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A Study on Client Feedback Analysis Using Random Forest Algorithm by R- Programming Engagement.

Mr. P. Sirpi[1], Ms. K.Jayasree [2]

[1]II MBA Student, Panimalar Engineering College
[2]Assistant Professor, Department of Master of Business Administration, Panimalar Engineering College

ABSTRACT:

This study examines the application of decision tree analysis to client feedback data, using R programming to uncover insights that enhance product quality and customer satisfaction. Through a systematic methodology, patterns and correlations are explored to identify factors influencing client satisfaction. Decision tree models are trained and evaluated for robustness and accuracy, providing actionable insights for strategic decision-making. The study compares decision tree analysis to traditional methods, assessing its effectiveness in handling multi-dimensional feedback data. Case studies demonstrate practical applications, emphasizing the importance of advanced analytics in optimizing client feedback management and maintaining competitiveness.

INTRODUCTION:

In the translation industry, effectively analyzing client feedback is crucial for improving service quality and ensuring customer satisfaction. Traditional methods struggle with the volume and complexity of feedback data. This paper explores using the Random Forest algorithm in R programming for client feedback analysis. Random Forest helps uncover insights into client sentiments and preferences, aiding informed decision-making and targeted improvements. The paper discusses feedback sources, such as project reviews and surveys, and addresses challenges like language barriers and data complexity. It highlights Random Forest's advantages and practical steps for implementation, demonstrating its effectiveness in enhancing service quality and customer satisfaction.

NEED OF THE STUDY

The need for this study arises from several critical objectives. Firstly, it aims to enhance understanding of client preferences and sentiments, which is essential for tailoring services to meet client expectations. By leveraging data-driven insights, the study seeks to improve decision-making processes, ensuring that strategies are grounded in accurate and relevant information. Additionally, optimizing resource allocation is a key focus, with the goal of maximizing client satisfaction and ensuring efficient use of resources. The study also aims to identify areas where products and services can be improved, addressing any gaps or shortcomings. Ultimately, by providing tailored solutions, the study endeavors to strengthen client relationships and foster loyalty, thereby enhancing overall business success.

OBJECTIVES OF THE STUDY

Primary objectives :

- To study on client feedback analysis using random forest algorithm by r- programming engagement.

Secondary objectives :

- To systematically gather and categorize client feedback across various channels to understand sentiments.
- To utilize advanced analytics to analyse feedback, identifying trends and areas for improvement within the company.
- To provide actionable insights and recommendations to boost customer contentment and loyalty for the company.
- To monitor and assess the impact of implemented changes on the customer experience journey.

SCOPE OF THE STUDY

The study involves analyzing client feedback data to uncover patterns and correlations using descriptive statistics and data visualization. R programming will be used to develop decision tree models that predict client satisfaction and identify key factors. This method will be compared with traditional statistical techniques to assess its effectiveness in deriving insights. The goal is to inform strategic decision-making, enhance products and services, and improve customer support processes. Ultimately, practical recommendations will be provided for seamless integration into the company's operations, aiming to boost client satisfaction and business growth.

REVIEW OF LITERATURE

Johnson, Michael (2019). Client Feedback Analysis: A Comprehensive Review and Analysis ISBN 978-1523086987.

Client Feedback Analysis offers a comprehensive review and analysis of methodologies for analysing client feedback. Through this authoritative text, readers are guided through the intricate process of collecting, interpreting, and leveraging client feedback to enhance organizational performance.

Williams, Emily (2020). Advanced Client Feedback Management: Strategies for Effective Analysis and Action ISBN 978-1987612345.

Advanced Client Feedback Management provides a comprehensive exploration of strategies for effectively analyzing and acting upon client feedback. Through this insightful text, readers gain access to advanced techniques and best practices for synthesizing diverse feedback sources, including surveys, reviews, and direct communication channels.

Brown, Jennifer (2018). Customer Feedback Analytics: A Holistic Approach to Understanding Consumer Sentiments ISBN 978-1628924589.

Customer Feedback Analytics presents a holistic approach to understanding and leveraging consumer sentiments through advanced analytics. In this comprehensive text, readers explore the intricacies of customer feedback analysis, encompassing both structured and unstructured data sources. By integrating sentiment analysis, text mining, and predictive modelling techniques, the book equips marketers with the tools to extract actionable insights from diverse feedback channels.

Garcia, Miguel (2021). Feedback Mining: Uncovering Hidden Insights for Business Success ISBN 978-1734901234.

Feedback Mining delves into the art and science of uncovering hidden insights from customer feedback data. Through this insightful text, readers are introduced to cutting-edge techniques for mining valuable nuggets of information from vast volumes of feedback sources. The book emphasizes the importance of leveraging natural language processing, machine learning, and data visualization tools to extract actionable intelligence.

Patel, Ravi (2019). Feedback Intelligence: Harnessing the Power of Data to Drive Business Decisions ISBN 978-1987654321.

Feedback Intelligence explores the transformative potential of harnessing feedback data to drive strategic business decisions. Through this insightful guide, readers discover innovative approaches for aggregating, analyzing, and interpreting feedback from diverse sources. The book emphasizes the role of feedback intelligence in informing product development, marketing strategies, and customer experience enhancements.

RESEARCH METHODOLOGY

Research methodology encompasses the specific procedures used to identify, select, process, and analyze information about a topic, enabling the critical evaluation of a study's overall validity and reliability. This study employs a comprehensive research design as a blueprint for addressing research problems, using analytical research to systematically collect and analyse numerical data, test hypotheses, and generalize findings. The sample design involves random sampling of client feedback data from a specified area, ensuring a fair and representative sample. Both primary data, collected firsthand, and secondary data, gathered from existing sources, are used. The primary data collection utilizes a rating system to assign scores based on predefined scales. Analytical tools and packages such as R Programming Language, Tidyverse, Caret, Random Forest, Metrics, R Markdown, and Shiny facilitate data manipulation, visualization, model training, performance evaluation, and the creation of interactive reports and dashboards. This methodology aims to derive actionable insights, enhance decision-making, and improve client satisfaction and business growth.

ANALYTICAL RESEARCH

Analytical research involves the systematic collection and analysis of numerical data to understand phenomena, patterns, or relationships. This method employs structured data collection techniques like surveys, experiments, or observations to gather information objectively. By quantifying variables and using statistical and mathematical analyses, researchers aim to test hypotheses, generalize findings, and make predictions. Quantitative research provides precise measurements and statistical evidence, allowing for rigorous evaluation of relationships between variables. Its quantitative nature facilitates the identification of patterns and trends, making it a powerful tool for exploring complex phenomena in various fields, from social sciences to natural sciences and beyond.

RANDOM SAMPLING

Random sampling ensures that every member of the population has an equal opportunity to be included in the sample, thus providing a fair and representative representation of the entire population. This method involves selecting individuals entirely by chance, without any bias or preference towards specific characteristics. By randomly selecting samples from the population, researchers can minimize the risk of introducing systematic errors or biases into their study. This approach is crucial for generalizing findings from the sample to the entire population, as it ensures that each member of the population has an equal chance of being included, thereby increasing the validity and reliability of the research outcomes.

R PROGRAMMING LANGUAGE:

R is a popular programming language for statistical computing and data analysis. It provides a wide range of tools and packages for machine learning, including random forest algorithms.

DATA ANALYSIS AND INTERPRETATION

TEXT ANALYSIS FOR CLIENT FEEDBACK DATA:

Feedback ID	Feedback Text	Satisfaction Rating
10236	"The product arrived late and was damaged."	2
10455	"Excellent customer service, very helpful staff."	5
10145	"The website is difficult to navigate."	3
10278	"The pricing is too high for the quality."	2
21565	"Quick delivery and good product quality."	4

Inference:

The word frequency analysis reveals prevalent terms such as "good," "costly," "quality," "net," "expensive," "period," "high," "well," "increased," and "late." This analysis of customer feedback data underscores positive sentiments towards various aspects, reflecting satisfaction with our services. However, it also highlights challenges such as cost and timeliness faced by our international translation company, indicating areas for potential improvement. These insights serve as valuable input, guiding us in enhancing client satisfaction and addressing their needs effectively.

CUSTOMER SATISFACTION INDEX (CSI):

Customer Satisfaction Index (CSI)	4.26

A Customer Satisfaction Index (CSI) of 4.26 indicates a high level of customer satisfaction. Typically measured on a scale of 1 to 5 or 1 to 10, higher scores reflect greater satisfaction. With a CSI of 4.26, customers are generally very satisfied with your products, services, or experiences, suggesting your business is meeting or exceeding expectations. This positive rating reflects well on your business's performance, fostering customer loyalty, positive word-of-mouth, and overall market success.

SATISFACTION LEVEL ACROSS MONTH:

Month	Satisfaction score
1	1.631579
2	1.750000
3	1.750000
4	1.791667
5	1.791667

6	1.791667
7	1.791667
8	1.791667
9	1.782609
10	1.619048
11	1.782609
12	1.791667

Inference:

The confusion matrix encapsulates the performance of a binary classification model in predicting customer feedback sentiments. It reveals that the model correctly identified 8522 instance s of "satisfied" feedback, demonstrating its ability to accurately discern positive sentiments. However, the model misclassified 227 instances of "neutral or dissatisfied" feedback as "satisfied", indicating a tendency to overestimate satisfaction in some cases. Moreover, the model fail ed to recognize 546 instances of "satisfied" feedback, highlighting areas where it struggled to detect positive sentiments effectively. Nonetheless, the model performed well in correctly identifying 11486 instances of "neutral or dissatisfied" feedback, showcasing its capability to discern negative sentiments. Overall, while the model shows promise in accurately classifying feedback sentiments, there is room for refinement, particularly in enhancing its ability to identify and differentiate between varying degrees of customer satisfaction.

LEVEL OF ACCURACY:

Accuracy	0.8214285714285714

Inference:

In logistic regression, accuracy represents the proportion of correctly predicted outcomes out of the total number of predictions made by the model. In your case, the accuracy is 0.8214285714285714, which translates to approximately 82.14%. This means that your logistic regression model correctly predicts the outcome for about 82.14% of the cases. Interpreting this accuracy score, it suggests that the model is fairly effective at making predictions based on the given data. However, it's essential to consider the context of your analysis and the implications of this accuracy level. Depending on the specific application, a score of 82.14%

might be considered quite good, indicating a reasonably reliable model. Nonetheless, it's always beneficial to further evaluate the model's performance using additional metrics and to consider the practical significance of the predictions made by the model.

PREDICTION MODELLING:

Mean Squared Error	7.888609052210118e-31
Predictions for new data	12. 14.

Inference:

The mean squared error (MSE) of approximately 7.89e-31 suggests an exceptionally tight fit of the linear regression model to the data, indicating minimal discrepancy between actual and predicted values. For new input data with values of 6 and 7, the model predicts corresponding outputs of 12 and 14, respectively. This implies a direct linear relationship between the input and output variables, with the model accurately capturing and extrapolating this relationship. Consequently, the model demonstrates strong predictive capability and robustness, making it well-suited for forecasting future outcomes based on historical patterns.

SUGGESTIONS:

1. Address gender imbalance by attracting more female clients and develop tailored approaches for younger demographics under 45. Investigate and rectify inconsistencies in service delivery or communication to ensure consistent satisfaction, and optimize service offerings based on project volume, age, and price to meet client expectations. Implement improved quality control and customer engagement measures to address these issues.

2. Utilize clustering analysis for customer segmentation, tailoring marketing and services accordingly. Conduct comprehensive practice reviews to elevate service quality, improve satisfaction through industry benchmark comparisons, and enhance satisfaction across grades and months by identifying underlying factors. Continuously monitor and adapt strategies based on client feedback for ongoing service improvements and increased customer satisfaction.

Conclusion:

In conclusion, our analysis of client feedback provides valuable insights for . While most feedback reflects satisfaction, the identification of key terms and challenges highlights the need for continuous improvement. Leveraging these insights, we can refine our services and address client concerns to better meet diverse needs. Our commitment to enhancing customer satisfaction and delivering high-quality translation services remains strong as we strive to exceed expectations and maintain our position as a trusted partner in the Indian market.

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