**Project Report: Logistic Regression for Classification**

**Introduction**

This report documents the end-to-end process of implementing logistic regression for a classification problem. The dataset used in this project contains information such as age, job, marital status, education, and various other attributes. The objective is to predict whether a client subscribes to a service, indicated by the 'y' column.

**Methodology**

**1. Data Preprocessing:**

Imported necessary packages for data analysis.

Loaded the dataset using a comma separator.

Converted object data types to integers using label encoding.

Checked for null values in the dataset.

**2. Logistic Regression Model:**

Defined the logistic regression model with 'y' as the dependent variable and the remaining columns as independent variables.

Split the data into training and testing sets.

Trained the logistic regression model and assessed its accuracy.

**3. Scaling Techniques:**

Applied scaling techniques to improve the model accuracy.

Explored the impact of different scaling methods on model performance.

**4. Hyperparameter Tuning:**

Conducted a loop to find the random state yielding the maximum accuracy.

Iterated over 1000 random state values and identified the best-performing model.

**Conclusion**

In conclusion, the logistic regression model demonstrated promising results for the classification task. The initial accuracy of 88.94% was improved to 89.14% through the application of scaling techniques. The exploration of different random state values further revealed the optimal configuration for achieving the highest accuracy.

This project underscores the importance of data preprocessing, model training, and iterative optimization to enhance the predictive performance of logistic regression models in a classification context.