

A professional photograph of a man and a woman in business attire. The man, on the left, has dark hair and a beard, wearing a grey blazer over a white shirt. The woman, on the right, has dark hair pulled back and is wearing a light-colored blazer over a white top. They are both smiling and looking towards the camera. The background is slightly blurred.

Insurance Cross Sell Prediction

August 7, 2023

Our Team

Aditya Kumar

Manideep Telukuntla

Rahull Borana

Daniel Lievano

Simran Kaur

Agenda

Business Issue

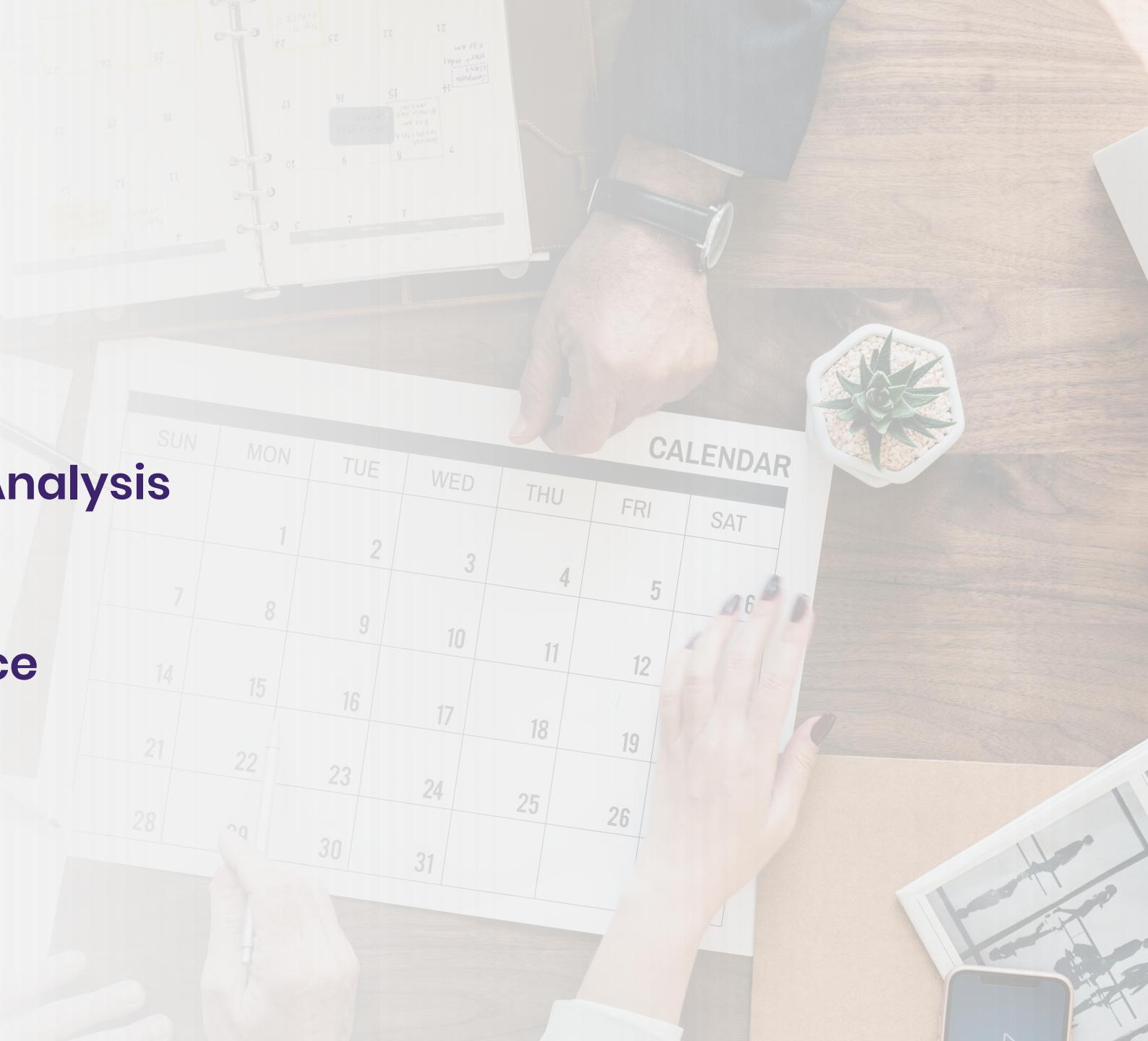
Dataset Overview

Exploratory Data Analysis

Models

Feature Importance

Conclusion



Business Issue

A blurred background image of a man with grey hair, wearing a white shirt. He is looking slightly downwards and to the right, with his right hand resting against his temple and forehead in a gesture of thought or stress.

"Namaste Insurance" is a well-recognized health insurance company in India, and they introduced a new vehicle insurance offering.

To enhance vehicle insurance sales for the insurance company using a predictive cross-sell model, optimizing client targeting and decision-making.

Dataset Overview

Number of features: 10

Number of observations: 381,109

Class distribution:

- Customers who bought a vehicle insurance: ~13 %
- Customers who didn't buy a vehicle insurance: ~86%

Demographic

Age

Gender

Region

Policy

Previously Insured

Days with Company

Annual Premium

Policy Sales Channel

Vehicle

Vehicle Age

Vehicle Damage

Driving License

id	Gender	Age	Driving_Li...	Region_Co...	Previously...	Vehicle_Age	Vehicle_D...	Annual_Pr...	Policy_Sal...	Vintage	# Response
1	Male	44	1	28.0	0	> 2 Years	Yes	40454.0	26.0	217	1
2	Male	76	1	3.0	0	1-2 Year	No	33536.0	26.0	183	0
3	Male	47	1	28.0	0	> 2 Years	Yes	38294.0	26.0	27	1
4	Male	21	1	11.0	1	< 1 Year	No	28619.0	152.0	203	0
5	Female	29	1	41.0	1	< 1 Year	No	27496.0	152.0	39	0
6	Female	24	1	33.0	0	< 1 Year	Yes	2630.0	160.0	176	0
7	Male	23	1	11.0	0	< 1 Year	Yes	23367.0	152.0	249	0
8	Female	56	1							72	1
9	Female	24	1							28	0
10	Female	32	1							80	0
11	Female	47	1	35.0	0	1-2 Year	Yes	47576.0	124.0	46	1
12	Female	24	1	50.0	1	< 1 Year	No	48699.0	152.0	289	0
13	Female	41	1	15.0	1	1-2 Year	No	31409.0	14.0	221	0
14	Male	76	1	28.0	0	1-2 Year	Yes	36770.0	13.0	15	0

Client bought a vehicle insurance

Demographic

Policy

Vehicle

Age

Previously Insured

Vehicle Age

Gender

Days with Company

Vehicle Damage

Region

Annual Premium

Driving License

Policy Sales Channel

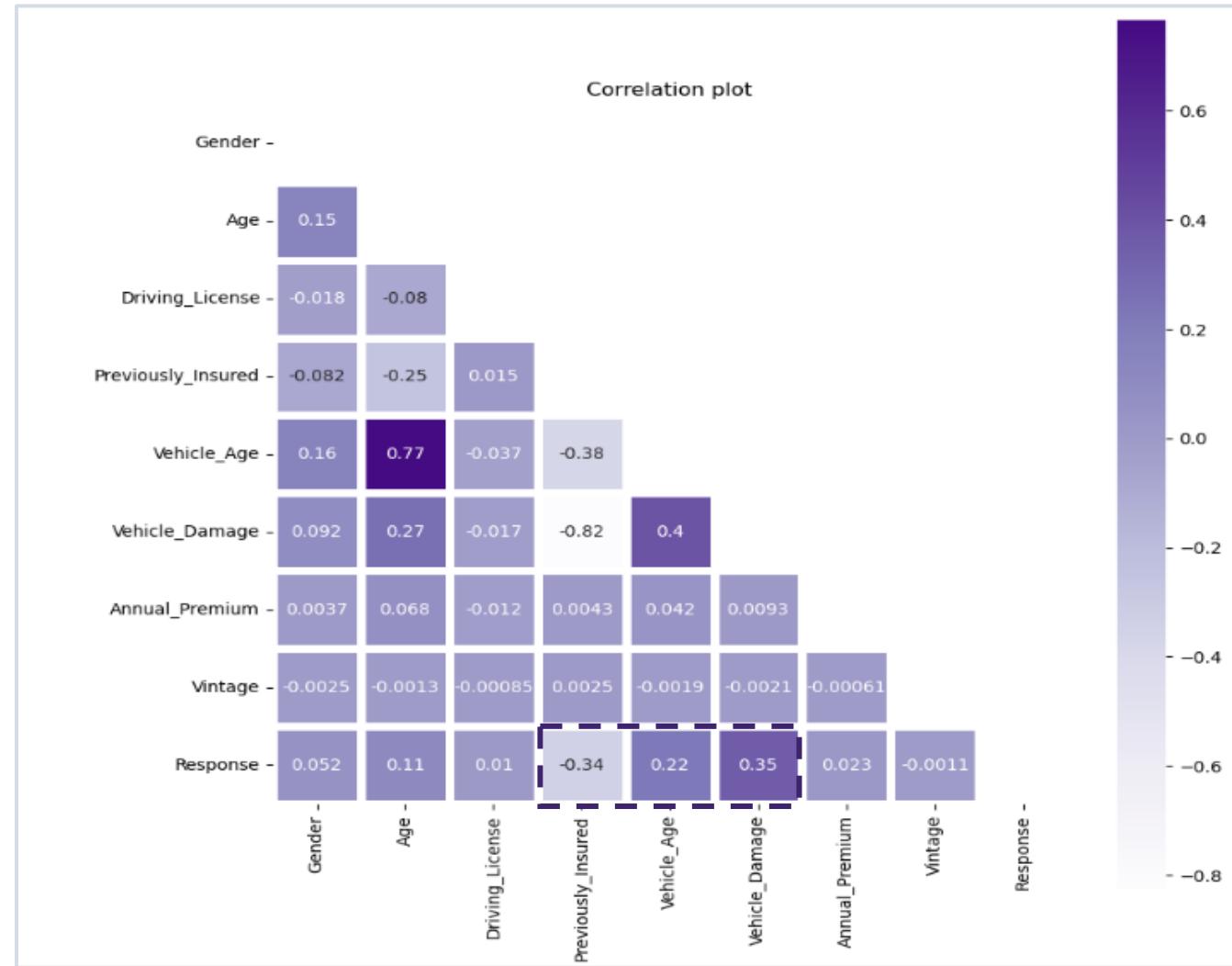
Gender	Age	Driving_License	Previously_Insured	Vehicle_Age	Vehicle_Damage	Annual_Premium	Vintage	Region	Policy_Channel	Response
Male	44	1	0	>2 Years	1	40454.0	217	West	Marketplace(BankBazaar, Coverfox, Insur...	1
Male	47	1	0	>2 Years	1	38294.0	27	West	Marketplace(BankBazaar, Coverfox, Insur...	1
Female	56	1	0	1-2 Years	1	22021.0	72	West	Marketplace(BankBazaar, Coverfox, Insur...	1
Male	79	1	0	>2 Years	1	57111.0	222	West	Marketplace(BankBazaar, Coverfox, Insur...	0
Male	39	1	0	1-2 Years	1	57582.0	141	West	Marketplace(BankBazaar, Coverfox, Insur...	0

Client bought a vehicle insurance

Exploratory Data Analysis

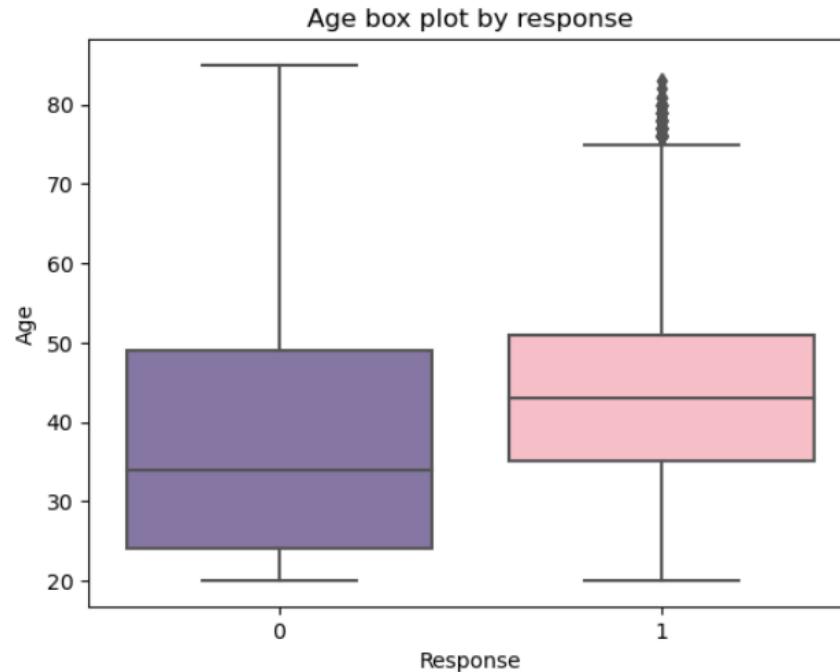


Our correlation matrix analysis reveals influential variables significantly affecting the response: previous insurance, past accidents, and vehicle age



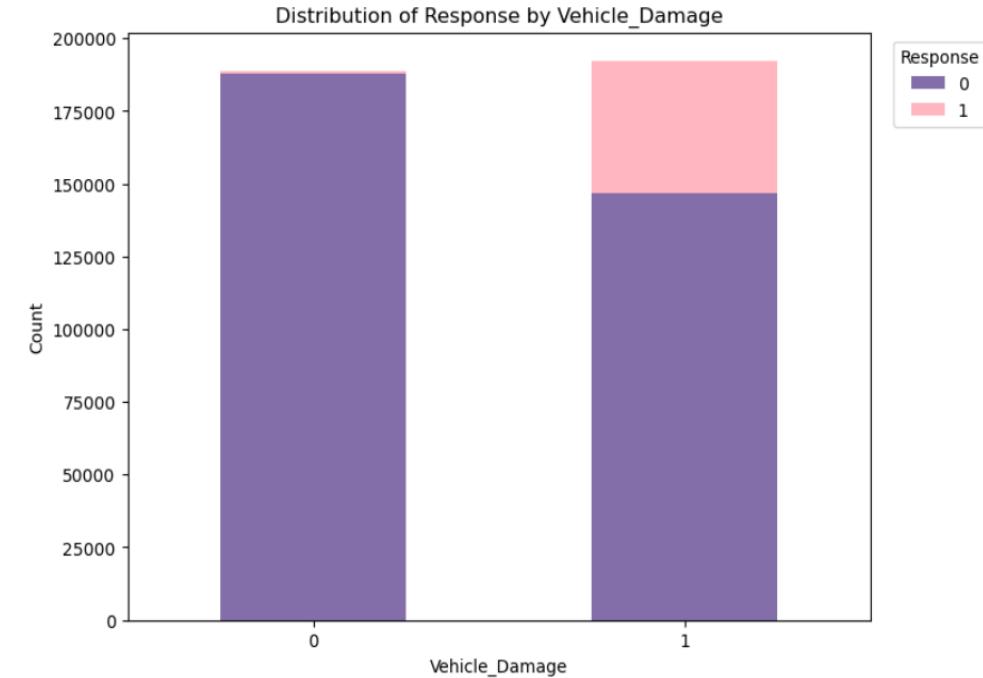
Age and previous vehicle damage seem to show a difference for those customers interested in the product

Targeting the Older Population



Older individuals are more inclined towards buying the insurance

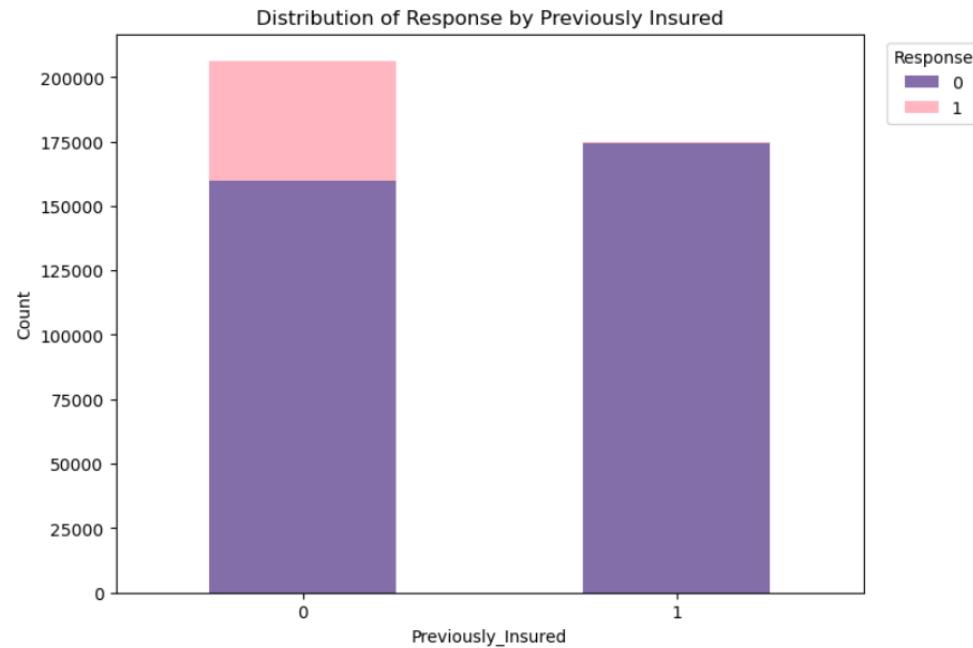
Influence of Vehicle Damage



Customers with a history of vehicle damage tend to buy insurance

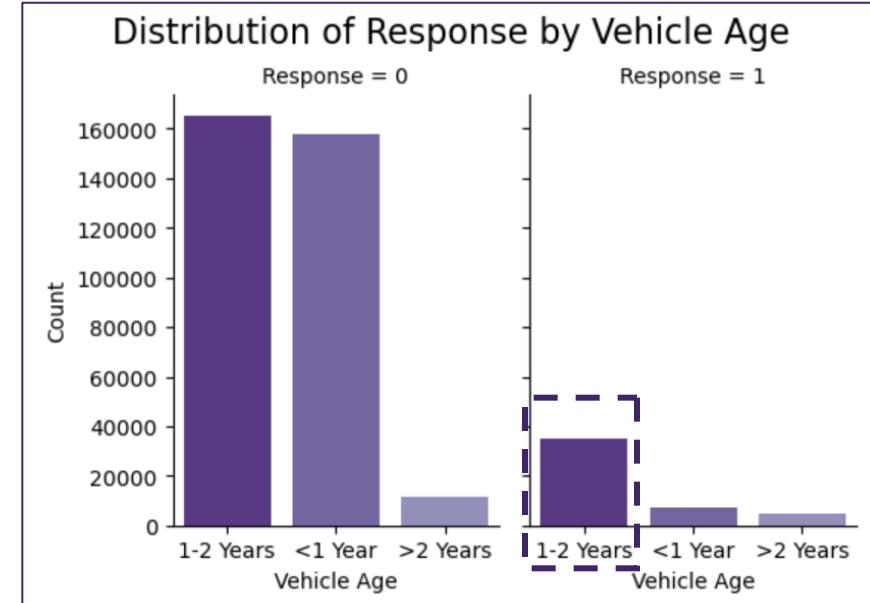
New customers without prior insurance and customers with newer vehicles offer potential for targeted marketing and business growth

Previous insurance status



Customers without prior vehicle insurance demonstrate significant interest in the product

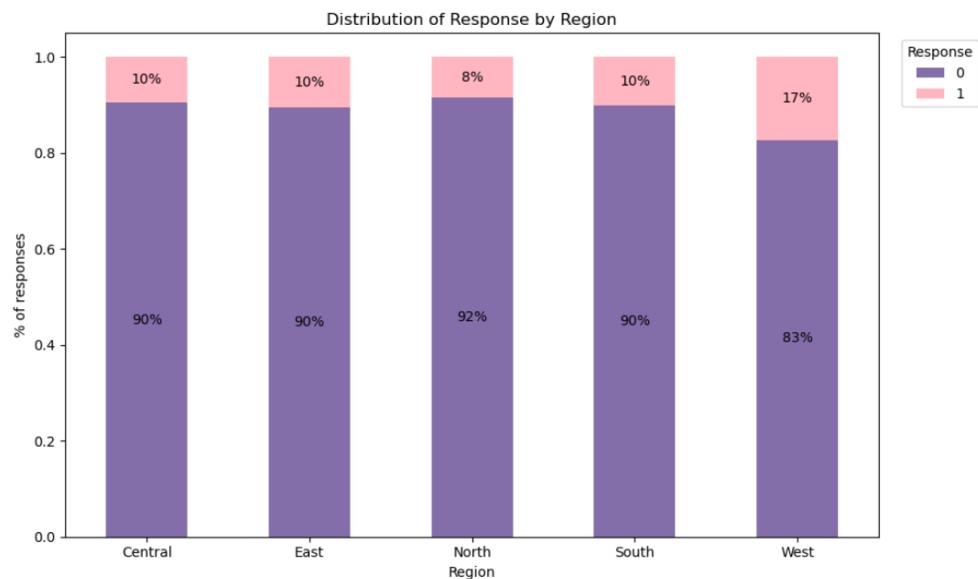
Vehicle Age Matters



Although vehicle age positively correlated with insurance interest, there is a huge opportunity to target new vehicle owners

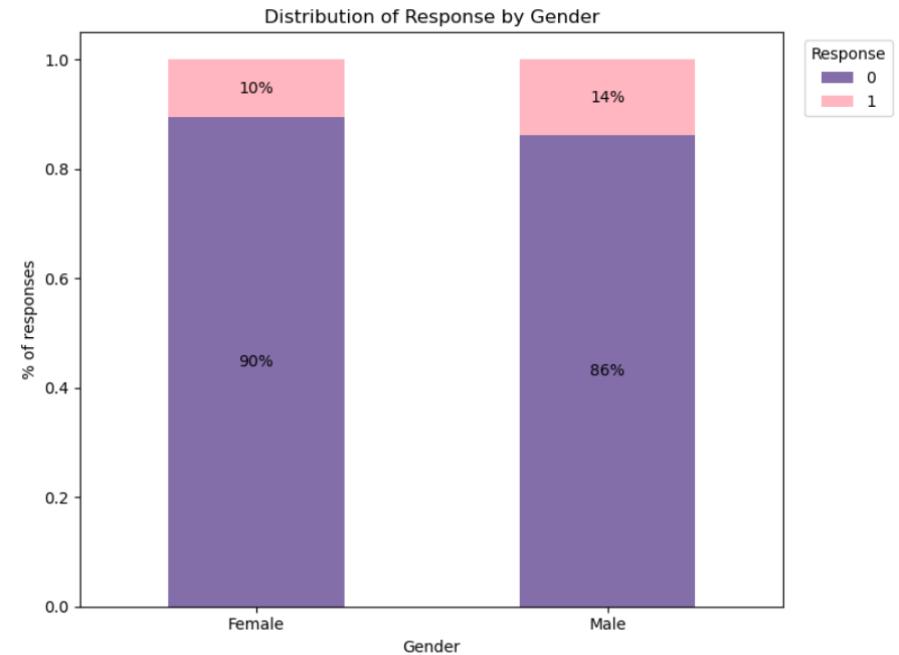
Other specific demographics didn't show a notable difference for interested vs not interested groups

Regional distribution



Interested and Non-interested group trend is consistent across regions, with slightly higher interest observed in the Western parts of India

Gender distribution



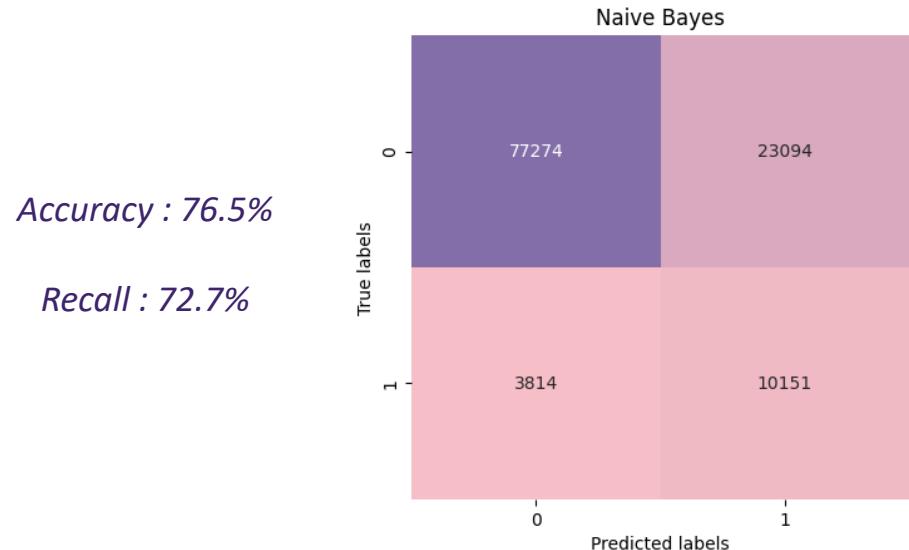
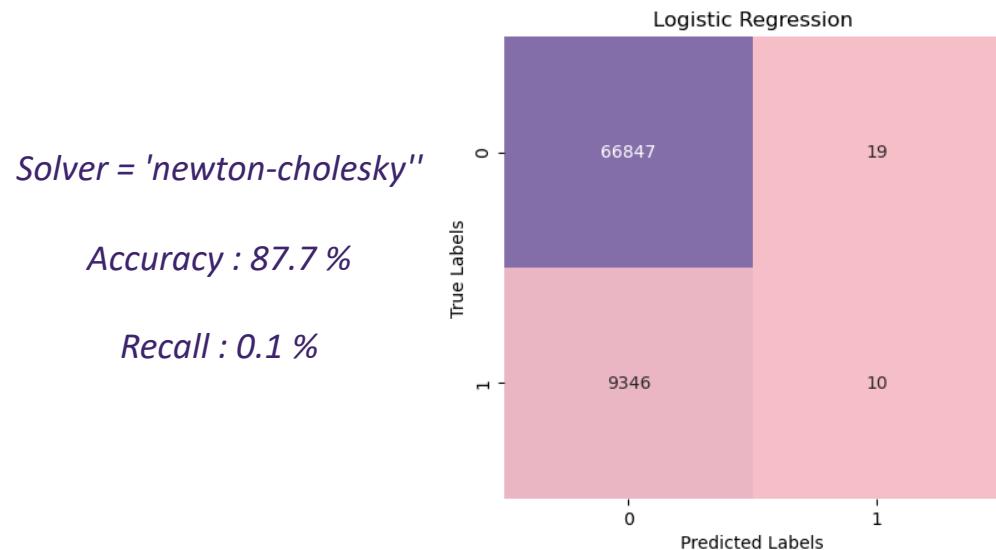
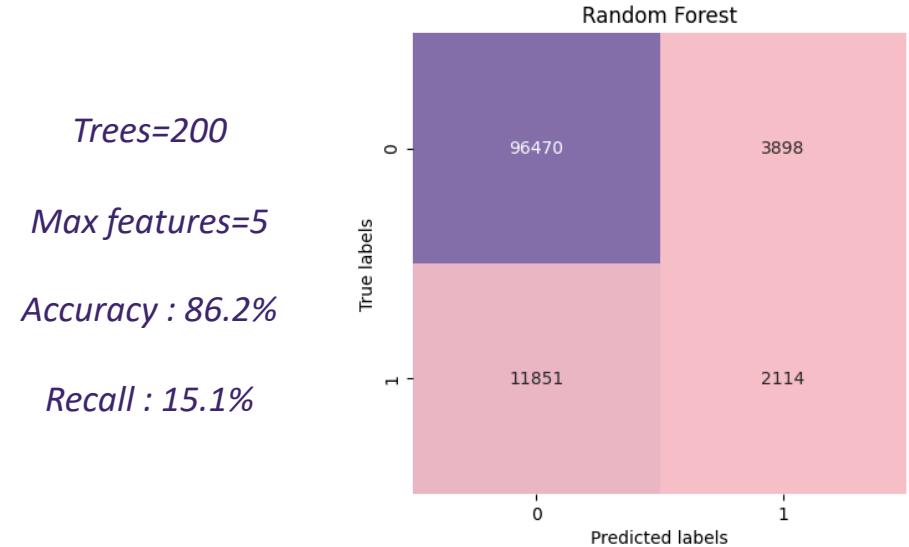
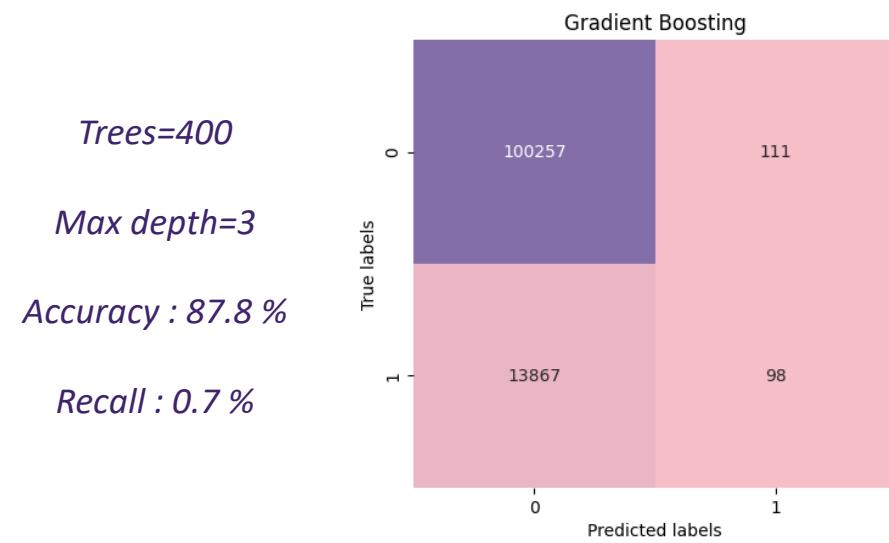
Directional difference between genders with males showing a slightly higher interest than females.

Models

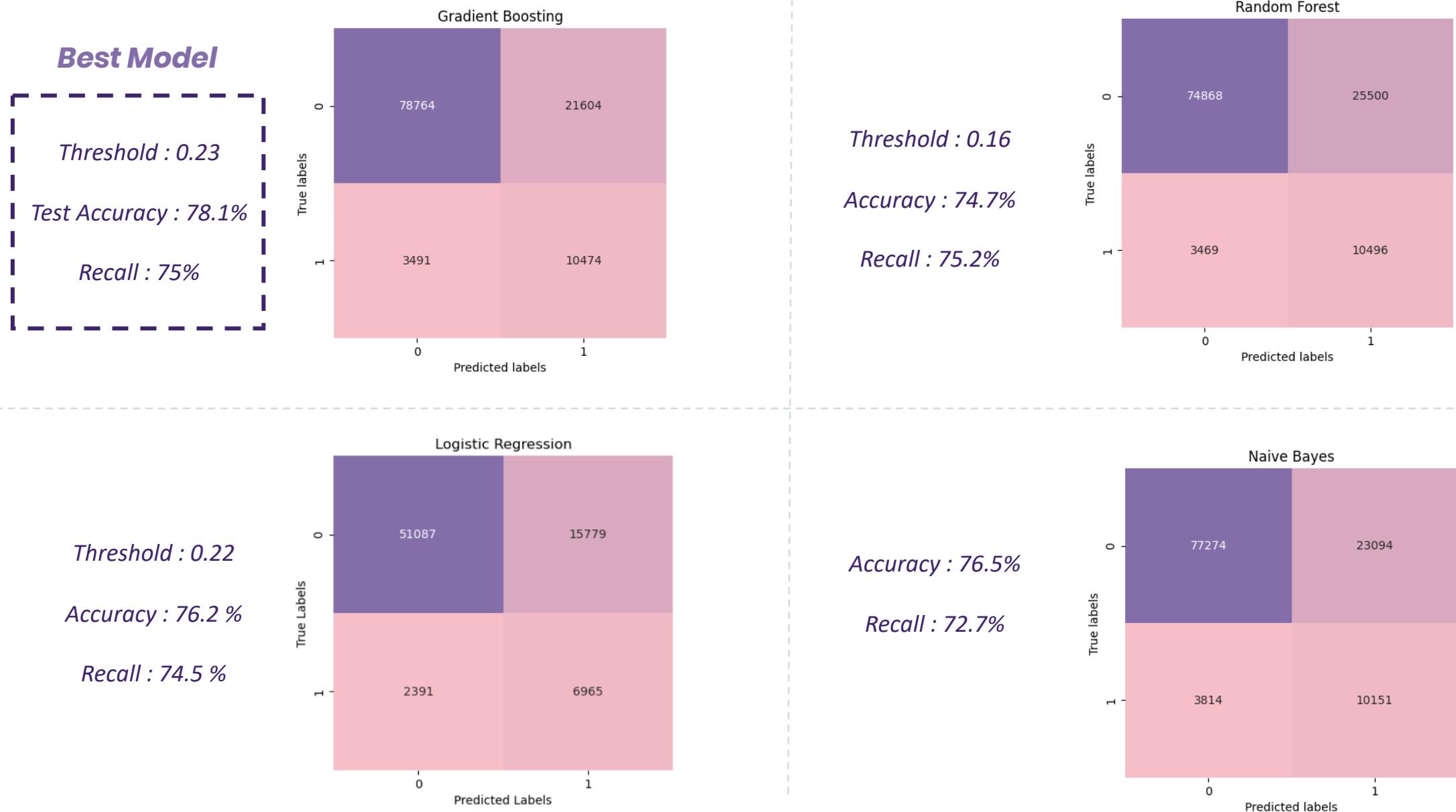
- **Gradient Boosting**
- **Random Forest**
- **Logistic Regression**
- **Multinomial Naïve Bayes**



Confusion Matrices before threshold tuning



Confusion Matrices after threshold tuning



Feature Importance



Top 5 Features Impacting Insurance Purchase Decisions

Decreasing relative importance

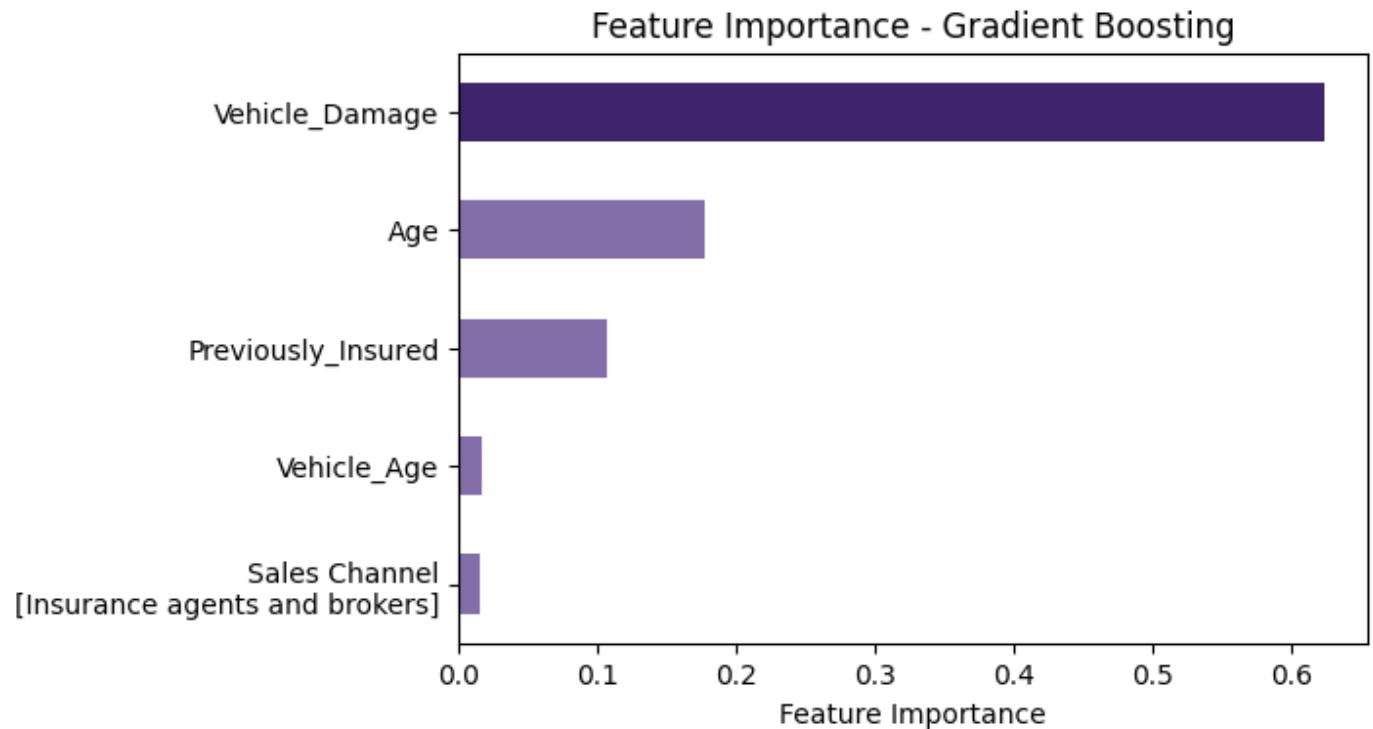
Vehicle Damage

Age

Previously Insured

Vehicle Age

Policy Sales Channel
[Insurance Agents and Brokers]



Customers with a history of vehicle damage are more likely to buy the insurance

Conclusion



Key Observations

Further Steps

Individuals with Vehicle Damage are more inclined to buy insurance



Company can increase the prices for the premium of Damaged Vehicles

For Individuals buying insurance with damaged vehicle, younger adults bought the insurance within 1 year of purchase whereas, the older adults bought it after 1 year



For Younger Adults : Partner with Car dealers more to boost insurance sales

For Older Adults : Roll out anniversary offers to attract customers

Most Previously Insured people are not buying the insurance, and out of this most people are younger adults



Tapping customers by rolling out shifting offers taking the insurance history in consideration and adding more competitor analysis

Questions?

