**Customer Churn Analysis Report**

**Introduction**

* Customer churn refers to customers discontinuing service.
* Analyzing churn helps reduce revenue loss and improve retention.
* **Objective:** Analyze telecom data, predict churn, and recommend actions.

**Dataset Overview**

* Dataset: tcom.csv – customer and service usage data.
* Includes: ~7,000 customers, 20+ features, covering recent 12-month period.
* **Key Variables:** Customer ID, Churn, Tenure, Contract Type, Monthly/Total Charges.

**Exploratory Data Analysis**

* Used .head(), .describe(), and visualizations to understand data.
* Identified churn distribution imbalance.
* Boxplots revealed numeric outliers.

**Data Preparation**

* Handled missing values and outliers using IQR method.
* Encoded categorical variables appropriately.
* Standardized features using StandardScaler.

**Correlation Analysis**

* Generated a correlation heatmap to find relationships between variables.
* Tenure and Contract Type negatively correlated with churn.
* Monthly Charges had a positive correlation with churn likelihood.

**Machine Learning Model**

* Used RandomForestClassifier for churn prediction.
* Applied 80-20 train-test split.
* Identified important features contributing to churn.

**Model Evaluation**

* Evaluation metrics: Accuracy, Precision, Recall, F1-score.
* Used a confusion matrix to visualize model performance.
* Model demonstrated strong predictive power.

**Key Findings & Insights**

* Customers with short tenure and high charges are more likely to churn.
* Month-to-month contract customers show highest churn rates.
* Customer support experience directly impacts churn risk.

**Final Recommendations**

* Proactively target high-risk customers with rewards and personalized offers.
* Improve support services and complaint resolution processes.
* Encourage long-term contracts through discounts and loyalty benefits.
* Optimize onboarding and user experience.
* Retrain churn model periodically with new data.
* Integrate churn analytics into business strategy and CRM systems.

**Conclusion**

* Identified key churn drivers through detailed analysis and modeling.
* Random Forest model delivered high accuracy and valuable insights.
* Findings support actionable strategies to reduce churn and improve retention.
* Continuous monitoring will help sustain customer loyalty and business growth.