

Survey-Based Insights for Targeted Marketing using predictive analysis.

Executive Summary:

The purpose of this focused marketing study was to provide Land Rover useful information about the features and preferences of possible SUV purchasers. To collect useful data, the research made use of a thorough customer survey that included 30 important qualities and a purchase probability assessment. We looked for buyer purchasing behavioural patterns using rigorous data analysis approaches such as Principle component analysis (PCA), Linear Regression, Random Forest regression and Naïve Bayes. On the basis of their survey replies, potential purchasers were also identified using categorization models. With its exceptional predictive accuracy, the Random Forest model proved to be a useful tool for creating marketing campaigns that are precisely targeted. With the help of this study, Land Rover will have a strong foundation to maximize their advertising efforts and expand their market reach.

Problem Statement:

Land Rover aims to gain a deeper understanding of the lifestyle and preferences of potential SUV buyers to optimize their advertising campaigns. With a dataset comprising survey responses from 400 consumers across 30 attributes, the objective is to identify key factors influencing purchase intent. This involves exploring relationships between survey questions and purchase likelihood, as well as building regression models to predict purchase intent based on consumer attributes. The goal is to provide Land Rover with actionable insights that will inform targeted marketing strategies, improving campaign effectiveness and driving higher conversion rates.

Methodology:

Data Exploration and Preprocessing: The survey data was thoroughly explored to extract initial insights and identify any missing information. Missing values, if any, were addressed to ensure data integrity. Graphical representation can be seen in *Fig 1*.

Correlation Analysis: We observed a strong positive correlation between the "Attitude" towards purchasing a Land Rover Discovery and attributes like being a risk-taker, adventurous, and having confidence. This suggests that these characteristics may indicate a higher likelihood of purchase.

Linear Regression Model: After performing linear regression, we found that the model accounted for approximately 56% of the variance in the "Attitude" scores. The coefficients for different attributes provided insights into their impact on the likelihood of purchasing.

PCA Analysis: Principal Component Analysis (PCA) was conducted to reduce dimensionality. With 10 components, we explained approximately 83% of the variance in the data. This reduced set of components was then used to build a linear regression model.

Buyer Attribute: 23% of the people in the dataset were identified as possible buyers, while 77% were identified as not interested in buying. This information was very important for training and testing the models. The distribution between buyers and non-buyers can be seen in *Fig 2*.

Random Forest Regression: We employed a Random Forest regression model, which exhibited good predictive performance with a Mean Squared Error (MSE) of 2.86 and an R-squared score of 0.58.

Classification Models: Naive Bayes and Random Forest classification models were employed to predict potential buyers. The Random Forest model demonstrated superior performance, achieving an accuracy of 90% as shown in *Fig 3*.

Performance Metrics:

	Naïve Bayes	Random Forest
Precision	89%	89%
Recall	63%	63%
F1 Score	74%	74%
AUC	50%	80%

Confusion Matrices:

Naïve Bayes:

	Predicted Non-Buyer	Predicted Buyer
Non-Buyer	93	0
Buyer	27	0

Random Forest:

	Predicted Non-Buyer	Predicted Buyer
Non-Buyer	91	2
Buyer	10	17

Recommendations:

Based on the survey data that was given, the Random Forest model works the best at predicting people who might buy a Land Rover. This information can be very helpful when making targeted marketing plans to get the most out of advertising campaigns.

It is suggested that marketing efforts be directed at people who show traits strongly linked to purchase likelihood, like being Risk Taker, Adventurous, or Confident.

Conclusion:

"Lots of different kinds of data analysis were used to help Land Rover learn more about the people who might want to buy an SUV. Based on the answers, we used linear regression to look at the data and guess how likely it was that a person would actually go out and buy a Land Rover. Principal Component Analysis (PCA) also helped us make the data easier to understand without losing any important information. We used both the Naïve Bayes and the Random

Forest Regression model. The Random Forest Regression model was a little more accurate at making predictions.

We also looked at the demographics of the people who answered and found that 23% of them were very likely to buy. To guess who might buy the product, we used a number of classification algorithms, such as Naive Bayes and Random Forest. The Random Forest model did a good job; it was right 90% of the time. With these results, the client will be able to focus their marketing efforts more precisely, which will make their ads more effective."

Appendix:

Fig 1

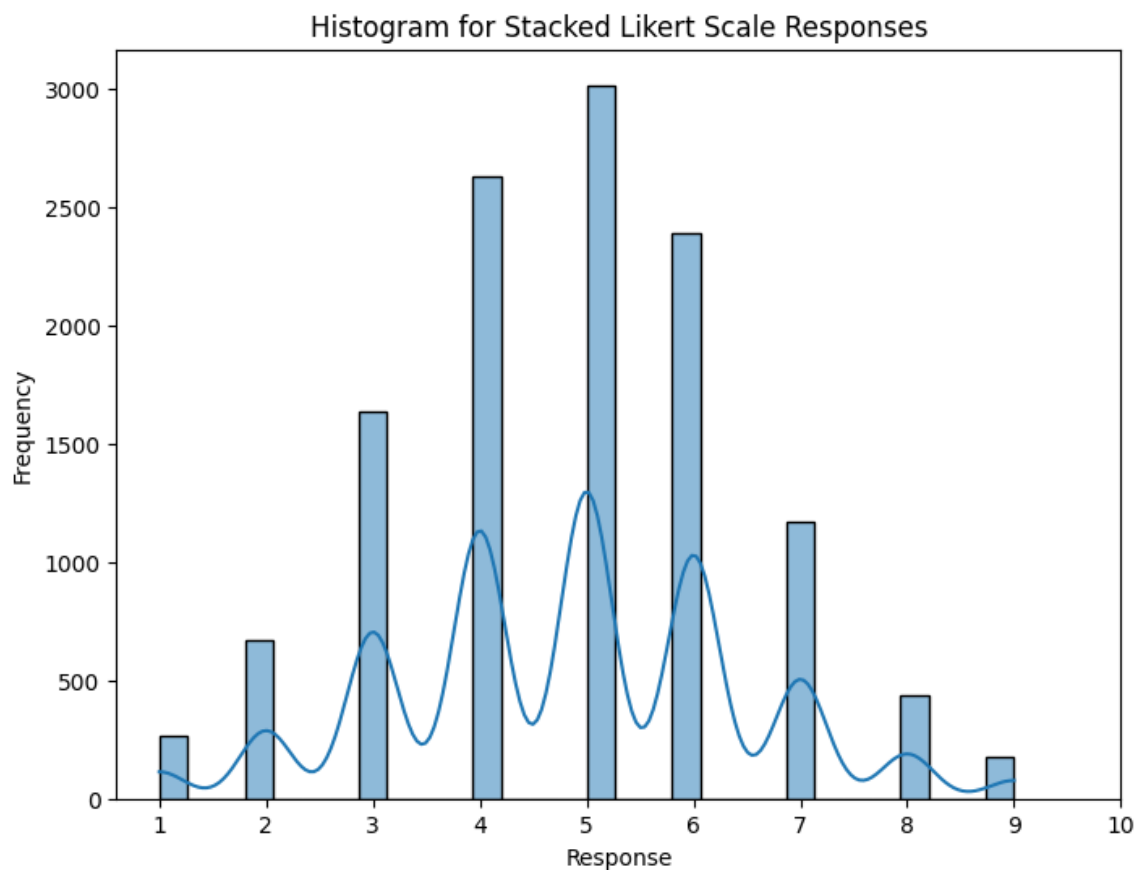


Fig 2

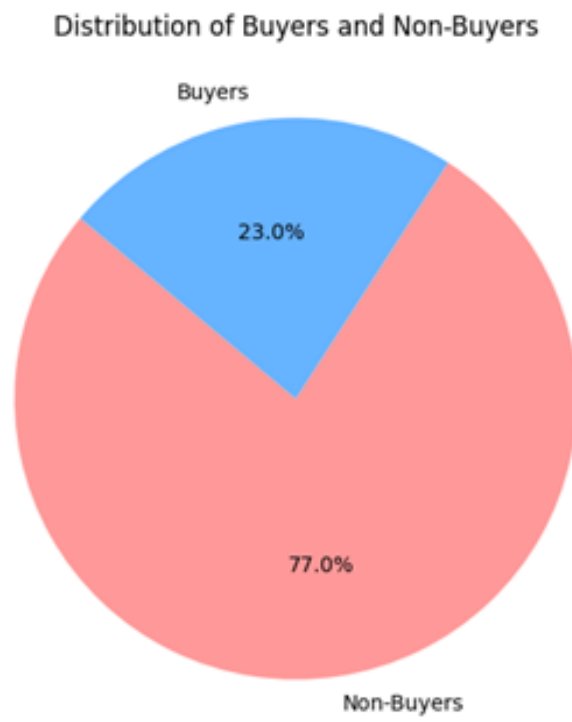


Fig 3

