CUSTOMER CHURN ANALYSIS (Exploratory Data Analysis)
FINDINGS AND RECOMMENDATIONS

- **Objective**: The analysis primarily investigates factors influencing customer churn, particularly focusing on payment methods and contract types.
- **Key Insights**:
    1. **Contract Type**: Customers on month to month contracts show a higher tendency to churn compared to those on yearly or bi-annual contracts.
    Implication: This suggests that long term contracts may improve customer retention.
    2. **Payment Methods**: A significant proportion of customers using electronic checks are likely to churn compared to those using other payment methods (credit cards, bank transfers etc). This could be due to convenience or trust issues associated with electronic check payments.
    Implication: The convenience, security and trust issues related to electronic payments might be contributing factors. Encouraging customers to switch to more stable payment methods could reduce churn.
- **Churn Rate by tenure**:
    1. Customers with shorter tenure (less than one year) are more likely to churn, with a 50% churn rate. Those with 1-3 years of tenure show a decreasing churn trend at 35%, while customers who have been with the company for more than three years have a churn rate of just 15%.
    2. **Implication**: Engaging customers early in their journey, especially within the first year, is critical for retention.
- **Churn by Internet Service Type**:
    1. Customers using Fiber Optic services show a higher churn rate of 30% compared to DSL customers with a churn rate of 20%.
    2. **Implication**: This could be due to increased competition or dissatisfaction with service quality. Understanding customer satisfaction with service speed and reliability may help retain fiber optic users.
- **Senior Citizens and Churn**:
    1. The analysis reveals that senior citizens have a churn rate of around 41% compared to a 26% churn rate among non senior citizens.
    2. **Implication**: Special retention programs and targeted customer service for senior customers may help reduce churn in this demographic.
- **Visualizations**: The visualizations, including bar plots and pie charts, highlight the disparity in churn rates by different contract types and payment methods. They also show trends over customer tenure, supporting the need for personalized retention strategies.
- **Recommendations**:
    1. **Promote Long-Term Contracts**: Offer incentives for customers to commit to longer contracts to reduce churn.
    2. **Address Payment Methods Concerns**: Implement campaigns encouraging customers to switch from electronic checks to more retable payments methods.

3. **Customer Engagement in Early Tenure**: Focus on improving the customer experience within the first year, as churn is highest in this period.
4. **Special Senior Citizen Retention Programs**: Create personalised offers or assistance programs to retain the senior demographic.

PREDICTION OF CUSTOMER CHURN

Algorithms used in the prediction are Logistic Regression, Support Vector Classifier, Decision Tree Classifier and K-Nearest Neighbors(KNN).

- Based on the evaluation metrics provided, the Logistic Regression and Support Vector Classifier models outperform the K-Nearest Neighbors(KNN) model for predicting customer churn.
- Both Logistic Regression and Support Vector Classifier(SVC) show high accuracy score of approximately 80%.
- However, considering precision, recall, and F1 score ,Support Vector Classifier demonstrates slightly better performance.
- Therefore, the Support Vector Classifier(svc) emerges as best-performing model among the models used for our dataset.