
Need Car Insurance?
USING CLASSIFICATION ALGORITHMS TO PREDICT WHETHER A HEALTH INSURANCE POLICY-OWNER WILL BE INTERESTED IN BUYING AUTO INSURANCE

Background:

Our Client: Insurance Company which hopes to cross-sell Auto Insurance to their current Health Insurance policy owners

Impact:

- Analyzing Cross-Selling trends will:
- Help target interested customers
- Bring in additional revenue
- Build brand loyalty
- Help gauge customer interest in new services

Dataset: Kaggle

10 features, 381109 customers

Features:

- Gender
- Age
- Drivers License
- Previously Insured
- Vehicle Age
- Vehicle Damage
- Annual Premium (INR)
- Policy Sales Channel
- Region Code
- Vintage

Target:

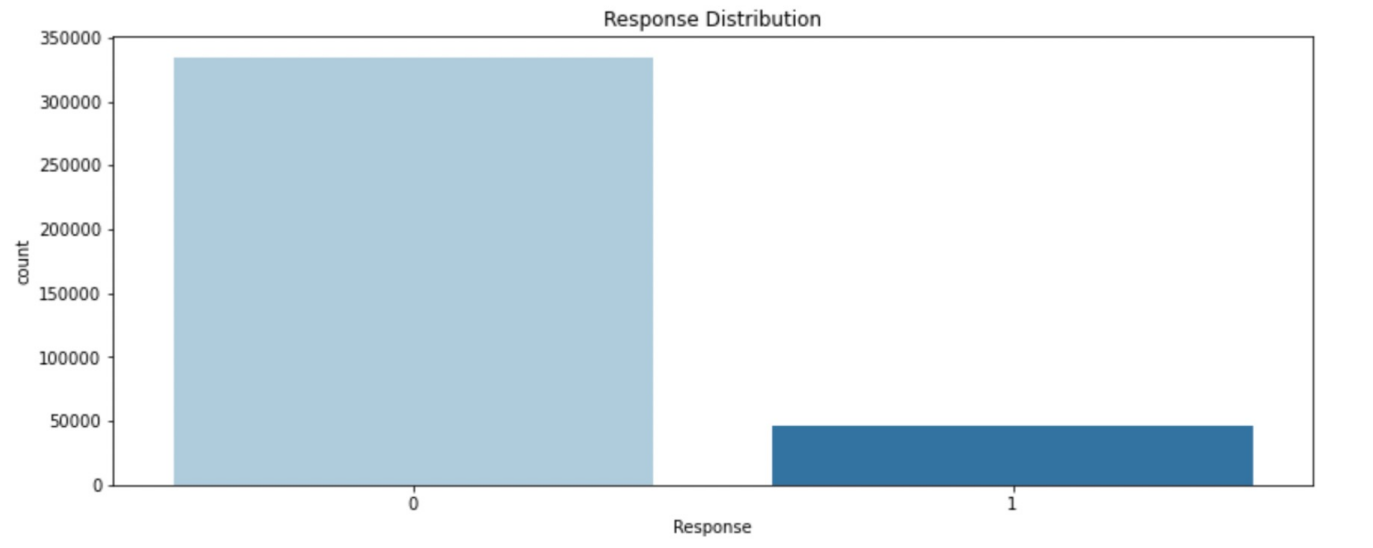
Response

0 – Not Interested

1- Interested

Evaluation Metric:

F2: Targeting Recall



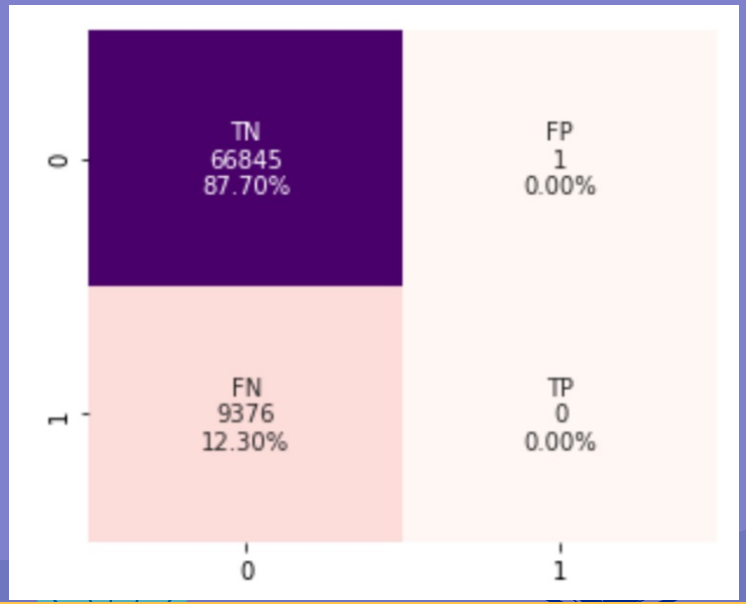
Model Choices:

Decision Tree, Random Forest, XGBoost, Logistic Regression

Baseline

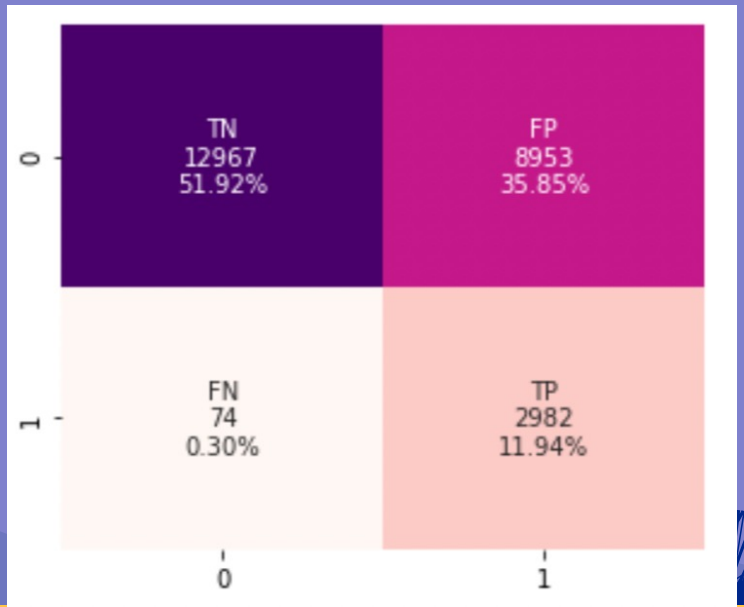
Logistic Regression

F2 Score: 0



Top Choice:

Logistic Regression
balanced class weight
F2 Score: .617



Recommendations:

Feature Coefficients:

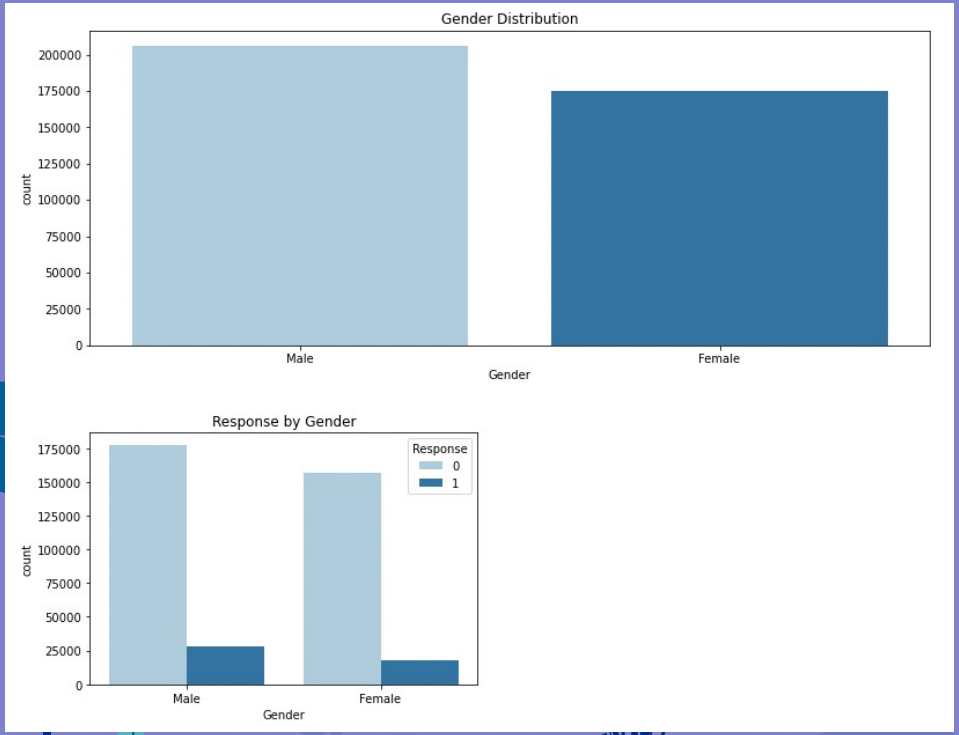
Features:	Coefficients:
Vehicle Damage	2.026383
Gender	.117056
Annual_premium	-0.000003
Vintage	-0.001251
Policy Sales Channel	-0.007695
Region Code	-0.009494
Age	-0.028976
Driving License	-0.229017
Vehicle Age	-0.505362
Previously Insured	-2.156361

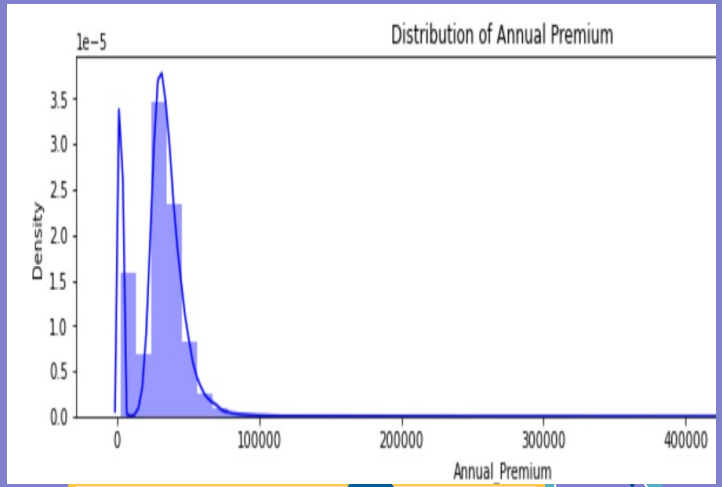
- Offer special promotions to customers who have had previous vehicle damage
- Gender based promotions if maximizing cross-buy
- Caveat: Higher annual premium policy-owners may not be interested
- Newer customers may be more inclined to cross-buy than older customers

Future Work:

- Continue to optimize current models
- Utilize other models (Naïve Bayes, other gradient boosting algorithms)

Appendix:


Gender Distribution
count
200000
175000
150000
125000
100000
75000
50000
25000
0
Male
Female
Gender
Response by Gender
Response
0
1
count
175000
150000
125000
100000
75000
50000
25000
0
Male
Female
Gender


Distribution of Annual Premium
1e−5
Density
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
100000
200000
300000
400000
Annual_Premium