Classifying Cardiac Arrest Outcomes

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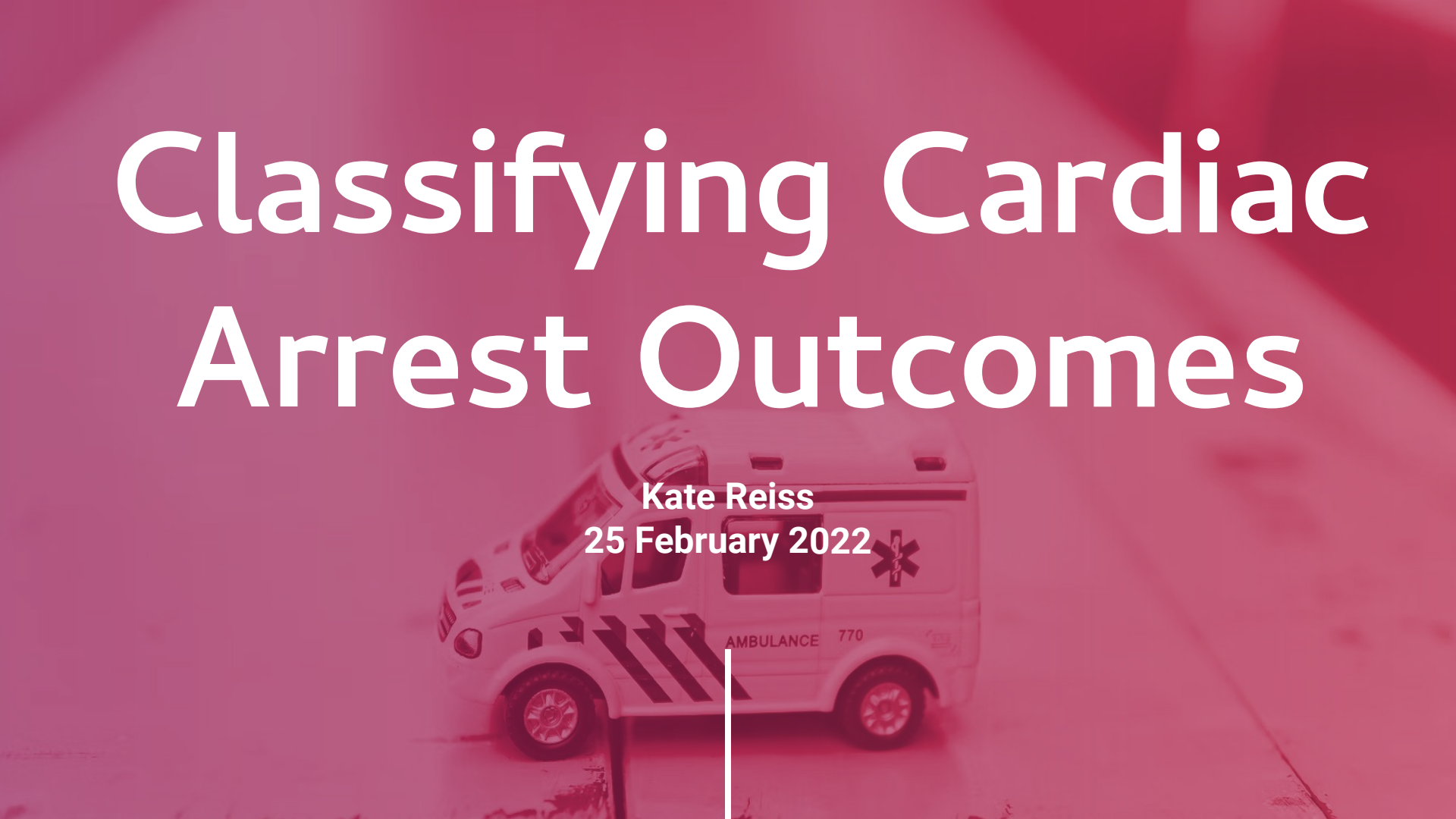


WHY STUDY CARDIAC ARRESTS?

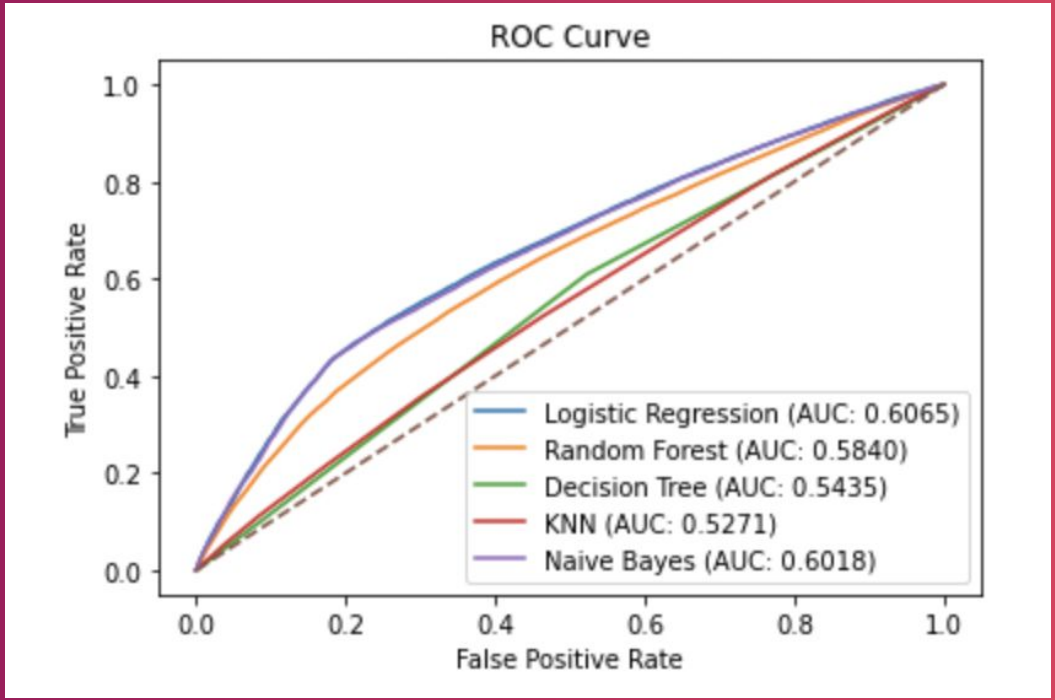
- Cardiac arrest deaths are often **preventable**
- How can FDNY improve cardiac arrest outcomes?

DATA

300,000
cardiac arrests in NYC from 2011-2021

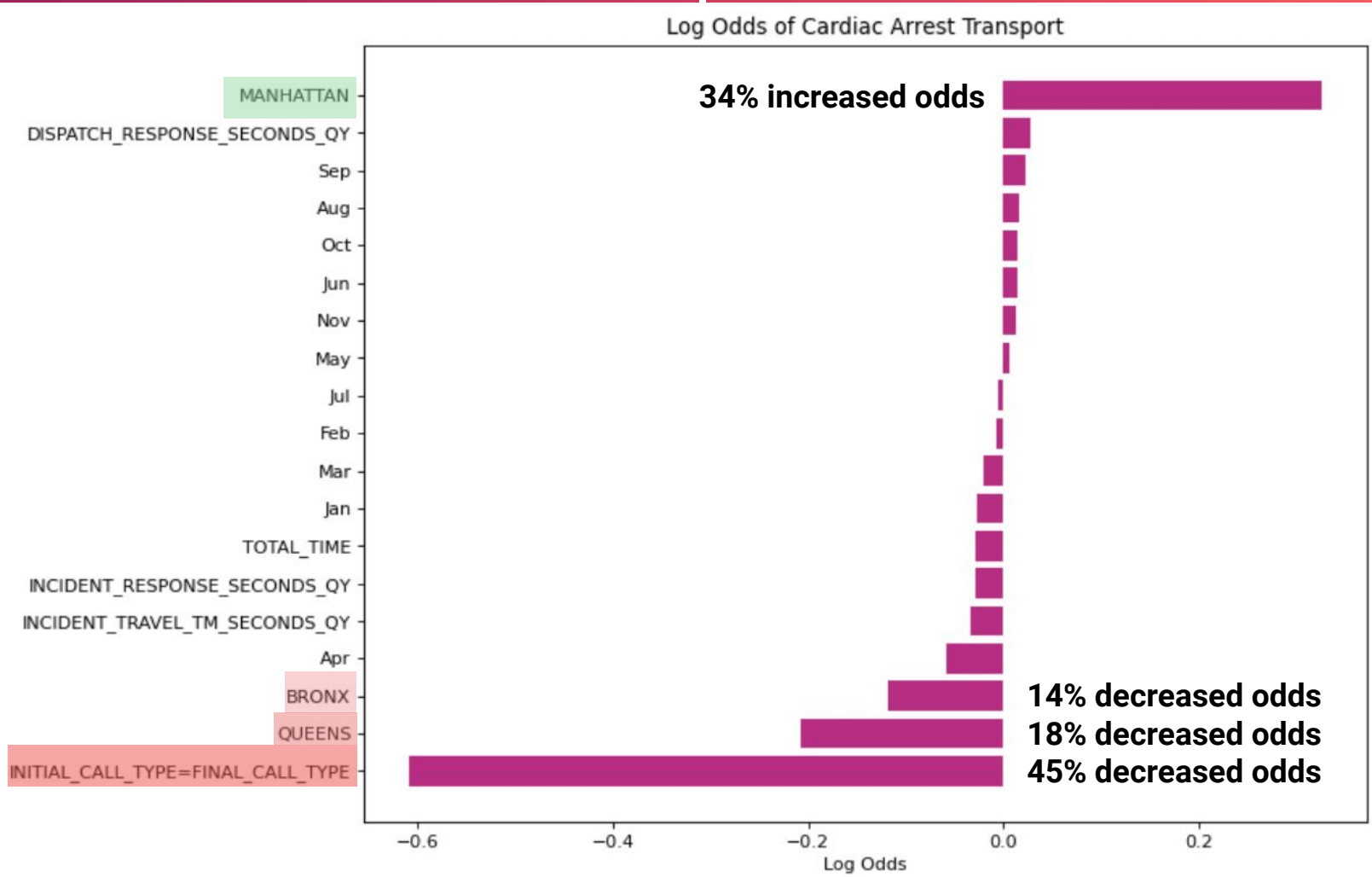
PREDICT
patient outcome: death or transport

RESULTS



Logistic Regression

- **Accuracy: 0.618**
- **F1: 0.673**

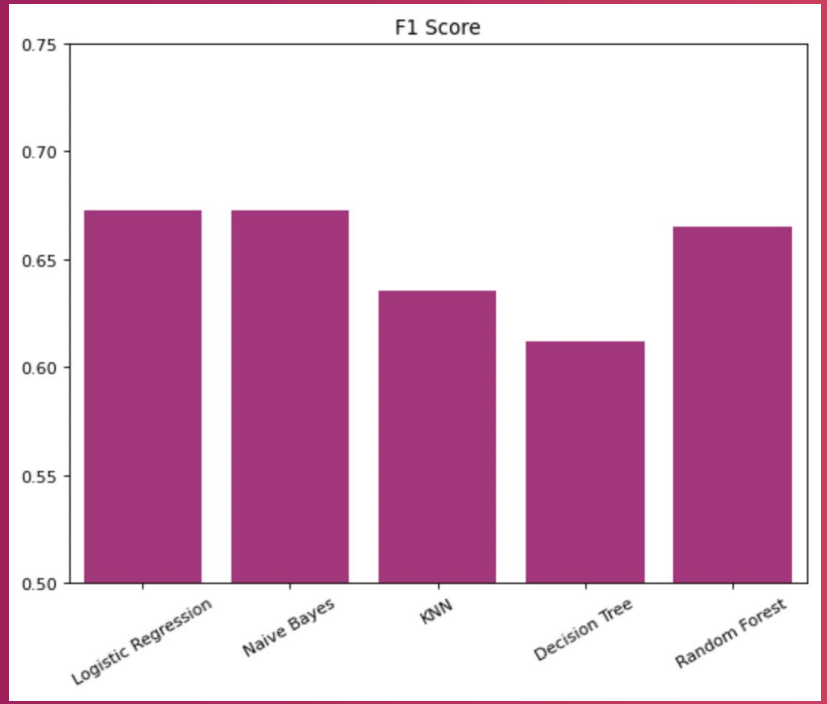

Log Odds of Cardiac Arrest Transport
MANHATTAN
DISPATCH_RESPONSE_SECONDS_QY
Sep
Aug
Oct
Jun
Nov
May
Jul
Feb
Mar
Jan
TOTAL_TIME
INCIDENT_RESPONSE_SECONDS_QY
INCIDENT_TRAVEL_TM_SECONDS_QY
Apr
BRONX
QUEENS
INITIAL_CALL_TYPE=FINAL_CALL_TYPE
34% increased odds
14% decreased odds
18% decreased odds
45% decreased odds
−0.6
−0.4
−0.2
0.0
0.2
Log Odds

FUTURE WORK

- Include medical data
- Post-hospital outcomes

THANK YOU

APPENDIX

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Test Metrics:
 Logistic regression:
 Accuracy: 0.6180
 Precision: 0.6651
 Recall: 0.6804
 F1: 0.6727
 ROC AUC: 0.6066
10 Nearest Neighbors:
 Accuracy: 0.5492
 Precision: 0.5957
 Recall: 0.6808
 F1: 0.6354
 ROC AUC: 0.5253
Bernoulli Naive Bayes
 Accuracy: 0.6148
 Precision: 0.6597
 Recall: 0.6865
 F1: 0.6728
 ROC AUC: 0.6018
Decision Tree:
 Accuracy: 0.5538
 Precision: 0.6140
 Recall: 0.6106
 F1: 0.6123
 ROC AUC: 0.5435
Random Forest:
 Accuracy: 0.6001
 Precision: 0.6433
 Recall: 0.6885
 F1: 0.6652
 ROC AUC: 0.5840
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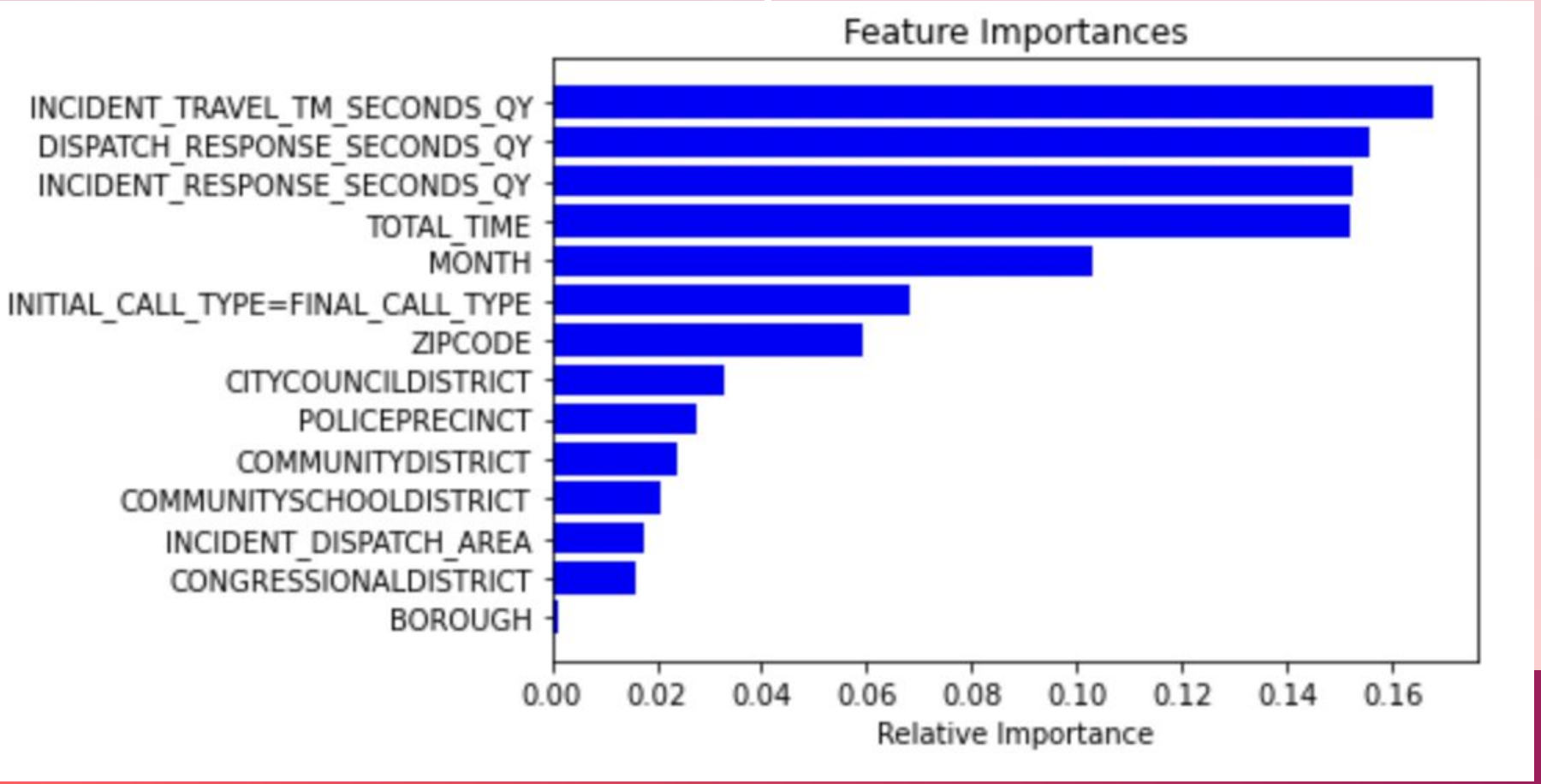
Feature Importances
INCIDENT_TRAVEL_TM_SECONDS_QY
DISPATCH_RESPONSE_SECONDS_QY
INCIDENT_RESPONSE_SECONDS_QY
TOTAL_TIME
MONTH
INITIAL_CALL_TYPE=FINAL_CALL_TYPE
ZIPCODE
CITYCOUNCILDISTRICT
POLICEPRECINCT
COMMUNITYDISTRICT
COMMUNITYSCHOOLDISTRICT
INCIDENT_DISPATCH_AREA
CONGRESSIONALDISTRICT
BOROUGH
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
Relative Importance

RESULTS

- Borough
- Initial Call Type