

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 it serve

Level 2, 3 and 4 Injuries Explained



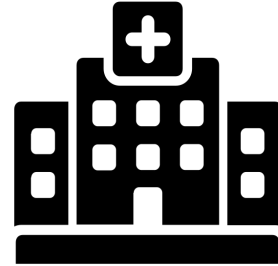
No Injury



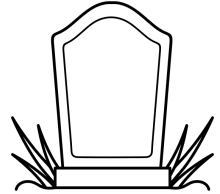
Level 1
Injury



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
3. Naive Bayes
4. Decision Tree
5. Random Forest
6. XGBoost
7. Naive Bayes

Interpretability



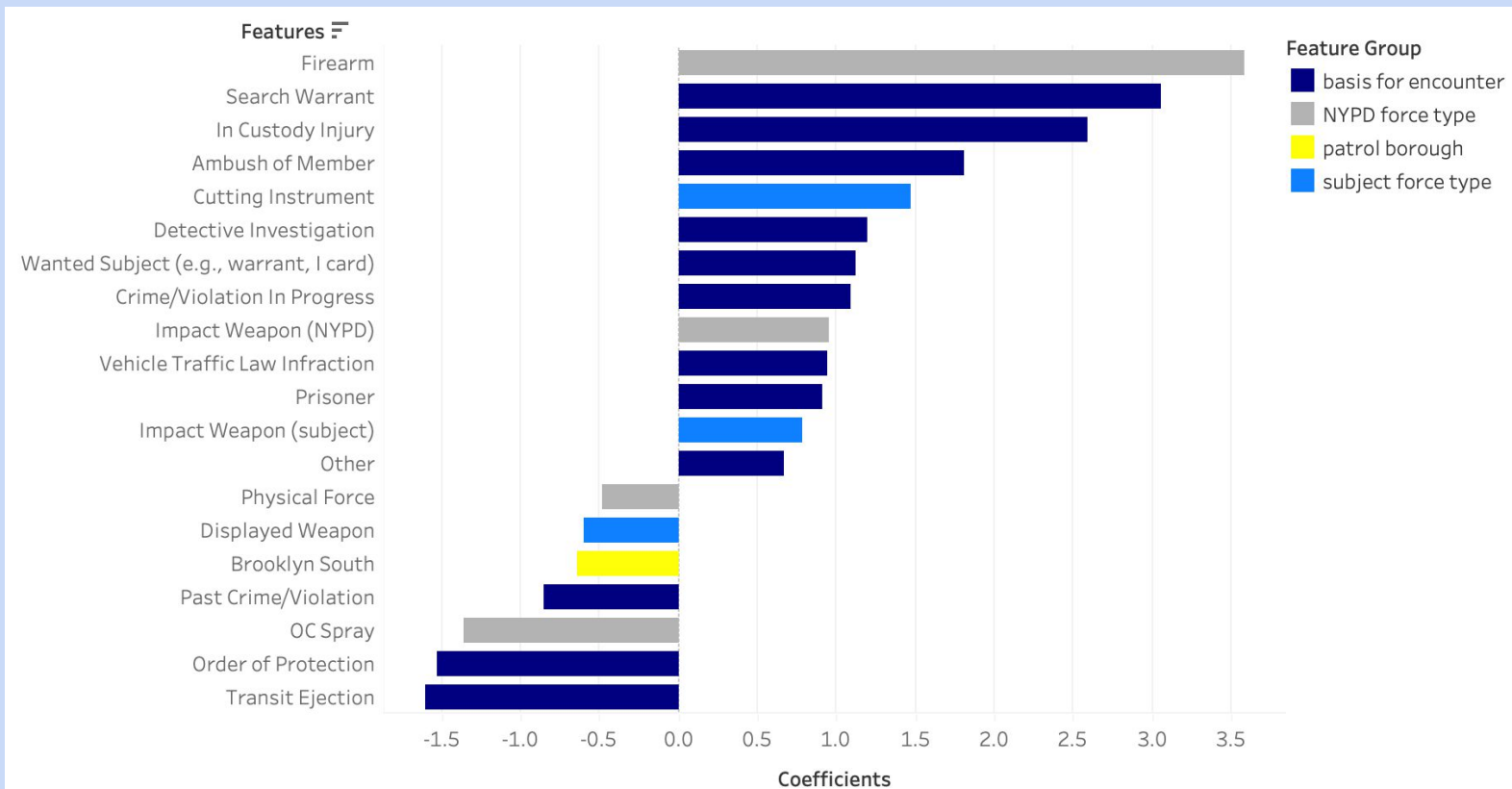
Results



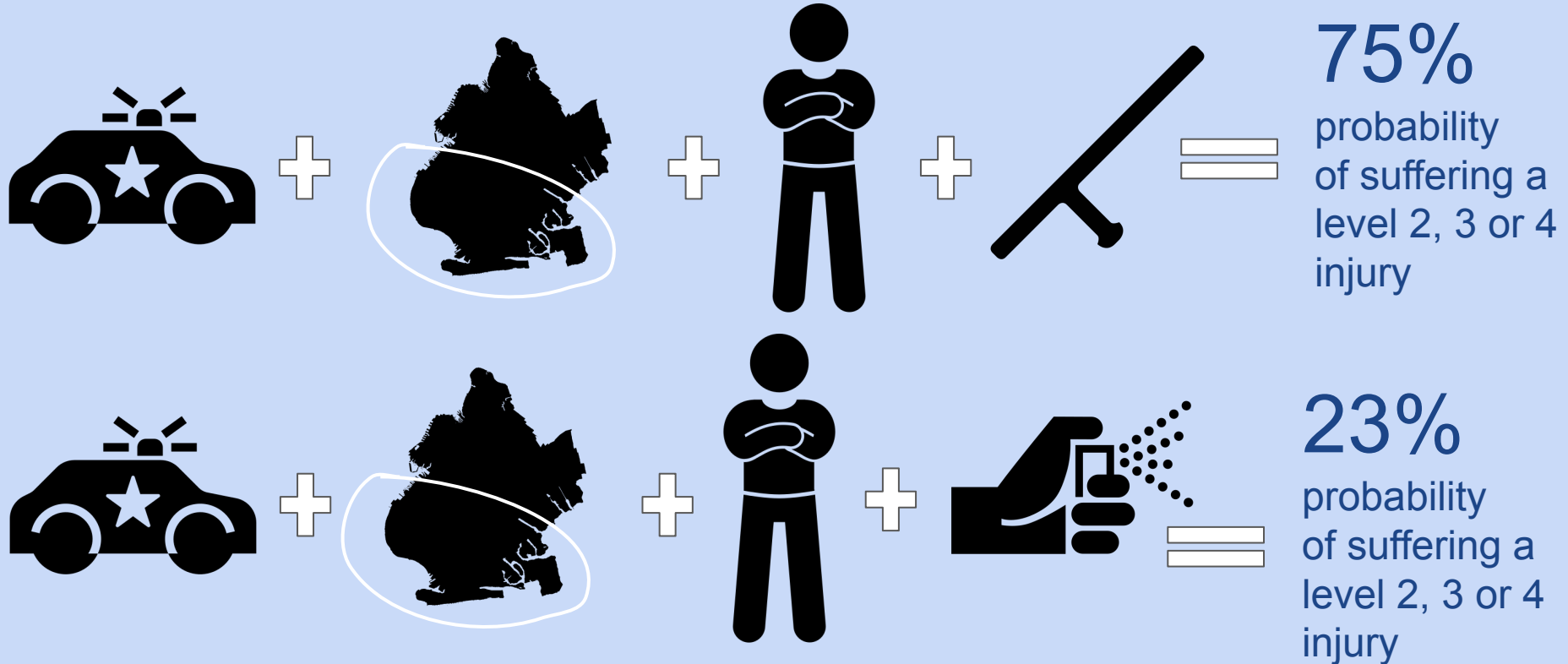
Ideally,
% True Neg would be ~97%
% True Pos would be ~3%

But,
False Pos > False Neg = Good!

Results



Results



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

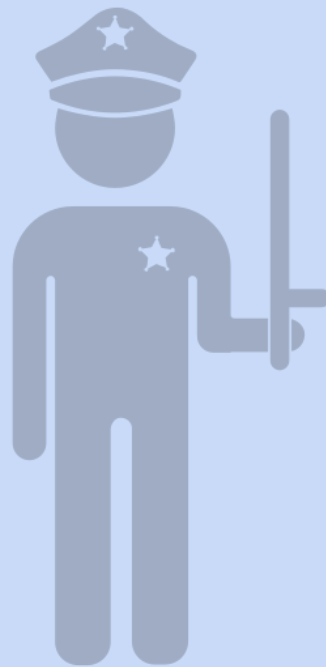
Gain access to more detailed data on use of force incidents
(re data used in **Use of Force Reports**)



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/bandaids-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/>
- <https://thenounproject.com/icon/police-1018194/>
- <https://thenounproject.com/icon/police-hat-1993537/>
- <https://thenounproject.com/icon/classification-4456553/>