



# Insurance Cold Calling Optimization Using Random Forest Regression Compared With Decision Tree Regression For Improved Accuracy

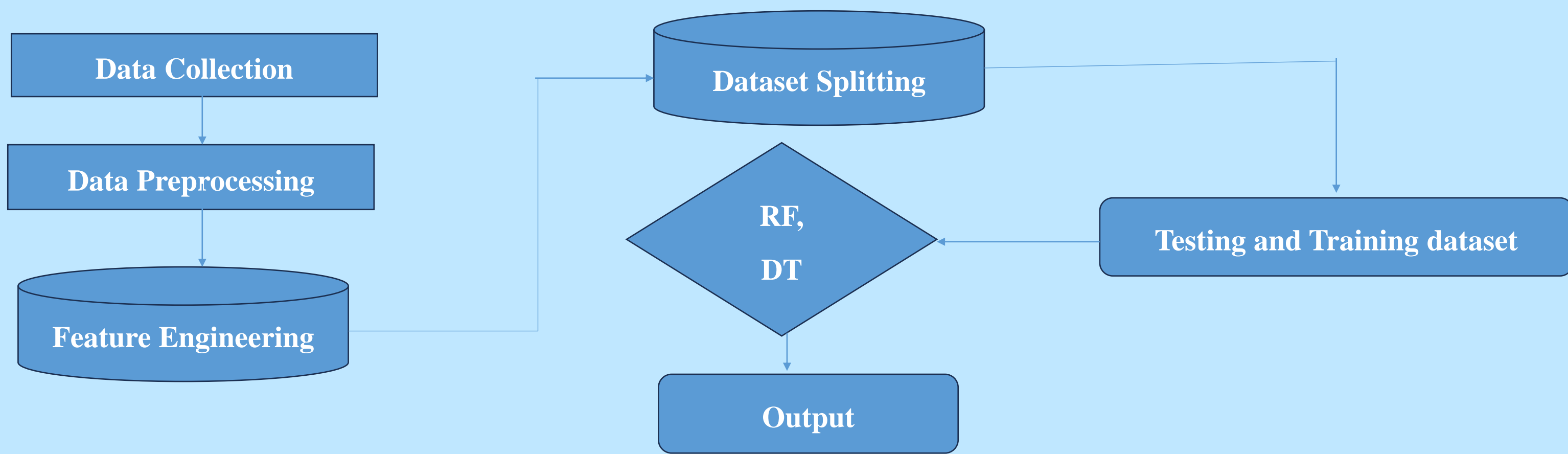
## INTRODUCTION

- The primary aim of this research is to optimize the cold-calling process for insurance companies, focusing on improving efficiency, reducing resource consumption, and enhancing overall productivity. By refining cold-calling strategies, insurance companies can more effectively attract new customers and maximize profits
- To identify factors like call timing, audience demographics, and communication skills that affect cold-calling success and to evaluate the effectiveness of various machine learning techniques, such as Random Forest Regression and Decision tree regression, in streamlining marketing and sales initiatives for insurance companies
- Use machine learning algorithms, such as Random Forest Regression and Decision tree regression, to analyze and optimize cold-calling strategies
- Enhanced sales outcomes for insurance companies, with higher conversion rates and increased customer satisfaction, resulting from more targeted and data-driven cold-calling methods



Fig 1. Important metrics for Cold Calling

## MATERIALS AND METHODS



Process of evaluating and optimizing Insurance Cold Calls

- The Data was collected from Kaggle.
- The data has been preprocessed and performed various techniques like Data cleaning
- The data has been split into two different datasets (i.e. Training set – 75% and Testing set – 25%)
- Then, performed model evaluation and model validation using Random Forest regression and Decision Tree regression

## RESULTS

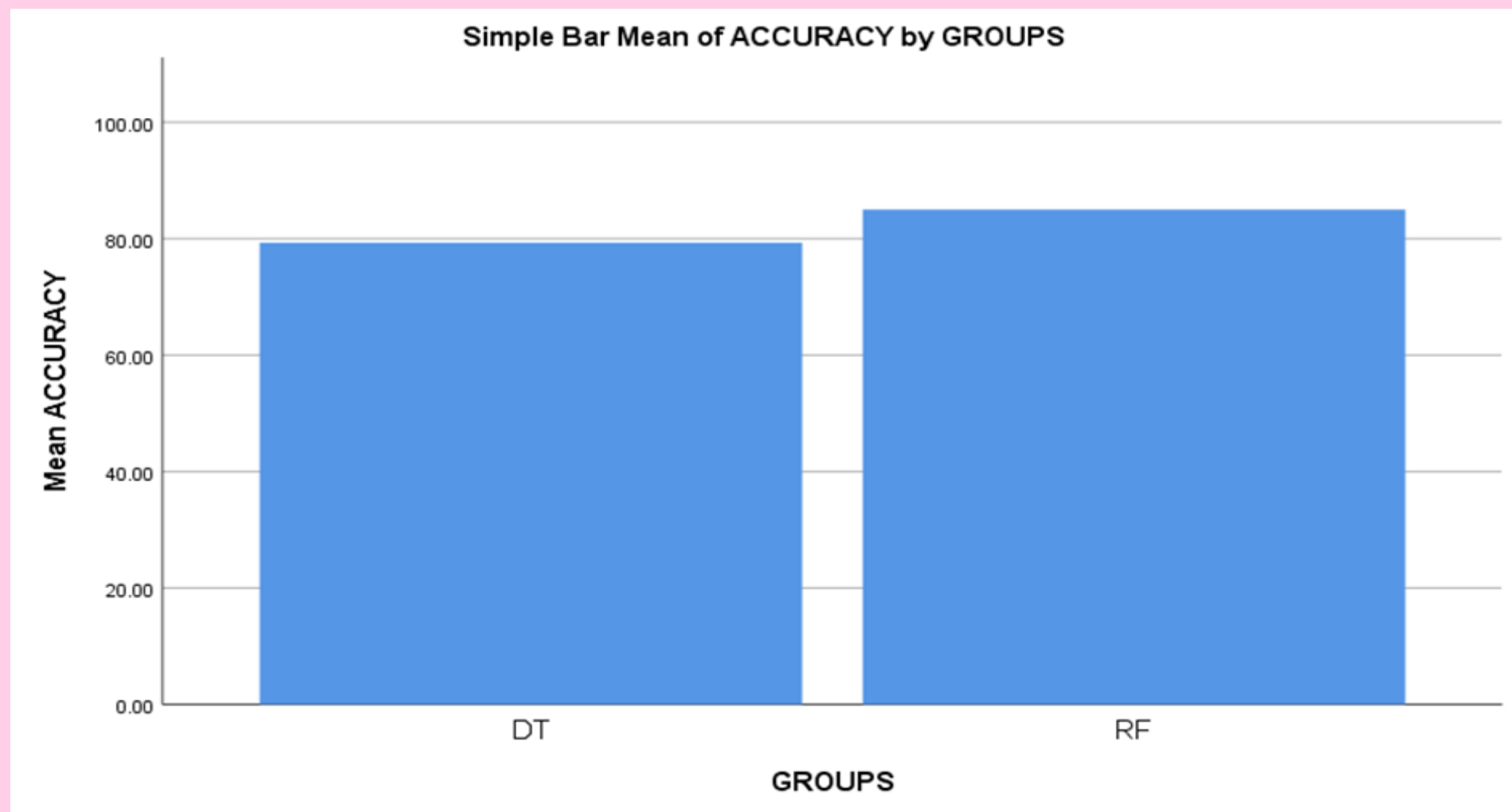


Fig 2. The Mean Accuracy Graph

Table 1. The Mean Accuracy of the Random Forest Regression algorithm and the Decision Tree Regression

	Group	N	mean	Std. Deviation	Std Error mean
Accuracy	Random Forest Regression	10	85.4000	3.74166	1.18322
	Decision Tree Regression	10	77.2000	2.98329	0.94340

- The figure shows the mean accuracy of the Random forest regression which is greater than the Decision Trees algorithm. X axis is Random forest regression vs Decision Trees, Y axis is Mean Accuracy. Error bar is +/-2 SD

## DISCUSSION AND CONCLUSION

- Random Forest Regression outperformed Decision Tree Regression in predicting insurance cold-call outcomes, achieving an average accuracy of 85.4% compared to 77.2%.
- Statistical analysis revealed higher standard deviation and mean standard error for Random Forest Regression compared to Decision Tree Regression, indicating greater variability in predictions.
- Independent variable analysis showed a significant difference in accuracy rates between Random Forest Regression and Decision Tree Regression, with a mean difference of 8.2%.
- The study suggests potential for insurance firms to enhance customer acquisition and profitability through optimized cold-calling techniques and data-driven insights.
- Random Forest Regression's alignment with the procedural nature of cold calling enhances its effectiveness, while Decision Tree Regression's interpretability may be advantageous in certain scenarios.

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