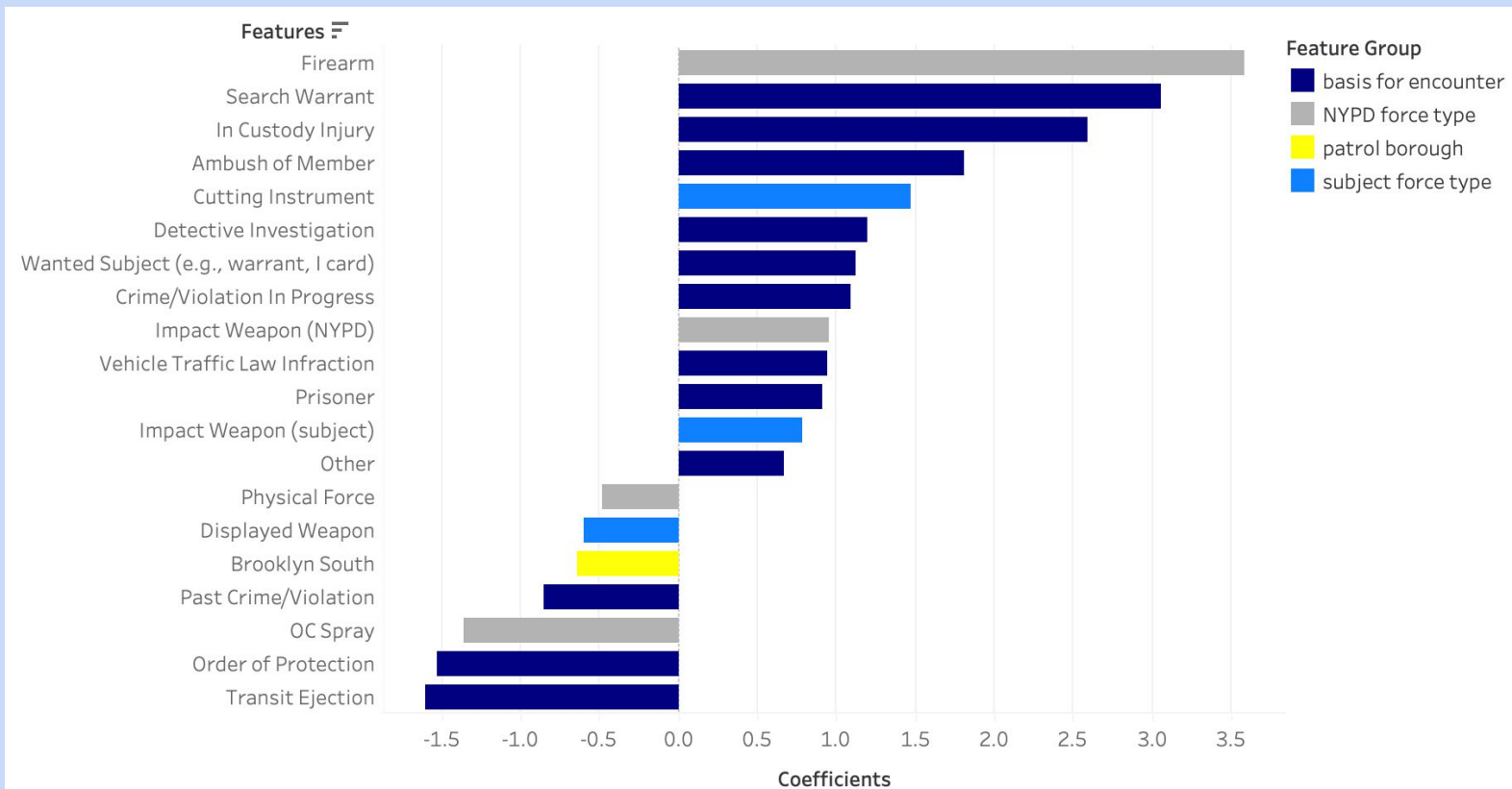6. XGBoost
7. Naive Bayes

Interpretability

Results

Ideally,
% True Neg would be ~97%
% True Pos would be ~3%

But,
False Pos > False Neg = Good!

Results

Results

75%
probability of suffering a level 2, 3 or 4 injury

23%
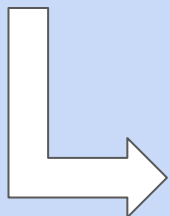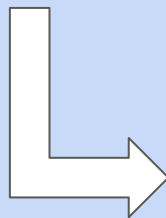probability of suffering a level 2, 3 or 4 injury
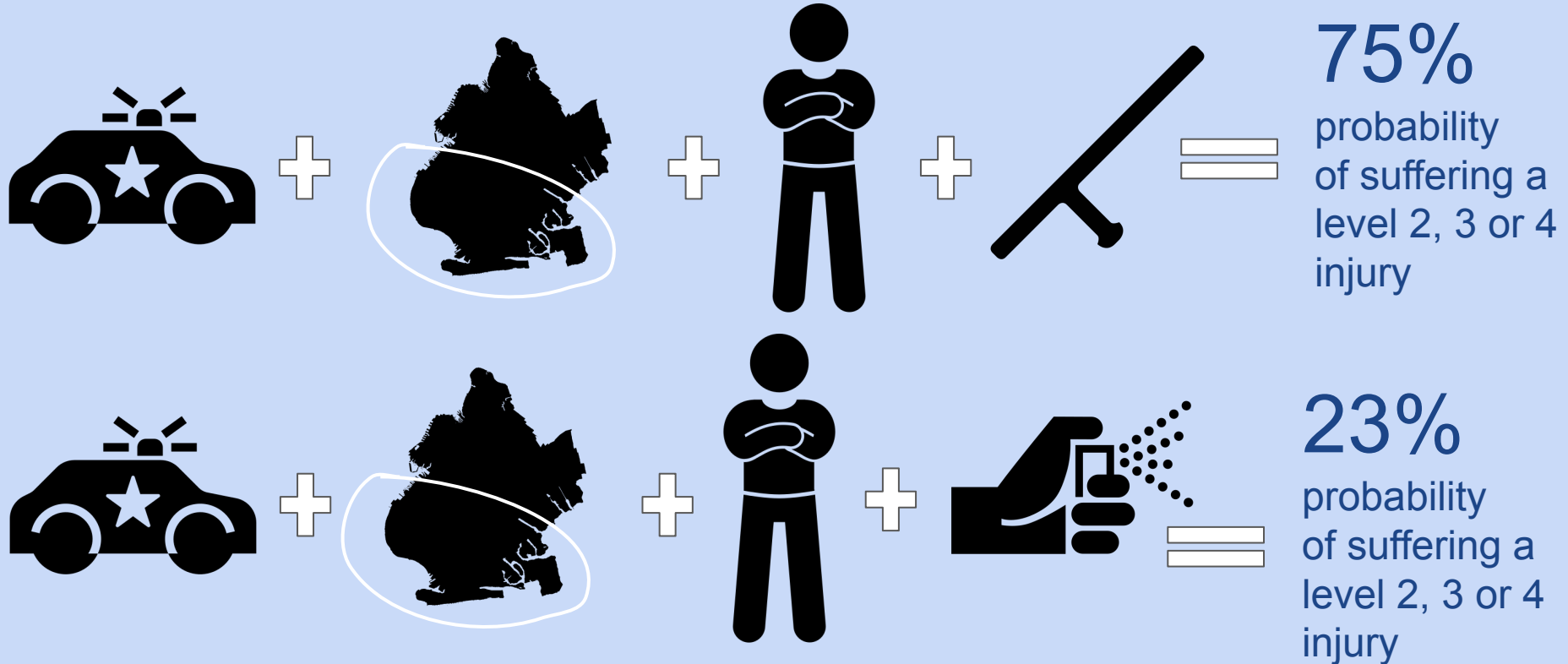
Conclusions

- Different **types of force** used by members of service and **bases for encounters** have the **strongest impact** on the probability a subject will suffer a level 2, 3 or 4 injury

- The NYPD should consider:

    - **Policy/training changes** to promote the use of certain types of force over others to mitigate harm

    - **Investigating why** some bases for encounters increase or decrease the probability of a subject suffering a level 2, 3 or 4 injury

Future Work

Gain access to more detailed data on use of force incidents (like that referenced **Use of Force Reports**)

More/Better features

Better model

Thank You!

Appendix

Image Sources

Images:

- https://copspassions.pagesperso-orange.fr/BadgesNYPD.htm
- https://www.vox.com/21291901/nypd-billion-de-blasio-defund-police-reform
- https://www.pinterest.com/pin/50876670764093394/
- https://thenounproject.com/icon/jump-1682137/
- https://thenounproject.com/icon/bandaid-1421412/
- https://thenounproject.com/icon/zombie-2879683/
- https://thenounproject.com/icon/hospital-63213/
- https://thenounproject.com/icon/tombstone-2128181/
- https://twitter.com/nycgov/status/1143139711105544192
- https://thenounproject.com/icon/new-york-city-783402/
- https://thenounproject.com/icon/police-car-1284959/
- https://thenounproject.com/icon/brooklyn-160964/
- https://thenounproject.com/icon/baton-12613/