**Project Documentation: Predictive Analysis of iPhone Purchases**

**Introduction**

This project aims to analyze a dataset containing information about individuals, including their gender, age, salary, and iPhone purchase behaviour. The goal is to build a predictive model to understand the factors influencing iPhone purchases and present the insights through both Jupyter Notebook analysis and Tableau visualization.

**Jupyter Notebook Analysis**

**Data Import and Preprocessing:**

In the Jupyter Notebook, the basic necessary packages, including Pandas, NumPy, Seaborn, and Matplotlib, were imported. The dataset, consisting of 400 rows and 4 columns (Gender, Age, Salary, Purchase\_iPhone), was loaded and copied for analysis. During preprocessing, the 'Gender' column was converted to a numerical format using one-hot encoding to prepare it for the analysis.

**Exploratory Data Analysis (EDA):**

The initial data exploration involved checking for null values (none found) and understanding the correlation between variables using a heatmap. Notably, the 'Purchase\_iPhone' variable exhibited a higher correlation with age compared to other variables.

**Outlier Detection and Imputation:**

Box plots were employed to identify outliers in the distribution of iPhone purchases by age and salary. Outliers were imputed to ensure the robustness of the analysis. The resulting box plots were visualized to observe the impact of imputation.

**Model Planning and Execution:**

The analysis involved designing a predictive model using the K-Nearest Neighbours (KNN) algorithm. The appropriate value of k was determined using an error plot, and the dataset was split into training and testing sets. The model achieved an accuracy of 88.75% on the test set. A confusion matrix was plotted to evaluate the model's performance.

**Tableau Visualization**

**Dashboard Overview:**

A Tableau report was created to visualize key aspects of the dataset. The dashboard included KPIs displaying the number and percentage of iPhone purchases based on gender. Bar charts illustrated iPhone purchases based on salary and age, with gender differentiation through color coding. A filter was implemented to allow users to explore the data based on gender.

**Summary of Tableau Report:**

The Tableau report revealed that 35.75% of individuals in the dataset purchased iPhones. Notably, individuals earning 1 Lakh or more tended to be iPhone buyers. Age-wise analysis indicated that individuals aged 40 and above were more likely to make iPhone purchases.

**Conclusion**

In summary, the analysis revealed key insights into iPhone purchase behaviour. Age emerged as a significant factor, showcasing a correlation with purchases. Outlier handling enhanced data reliability. The K-Nearest Neighbours (KNN) model achieved an 88.75% accuracy in predicting purchases. Tableau visualizations highlighted a 35.75% purchase rate, with notable trends among higher earners and individuals aged 40 and above. This analysis provides actionable insights for strategic decision-making in marketing and product development.