DATA SCIENCE PROJECT
MARKETING CAMPAIGN CUSTOMER RESPONSE PREDICTIONS

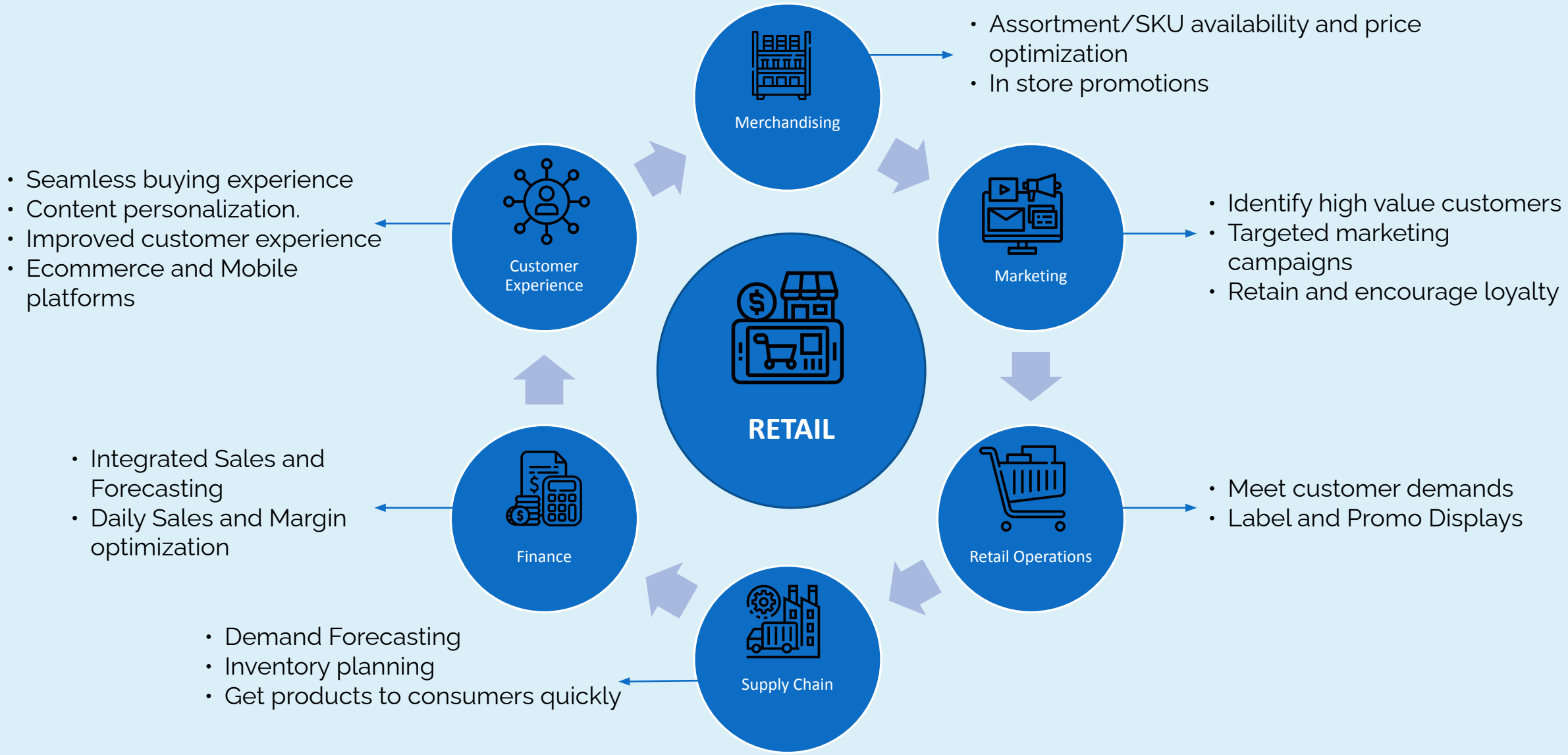
02/24/2022

Swati Goyal

AGENDA:

- Introduction: About me
- Retail: The Big picture
- Context and Problem Statement
- Objectives
- Process and Approach
- Analysis and Recommendations
- Machine Learning Models and Evaluations
- Adaptability and Future Scope

RETAIL: THE BIG PICTURE



- Assortment/SKU availability and price optimization
- In store promotions

- Identify high value customers
- Targeted marketing campaigns
- Retain and encourage loyalty

- Meet customer demands
- Label and Promo Displays

- Demand Forecasting
- Inventory planning
- Get products to consumers quickly

- Integrated Sales and Forecasting
- Daily Sales and Margin optimization

- Seamless buying experience
- Content personalization.
- Improved customer experience
- Ecommerce and Mobile platforms

Context/Problem statement: Marketing team needs to:

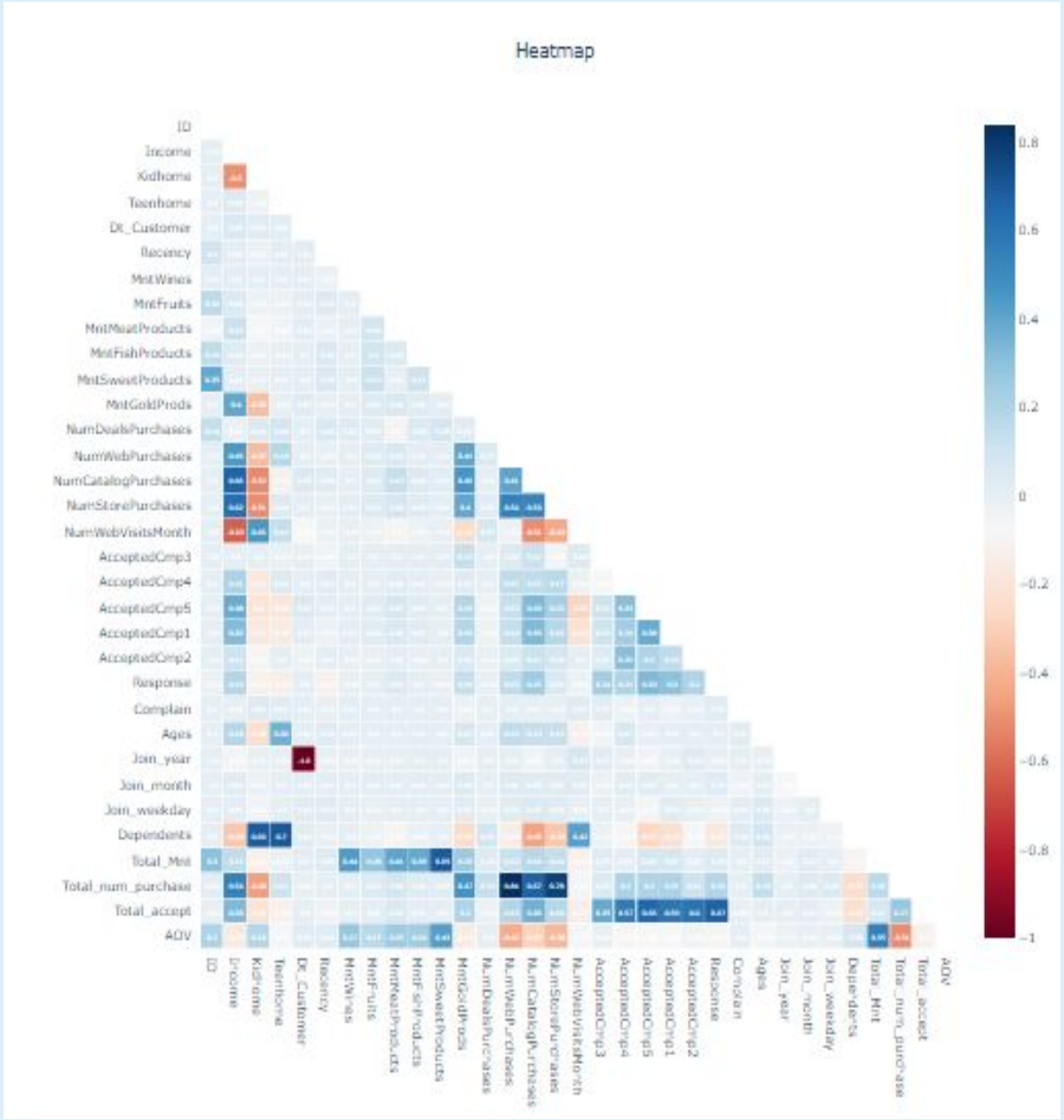
- ✔ Understand the problems or challenges with their earlier campaigns.
- ✔ Predict the customer response to upcoming campaigns.
- ✔ Ensure the effectiveness of the campaign.
- ✔ Increase the number of new customers/retain existing customers.

Objective:

- ✔ Build the machine learning model to predict the customer response to the campaigns based on customer demographics and last purchases.
- ✔ Increase the responses through personalized promotions by using this model and boost campaign efficacy.

About Data: The data set of 39983 customers of the company with data on:

- ✔ Customer profiles
- ✔ Product preferences
- ✔ Campaign successes/failures
- ✔ Channel performance

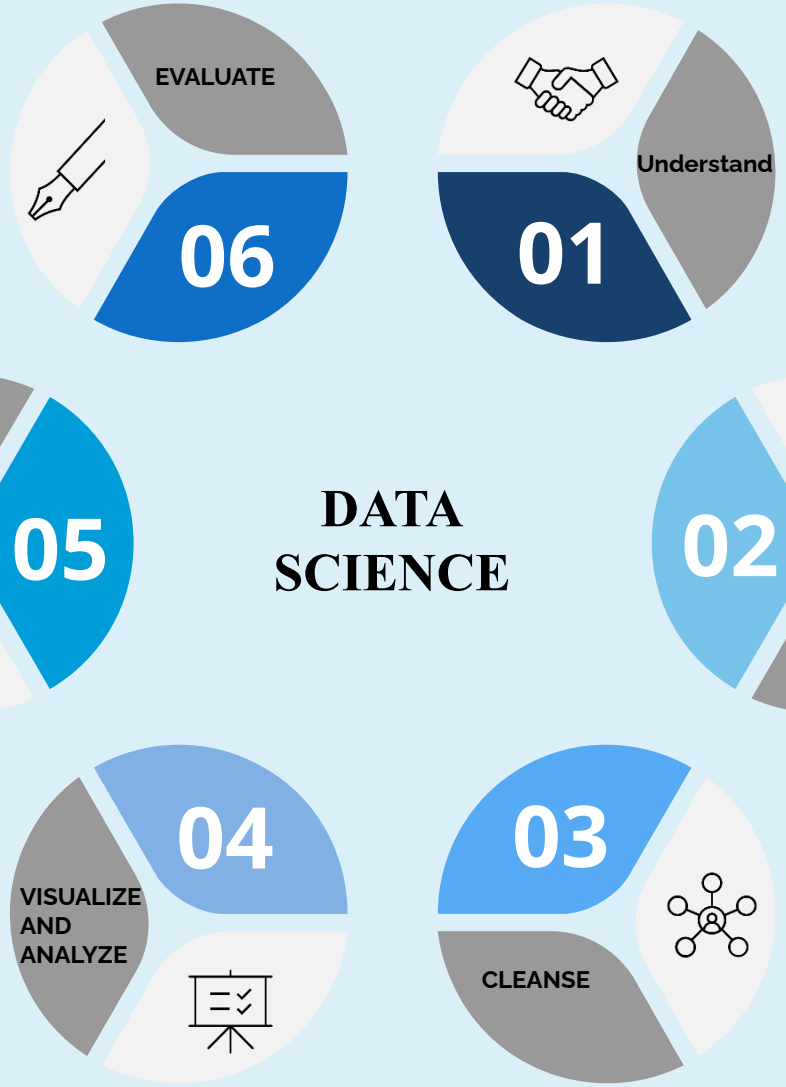


PROCESS AND APPROACH

Model Performance: Evaluating the performance of model on training and test dataset.

Building a Productive model: Algorithm Selection from Knn classifier, Random Forest classifier, Boosting. Split the dataset and Train the model in training and test data set.

Data Visualization and Further Statistical Analysis: Feature Identification, analysing the correlation between different variables. Preprocessing the data.



Understanding Requirement: Understand the problem. Gather the data.

Exploratory Data Analysis: Analysing data sets to summarize their main characteristics, with visual methods.

Data Cleaning: Remove Irrelevant Values, Filling the Missing Values.

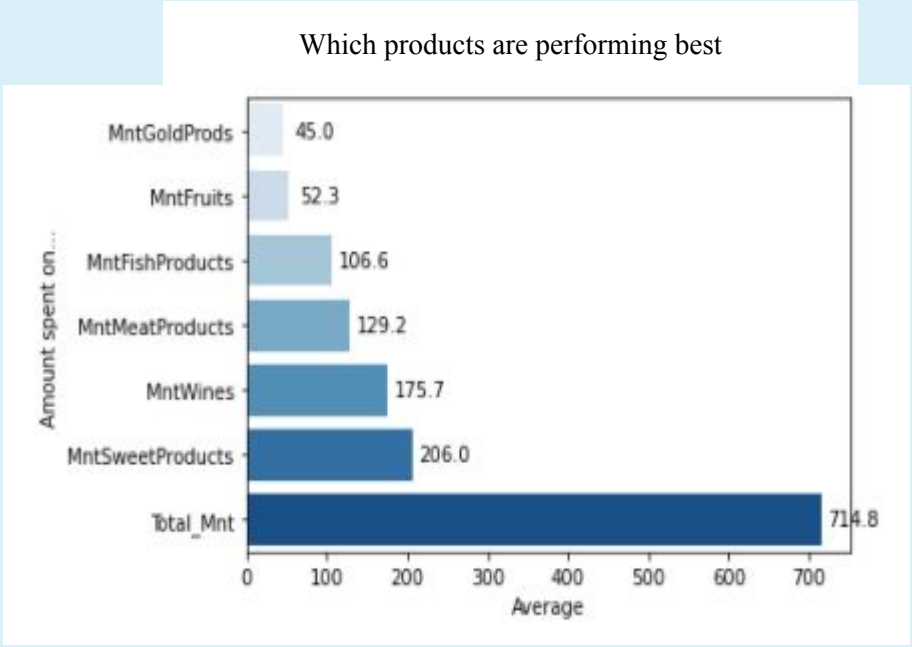
ANALYSIS AND RECOMMENDATIONS

Exploratory Data Analysis for the last campaign:

- Performed nearly twice better from the previous campaigns.
- Attracted more customers on various factors.
- The customers purchased more evenly through catalogs, websites and stores.
- The customers earned 25% more income than the customers in the previous campaigns.

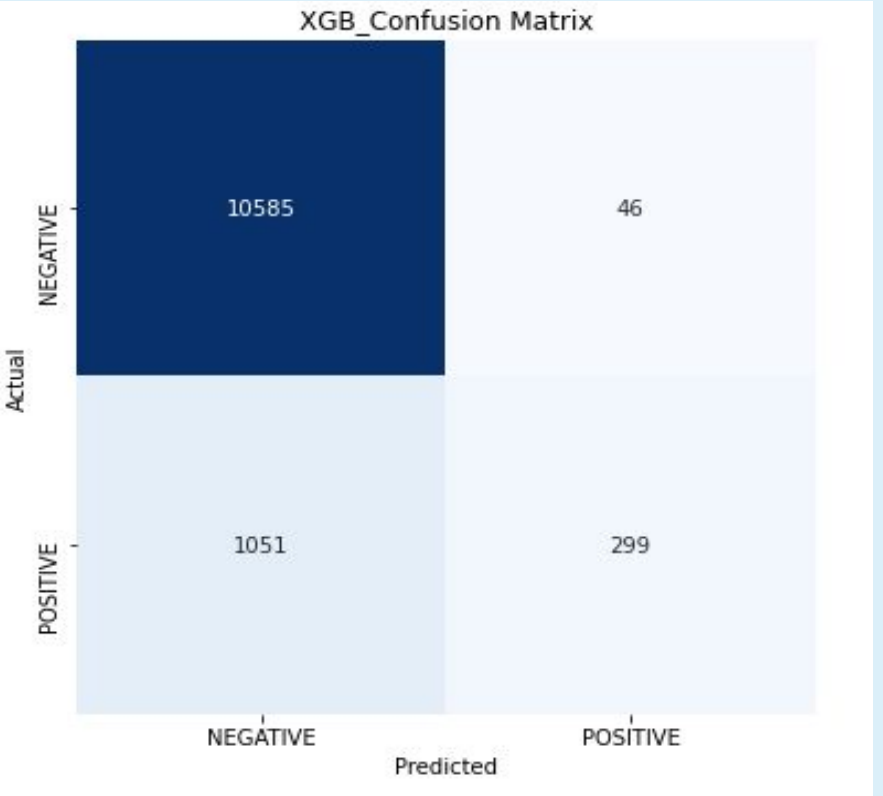
Data-Driven Recommendations:

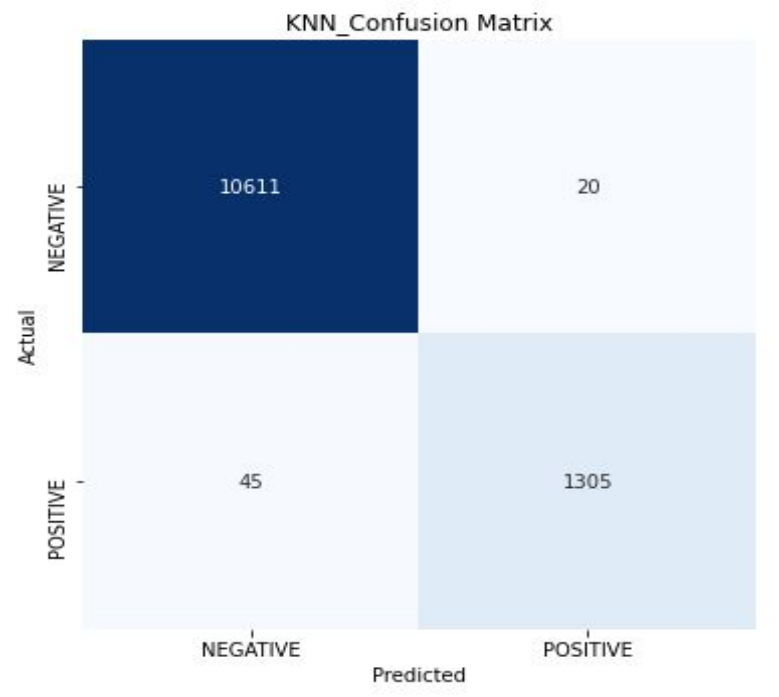
- Use the same marketing techniques as in the last campaign.
- Focus on promoting certain products.
- Have marketing campaigns to convert customers who shop online only to in-store purchases.
- People who spent an above average amount on certain products would have more in store purchases, so there should be focussed in store campaigns for them.



Machine Learning Models and Evaluations

	method	mean score	std score	precision score	f1 score
0	Logistic Regression	0.000000	0.000000	0.000000	0.000000
1	Decision Tree Classifier	0.956315	0.013380	0.968727	0.966209
2	KNN Classifier	0.972901	0.006715	0.984906	0.975701
3	Random Forest Classifier	0.982673	0.007802	0.986228	0.970267
0	Ada Boost Classifier	0.972921	0.008368	0.981777	0.969629
1	Gradient Boost Classifier	0.876815	0.026270	0.899749	0.410520
2	XGB Classifier	0.884991	0.020243	0.866667	0.410520





Comparison of different algorithms used in the machine learning models.

Best F1 score(97.57%) is of KNN Classifier model.

KNN_Classification Report:

	precision	recall	f1-score	support
NEGATIVE	1.00	1.00	1.00	10631
POSITIVE	0.98	0.97	0.98	1350
accuracy			0.99	11981
macro avg	0.99	0.98	0.99	11981
weighted avg	0.99	0.99	0.99	11981

XGB_Classification Report:

	precision	recall	f1-score	support
NEGATIVE	0.91	1.00	0.95	10631
POSITIVE	0.87	0.22	0.35	1350
accuracy			0.91	11981
macro avg	0.89	0.61	0.65	11981
weighted avg	0.90	0.91	0.88	11981

Adaptability of this model for other domains:

Banking - Mortgage approval predictions
Healthcare - Disease prediction
Real estate - Pricing predictions.

Future scope:

Sales forecasting
More customized campaigns for the customers.
Promotional event based campaigns.


Thank you