Telco Customer Churn Analysis

Insights, Strategies, and Predictive Modeling

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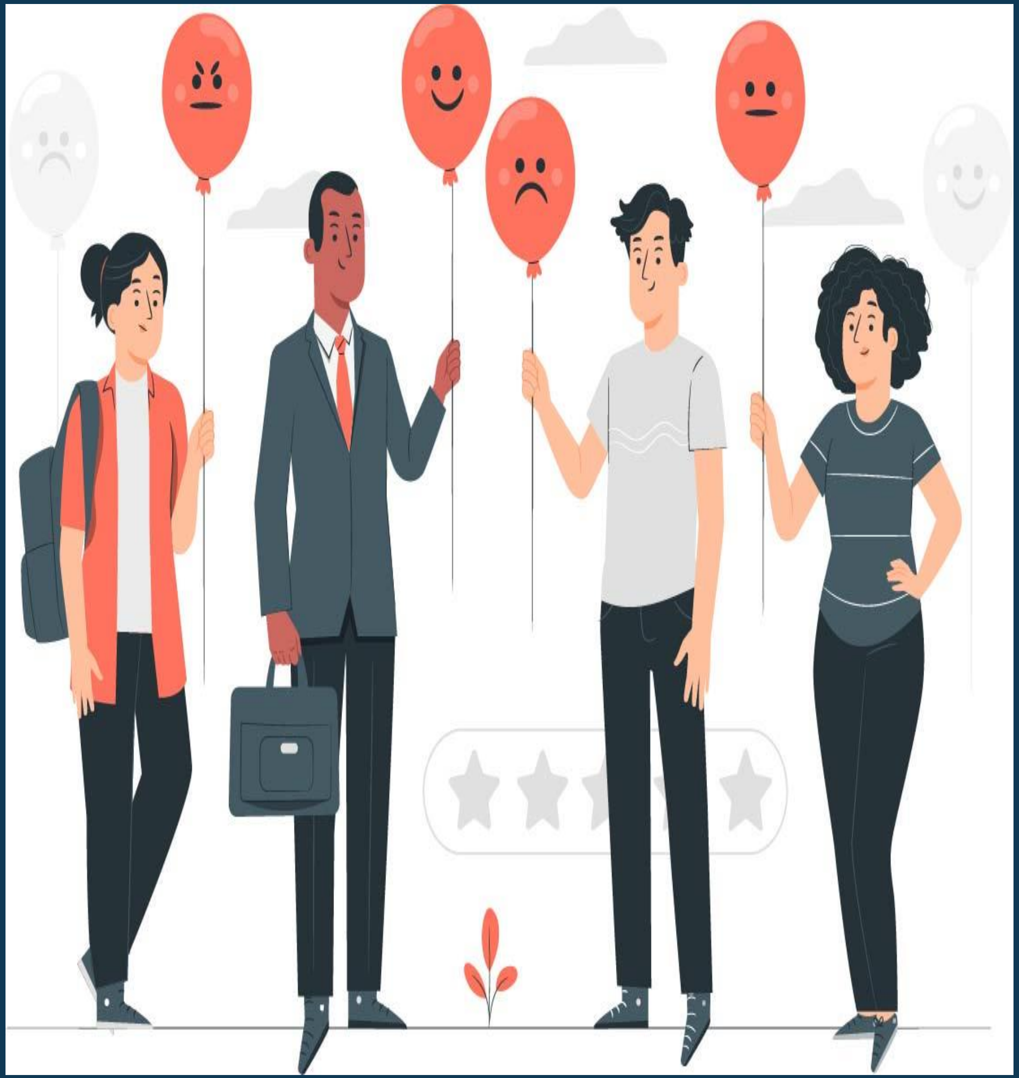
Agenda

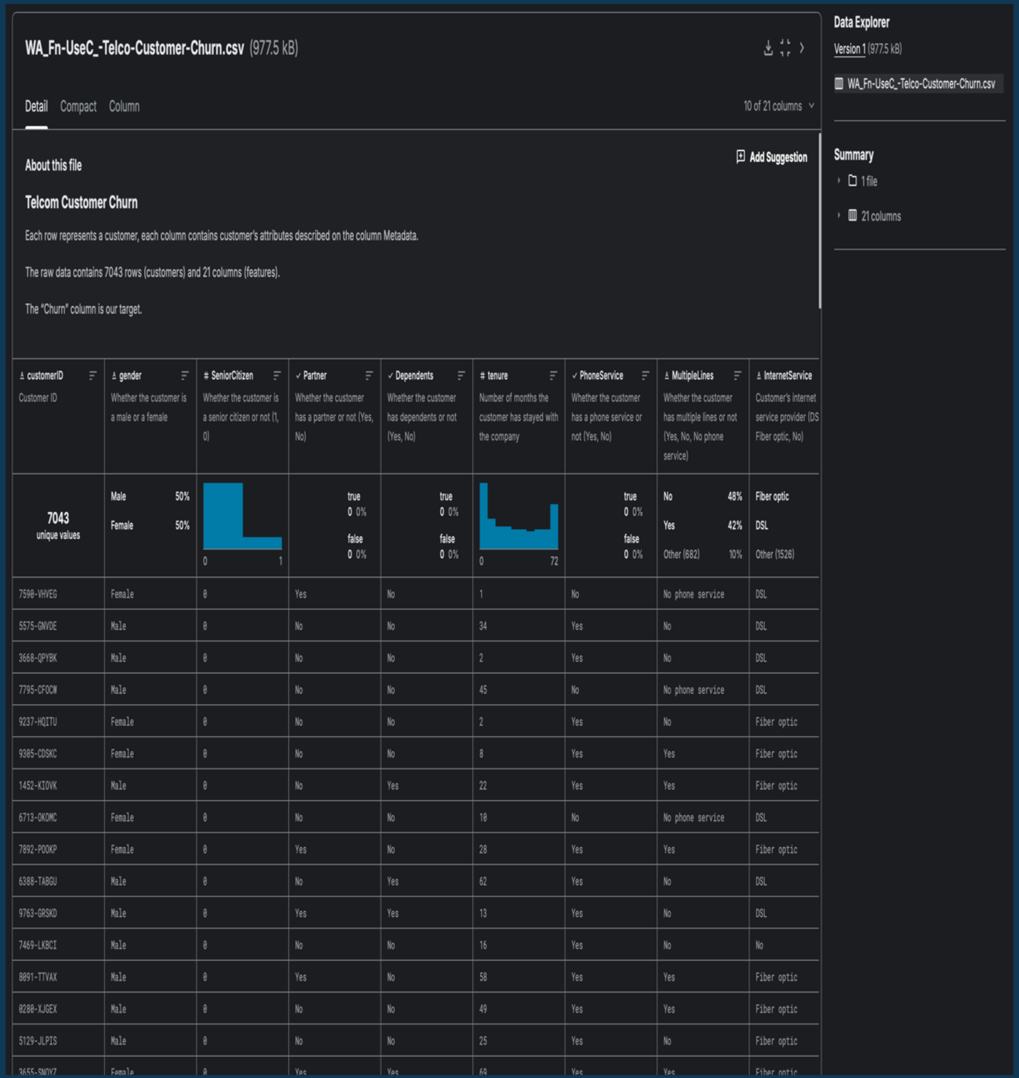
- **Introduction and Business Problem**: Overview of customer churn and its impact on telecom companies.
- **Dataset and Methodology:** Summary of the dataset, preprocessing steps, and modeling approach.
- **Exploratory Insights:** Key trends and visualizations discovered during the analysis.
- **Retention Strategies:** Actionable recommendations to reduce churn and improve retention.
- **Conclusion and Future Directions:** Summary of findings, ethical considerations, and next steps.

Introduction and Business Problem



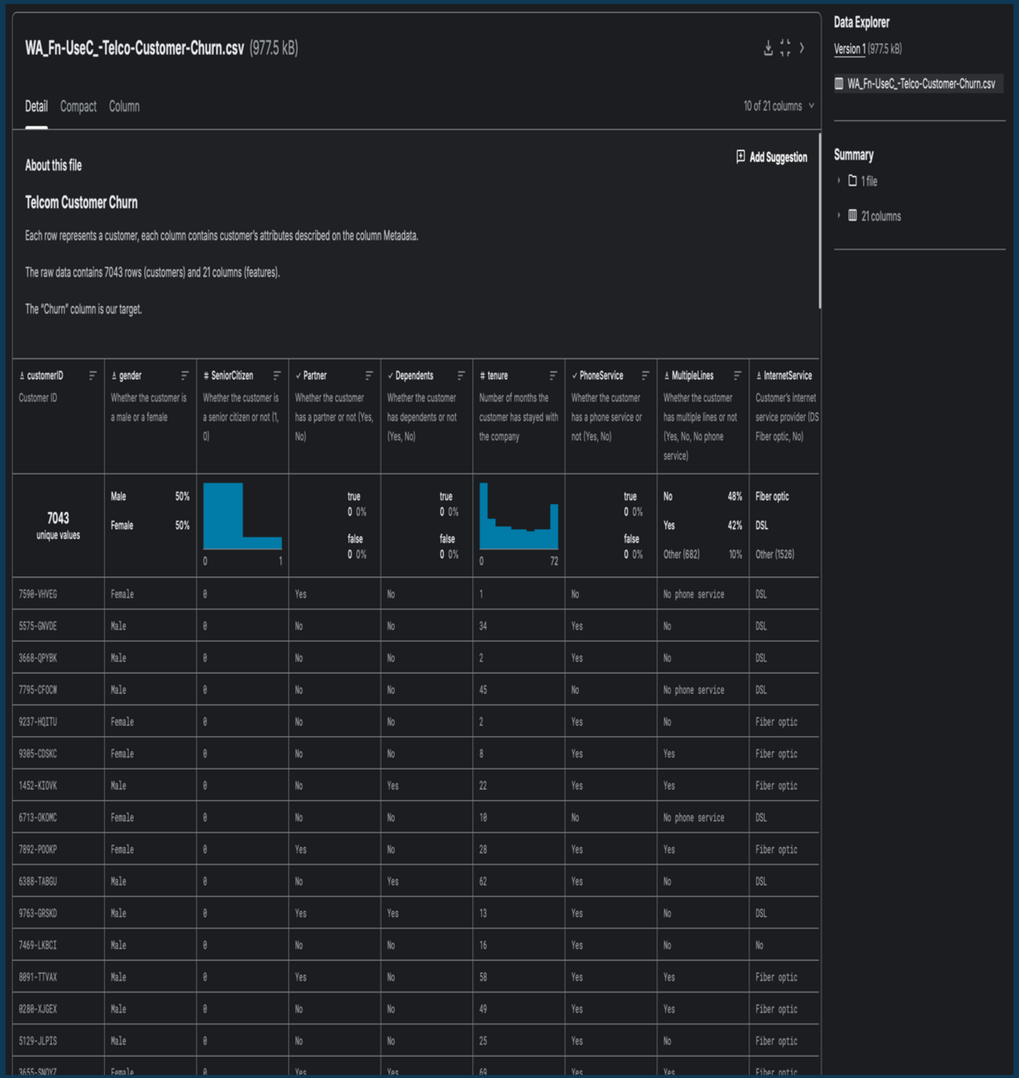
- **Customer churn** is a critical issue for telecom companies, leading to revenue losses and higher customer acquisition costs.
- Retaining existing customers is more cost-effective than acquiring new ones, making churn reduction a strategic priority.
- This presentation explores the factors driving churn and provides actionable insights to improve customer retention.

Dataset Overview



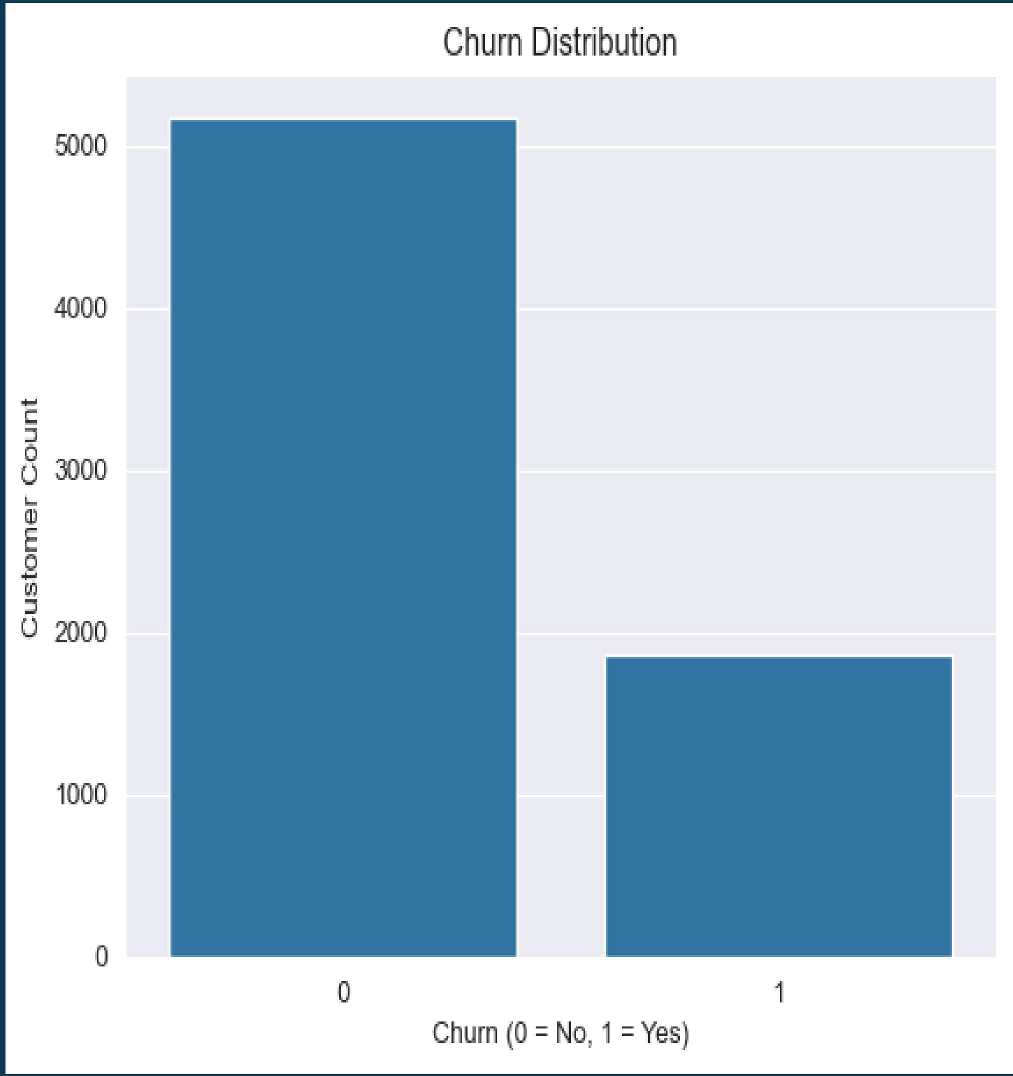
- ➢ **Source: [Kaggle - Telco Customer Churn Dataset]**
- ➢ 7,043 records with 21 features, including:
  - ❖ Customer demographics (e.g., senior citizen, gender).
  - ❖ Service details (e.g., internet service type, contract type).
  - ❖ Billing information (e.g., monthly and total charges).
- ➢ Target: Churn (Yes/No)

Methodology



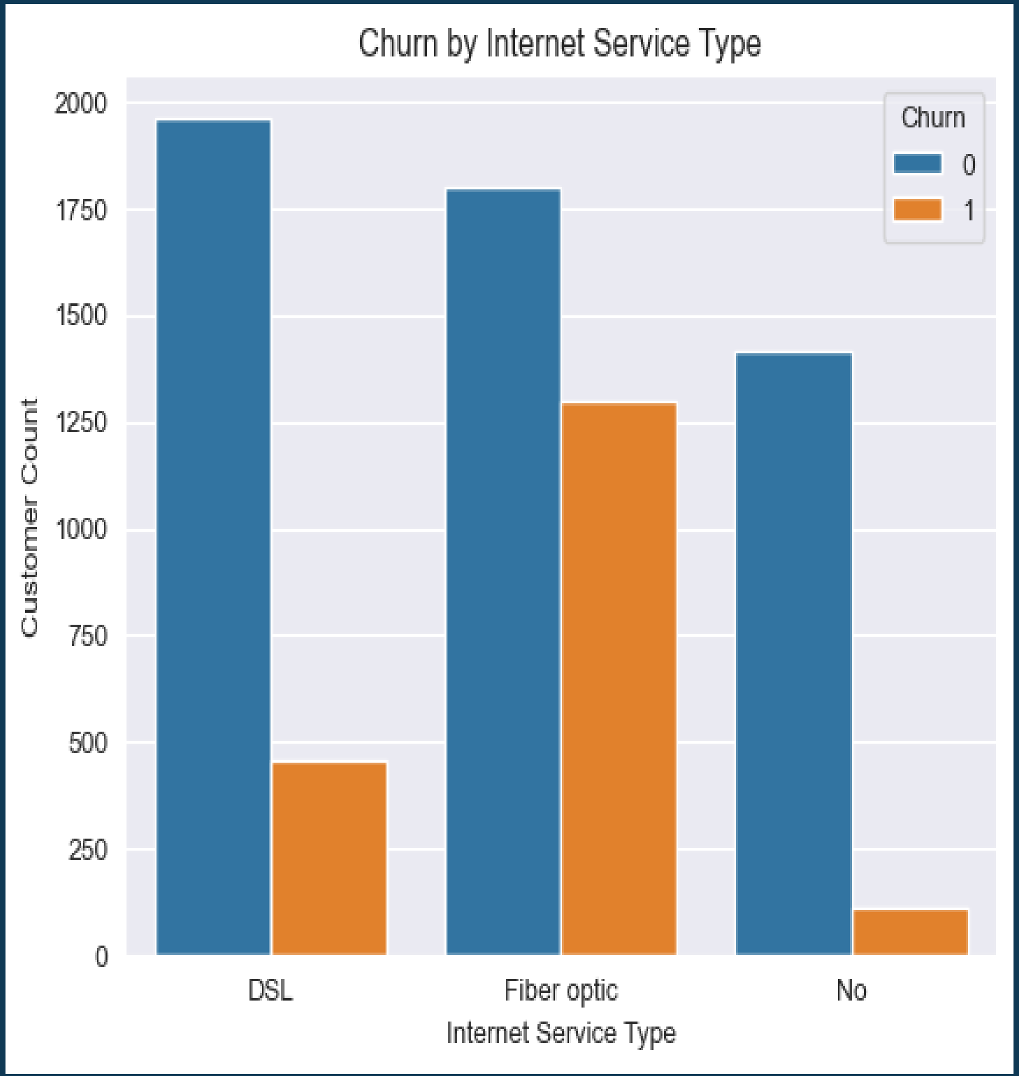
- ➢ Missing values in TotalCharges handled by median imputation.
- ➢ Categorical variables (e.g., Contract, PaymentMethod) one-hot encoded.
- ➢ Numerical features (e.g., MonthlyCharges, TotalCharges) scaled.
- ➢ Dataset split: 80% training, 20% testing.
- ➢ SMOTE applied to address class imbalance.

Data Analysis – Churn Distribution



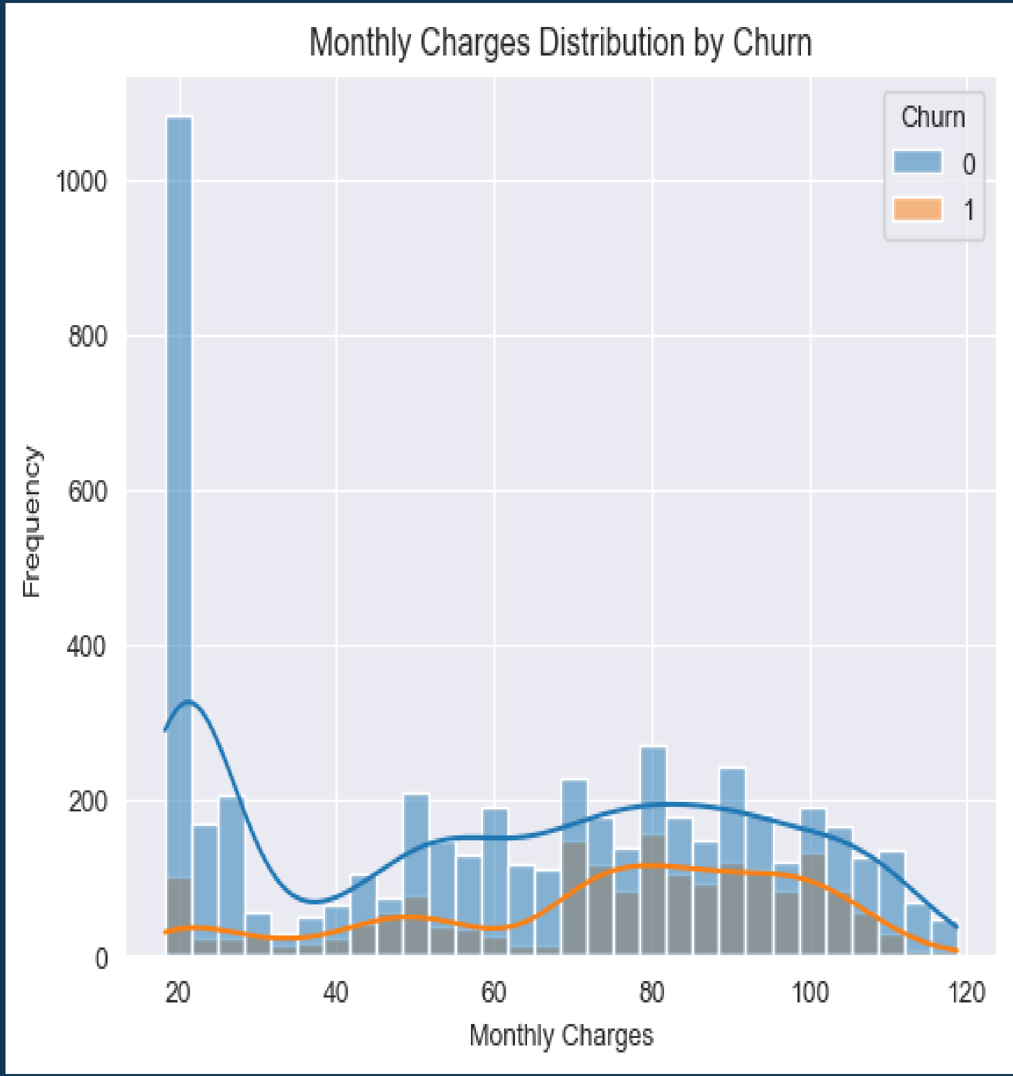
- Approximately 26% of customers in the dataset have churned.
- Highlights a significant imbalance between churned and non-churned customers.
- The churned customer segment, though smaller, has a disproportionately high impact on revenue loss and customer acquisition costs.
- Understanding churn distribution helps prioritize strategies aimed at retaining at-risk customers.

Data Analysis – Internet Service Type



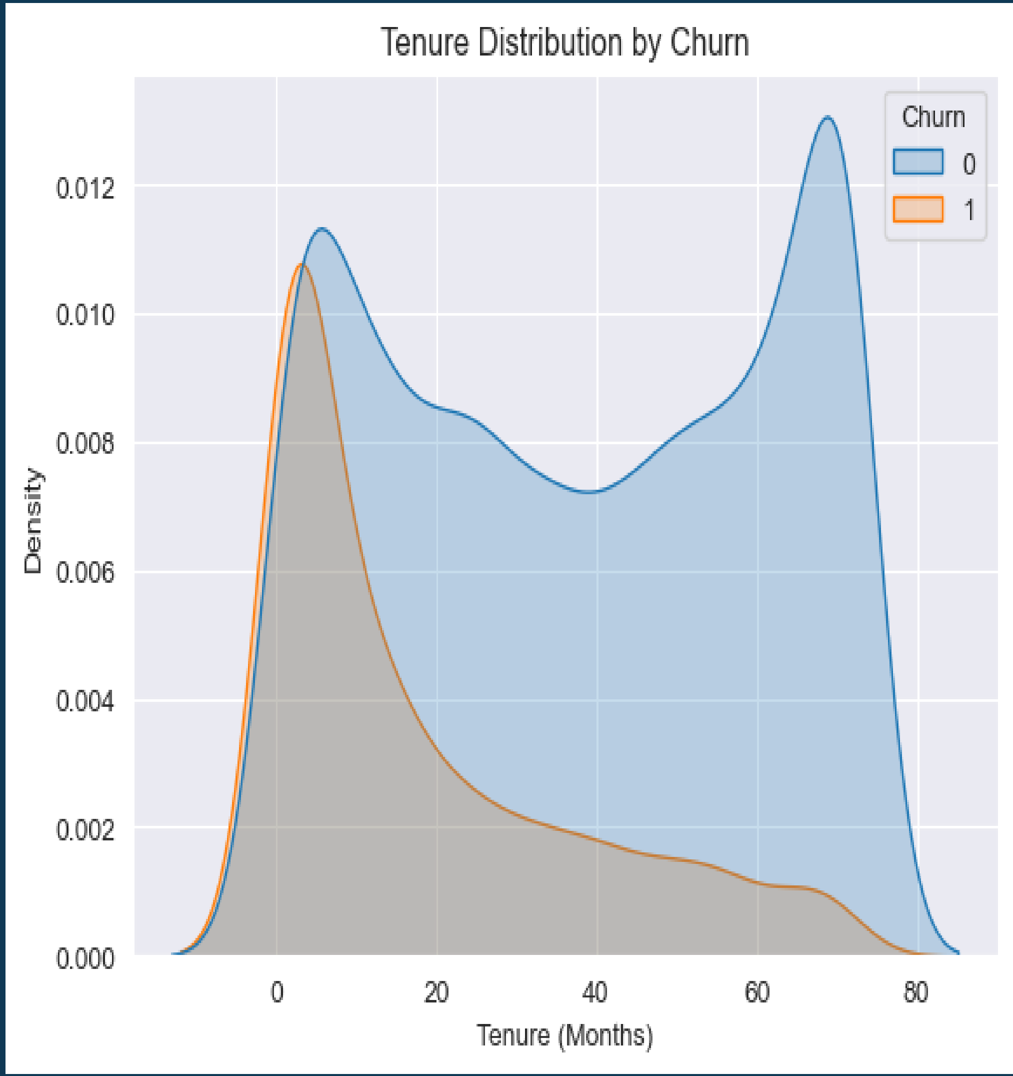
- Fiber-optic internet users exhibit significantly higher churn rates compared to DSL or no internet services.
- DSL users show lower churn rates, indicating relatively higher satisfaction or fewer competitive alternatives in this segment.
- Customers with no internet service have the lowest churn rates, possibly due to fewer service dependencies or simpler billing structures.

Data Analysis – Monthly Charges



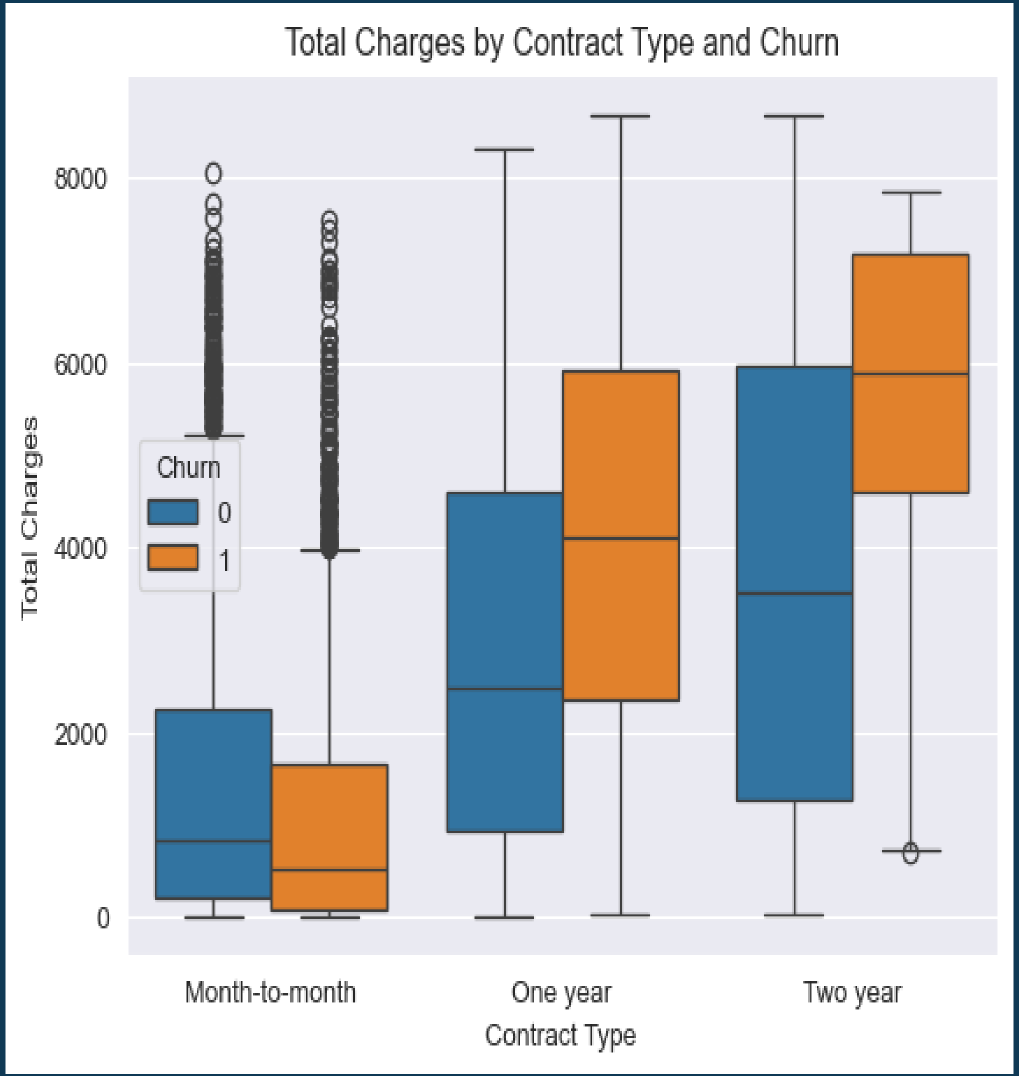
- Higher monthly charges are strongly correlated with increased churn rates.
- Customers on premium plans may feel dissatisfied with the value for money offered.
- Price-sensitive customers are more likely to leave when faced with rising costs or competitive alternatives.
- Low-cost plans appear to provide more stability, retaining customers over a longer period.
- Customers with low charges may perceive better affordability and alignment with their needs.

Data Analysis – Tenure Insights



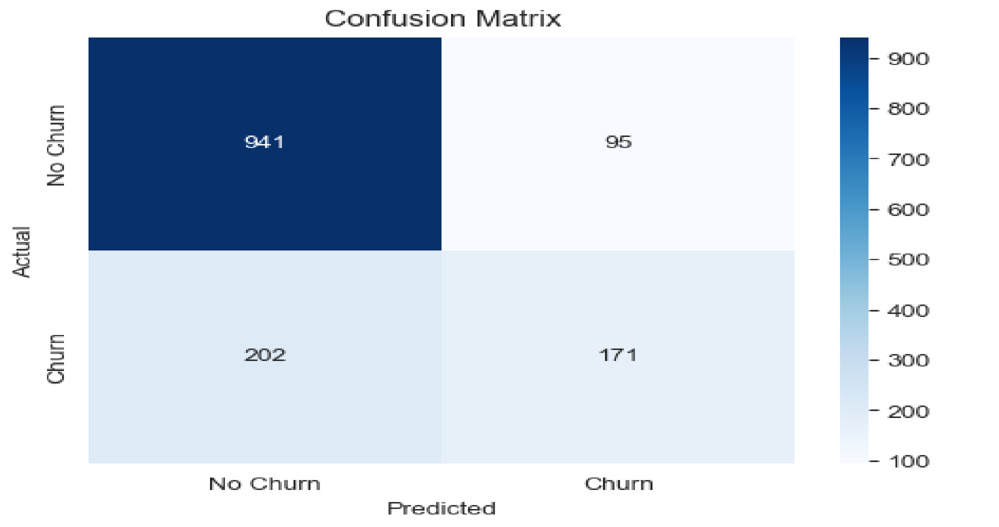
- Short-tenure customers (those with fewer months of service) have a significantly higher likelihood of churning.
- New customers may feel uncertain about the value or quality of the service during the initial months.
- Early churn suggests possible gaps in onboarding, support, or initial expectations not being met.
- Long-tenure customers are more likely to stay, indicating loyalty builds over time with positive experiences.

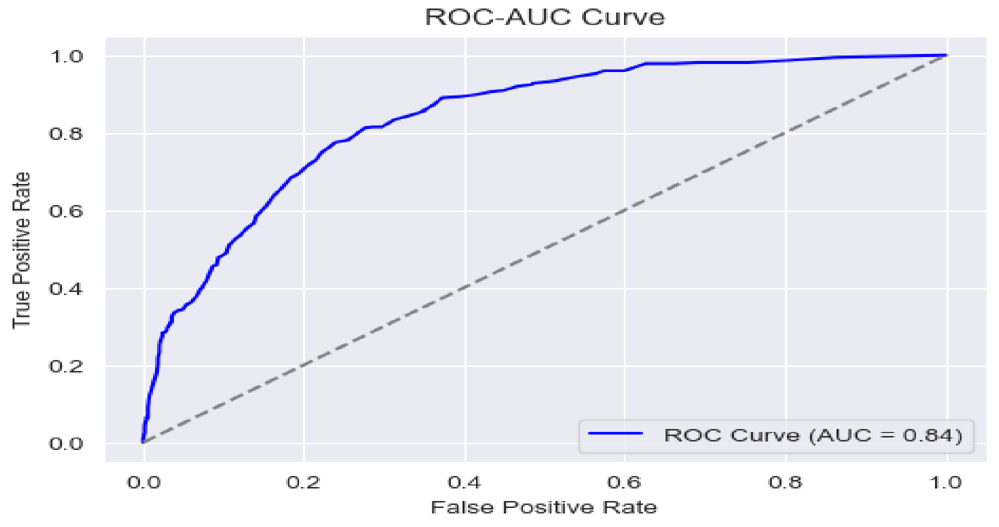
Data Analysis – Total Charges Insights



- Long-term contracts (1-year, 2-year) are associated with higher total charges but significantly lower churn rates, indicating customer loyalty.
- Month-to-month contracts have higher churn rates due to their flexibility, making it easier for customers to leave.
- Promoting long-term contracts with incentives or discounts could help reduce churn while maintaining revenue stability.

Predictive Modeling



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Model Accuracy: 0.79
F1-Score: 0.54

Classification Report:
              precision    recall  f1-score   support

           0       0.82      0.91      0.86      1036
           1       0.64      0.46      0.54       373

    accuracy                           0.79      1409
   macro avg       0.73      0.68      0.70      1409
weighted avg       0.78      0.79      0.78      1409
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- The Random Forest model achieved an accuracy of 79%, an F1-score of 0.54, and an ROC-AUC of 0.84, showing moderate performance in churn prediction.
- Precision (0.82 for non-churn, 0.64 for churn) and recall (0.91 for non-churn, 0.46 for churn) highlight the model's strength in predicting non-churn but limitations for churned customers.
- Enhancing the model through techniques like addressing class imbalance can improve its effectiveness in driving retention strategies and reducing churn.

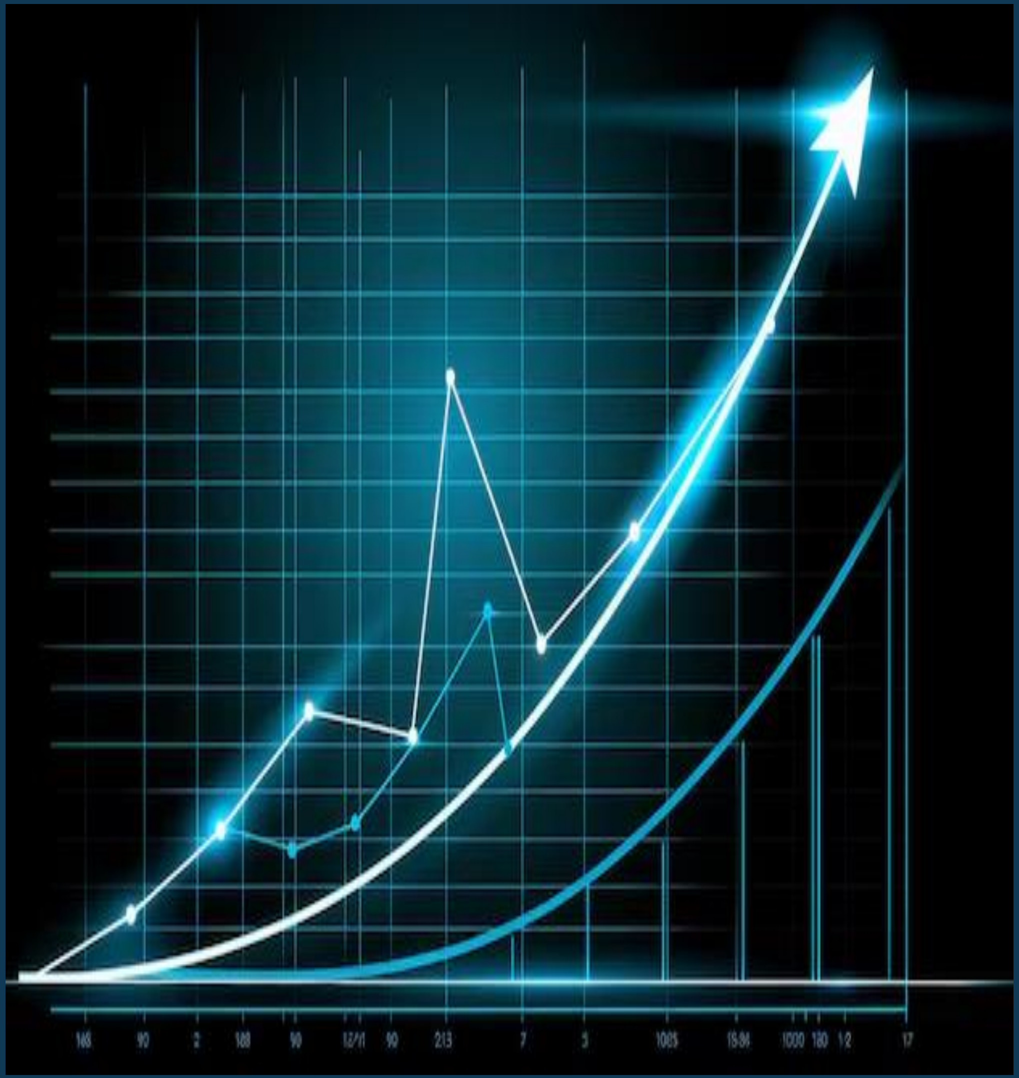
Retention Strategies

- Provide attractive discounts and incentives to encourage customers to opt for long-term contracts, fostering loyalty.
- Enhance service quality and tailored support for senior citizens, a demographic that may require additional attention.
- Introduce flexible pricing plans to address cost-related concerns and retain price-sensitive customers.
- Implement proactive monitoring systems to identify customer issues early and resolve complaints swiftly to improve satisfaction.

Challenges and Ethical Considerations

- Manage class imbalance effectively by applying techniques like SMOTE to improve model accuracy for underrepresented churn cases.
- Ensure fairness in predictions by mitigating potential biases in the data and algorithms.
- Safeguard customer privacy through robust data security measures and compliance with regulations.
- Promote transparency in model outcomes to build trust and support ethical decision-making.

Conclusion



- Tenure, contract type, and monthly charges are the most influential predictors of customer churn.
- Implementing targeted strategies based on these predictors can effectively reduce churn rates and enhance retention.
- The model's strong performance offers actionable insights to drive data-informed decision-making.
- Leveraging these insights enables businesses to focus on high-impact areas for improving customer satisfaction and loyalty.

Future Directions

- Implement real-time churn prediction systems to proactively identify at-risk customers and take timely action.
- Integrate predictive analytics with CRM platforms to enable personalized customer engagement and targeted retention efforts.
- Enhance the dataset by incorporating additional behavioral attributes to improve model accuracy and insight depth.
- Use advanced analytics to continuously refine retention strategies and address emerging customer needs.


Thank You