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TELECOM CHURN PREDICTION

USING MACHINE LEARNING TO IMPROVE CUSTOMER RETENTION



PROJECT OVERVIEW

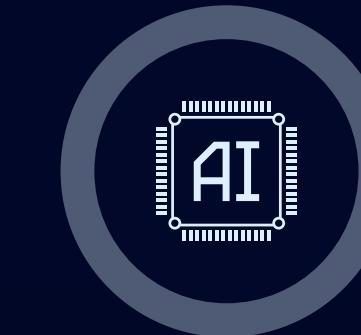
PROJECT GOAL

- Predict churn and understand key drivers to help the company retain customers
- Tools used: Python, Pandas, Scikit-learn, Seaborn, etc.

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BUSINESS PROBLEM

UNDERSTANDING THE
BUSINESS PROBLEM



Churn:

When customers discontinue their telecom service.

Impact

Losing customers is costly; retaining them is more economical.

Objective

Identify customers at high risk of churn and understand why.

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DATASET OVERVIEW

- Rows: 7,043
- Columns: 21 features + 1 target
- Target Variable: Churn (Yes/No)
- Key Features:
 - Contract, Tenure, InternetService
 - PaymentMethod, MonthlyCharges, Support Services



DATA CLEANING

⊕

PREPROCESSING

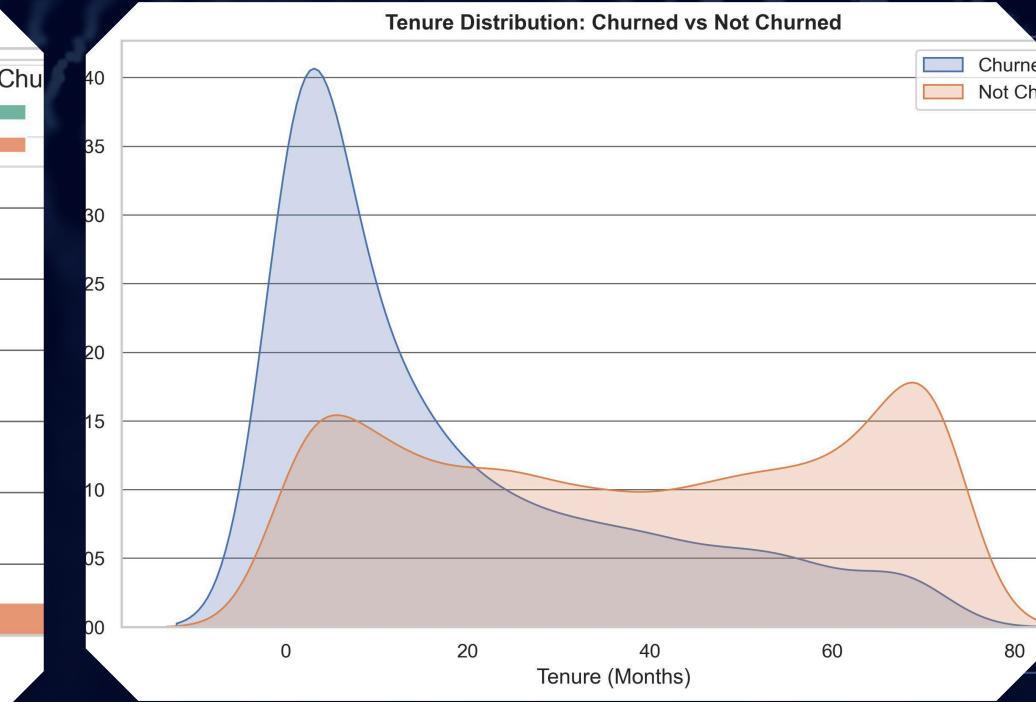
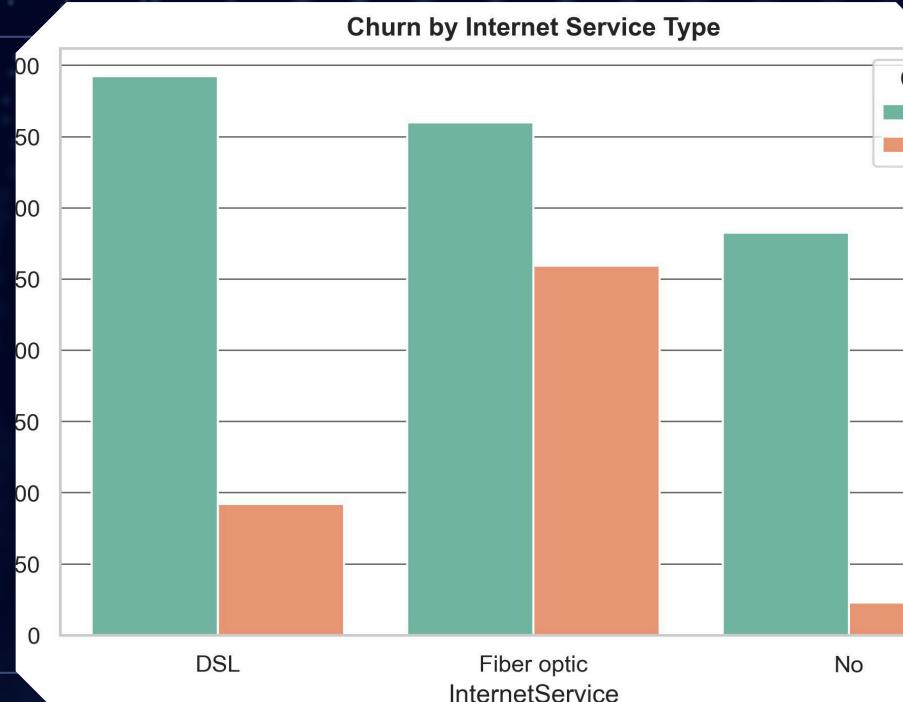
- Handled missing values (e.g, TotalCharges)
- Converted categorical variables using encoding
- Scaled numerical features
- Selected top 10 features using feature importance from Decision Tree



EXPLORATORY DATA ANALYSIS (EDA)

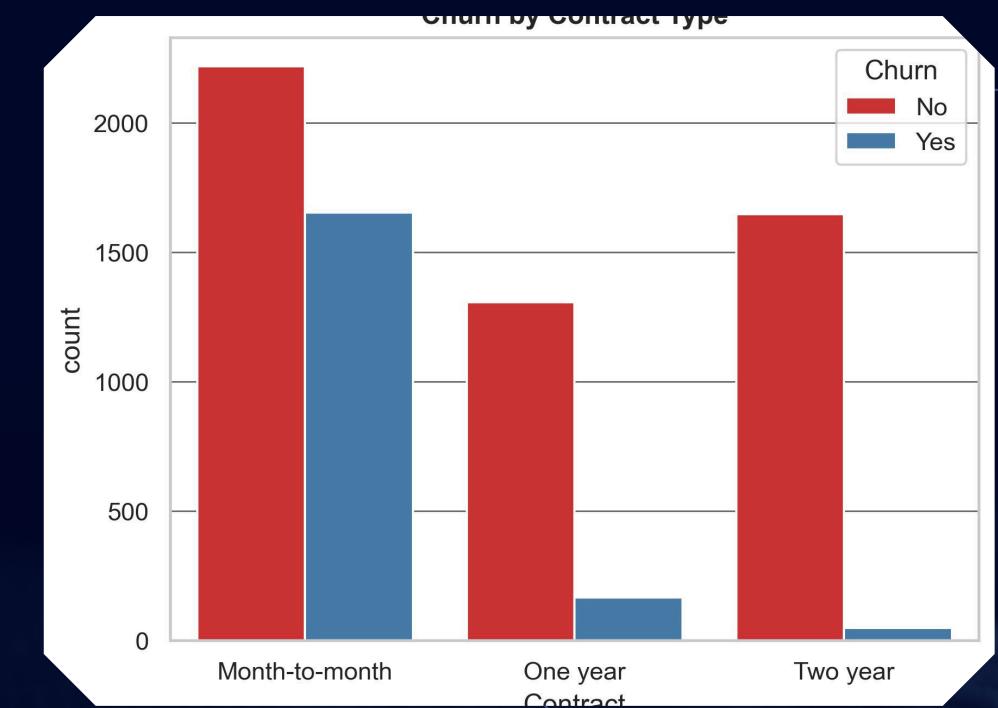
Churn by Internet service Type

- Customers using Fiber optic internet are churning at higher rates compared to those using DSL or no internet service.



Churn by Contract

Month-to-month contracts had highest churn



Churn by Tenure

Shorter tenures linked to higher churn

Models Trained

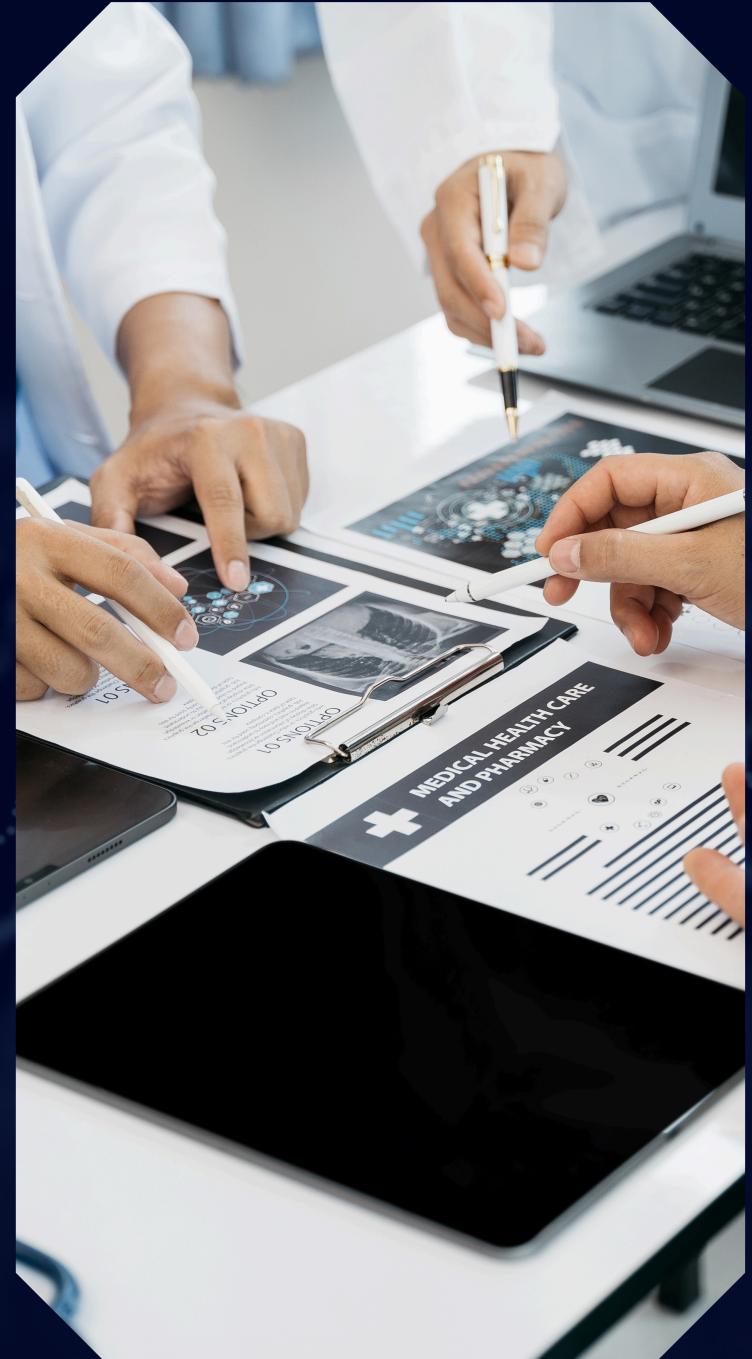
- Logistic Regression
- Baseline Decision Tree
- Optimized Decision Tree (GridSearchCV)

Train-Test Split

- 80-20

Evaluation Metric

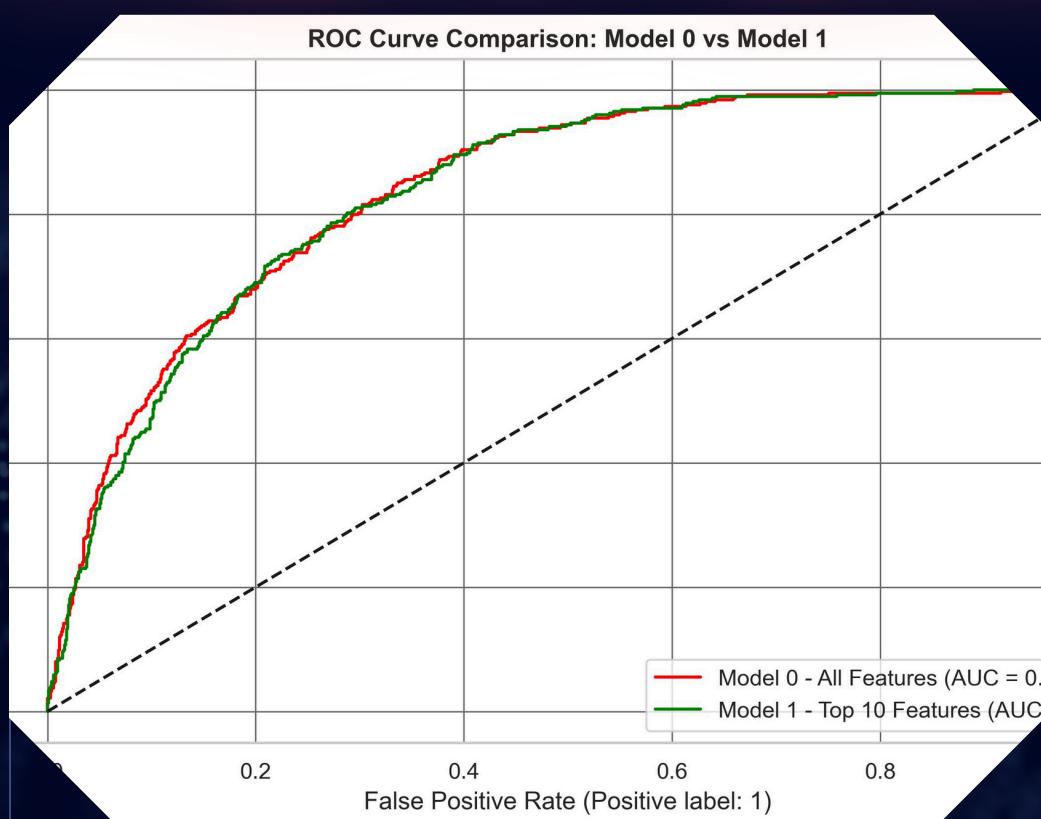
- Accuracy, Recall, ROC AUC



MODEL BUILDING

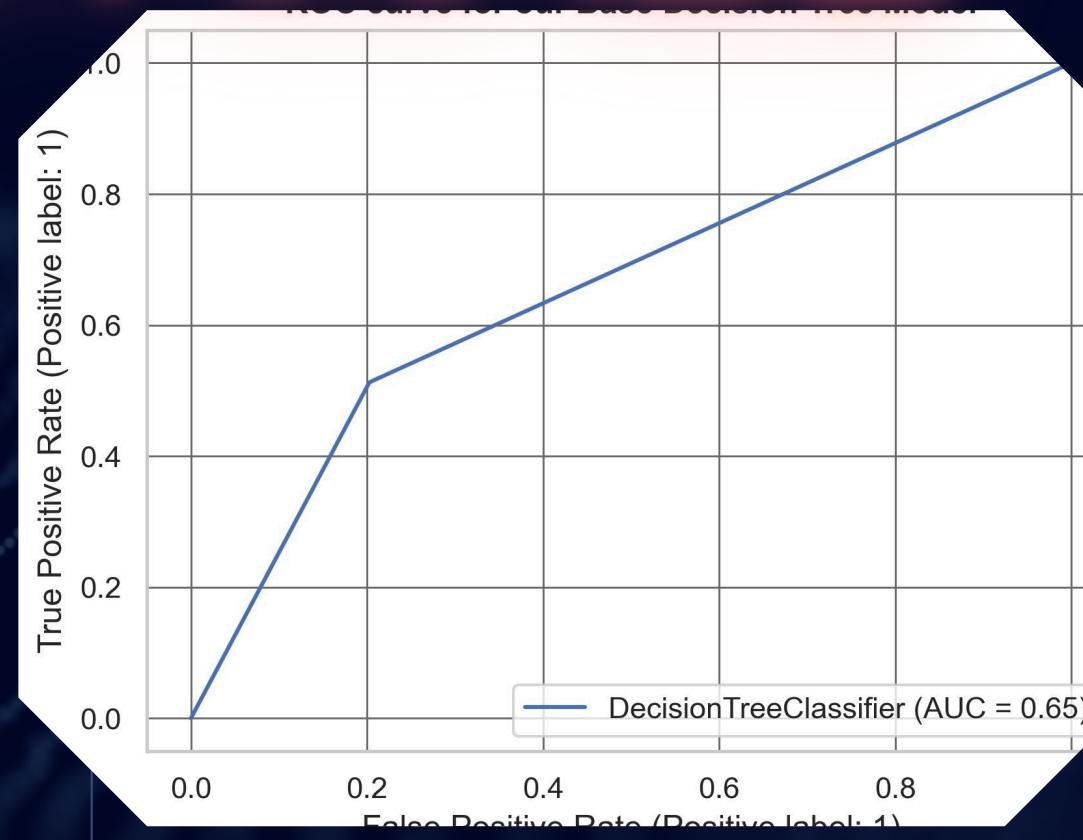


MODEL PERFORMANCE



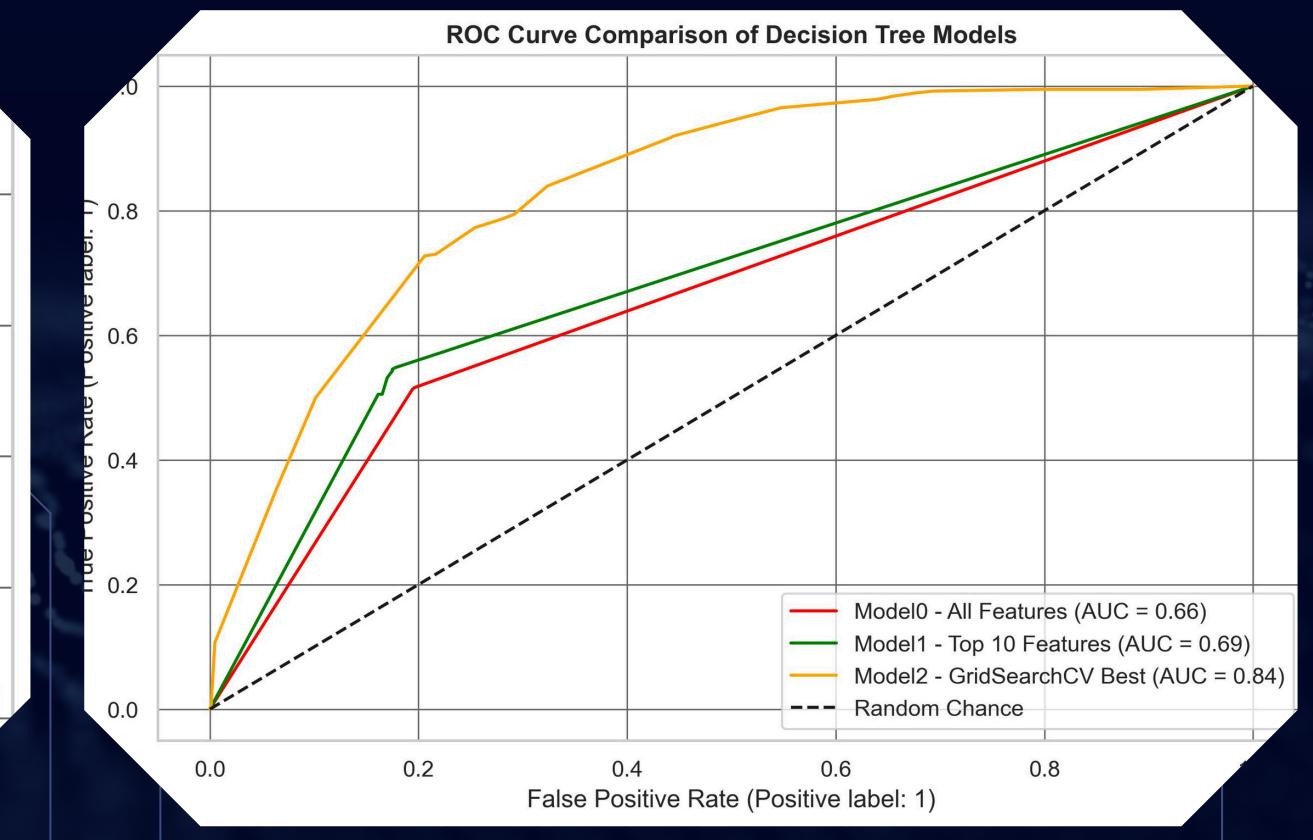
Logistic Regression

Accuracy: 80%, Recall: 54%



Baseline Decision Tree

Accuracy: 74%, Recall: 68%



Optimized Decision Tree

Accuracy: 77%, Recall: 73%, ROC AUC: 0.83

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FEATURE IMPORTANCE

TOP FEATURES

- Contract
- Tenure



- InternetService
- TechSupport





FINAL MODEL SUMMARY

Chosen Model

GridSearchCV-optimized
Decision Tree

Improvements

- Higher recall and ROC AUC
- Better generalization to test data

Key Insight

- Contract and customer engagement services are top churn drivers



CONCLUSIONS

- Churn is predictable using ML models
- Support services and contract length significantly affect churn
- GridSearchCV tuning led to better performance across all metrics



RECOMMENDATIONS

- Encourage long-term contracts with benefits
- Invest in customer support and proactive outreach
- Use the model to flag high-risk customers for retention campaigns



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THANK YOU

G E T I N T O U C H



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