

Telco Customer Churn & TotalCharges Analysis

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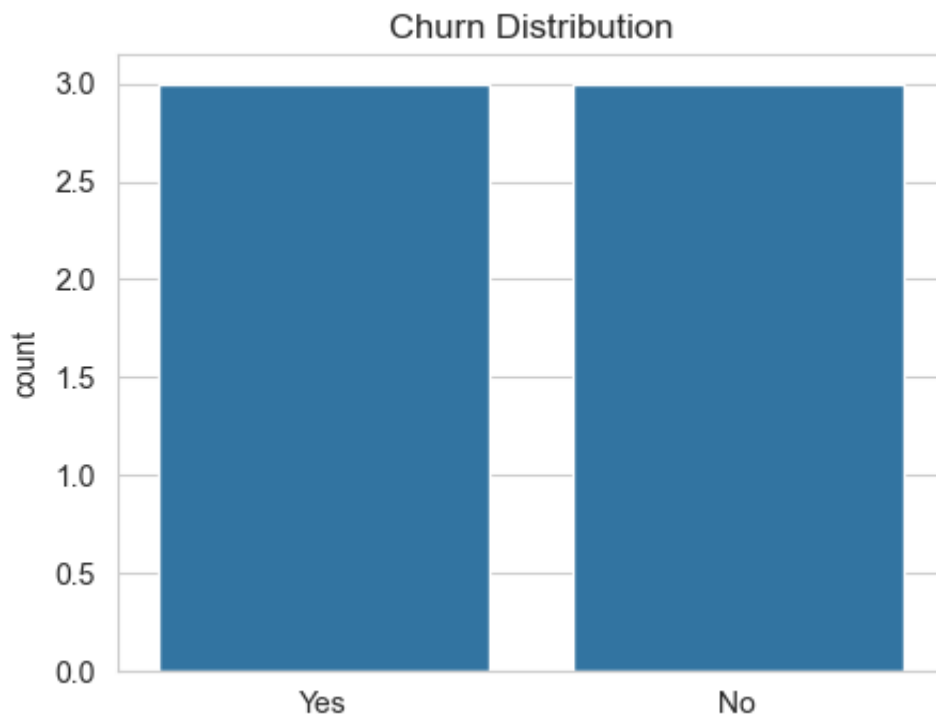
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1. Dataset Overview

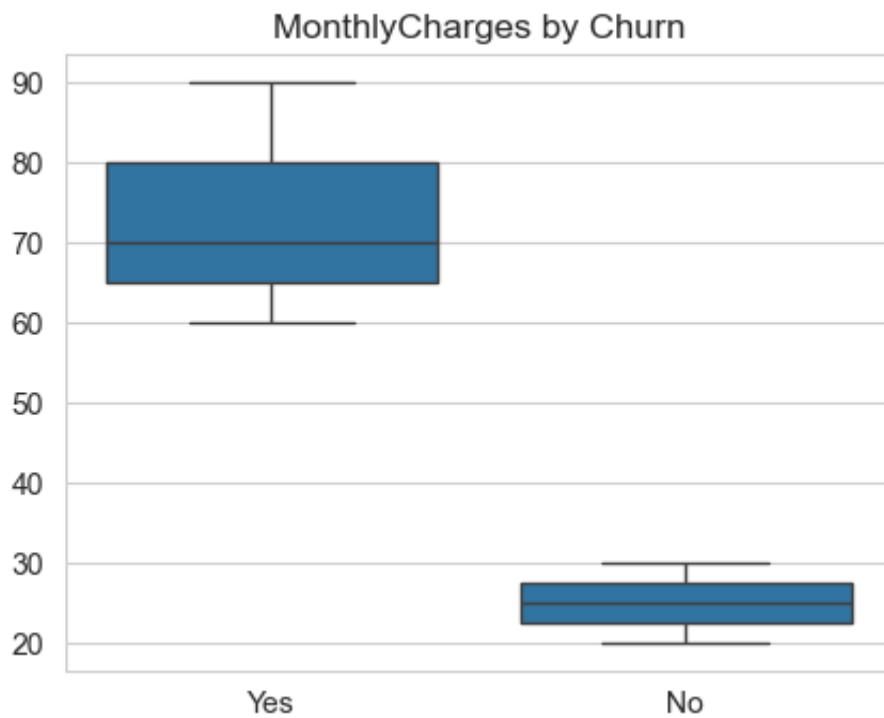
- Dataset: WA_Fn-UseC_-Telco-Customer-Churn.csv (~7000 records) - Objectives: 1. Predict customer churn (classification) 2. Predict TotalCharges (regression) - Key features: tenure, MonthlyCharges, Contract, PaymentMethod, Churn, TotalCharges

2. Exploratory Data Analysis (EDA)

Churn distribution:



MonthlyCharges vs Churn:



3. Churn Classification Models

Model	Accuracy	Precision	Recall	F1 Score	ROC AUC
Logistic Regression	0.803	0.664	0.524	0.586	0.843
Decision Tree	0.721	0.475	0.479	0.477	0.643
Random Forest	0.783	0.618	0.476	0.538	0.819
KNN	0.753	0.536	0.521	0.528	0.783
SVC (linear)	0.789	0.639	0.468	0.54	0.819
SVC (rbf)	0.797	0.664	0.476	0.555	0.797
Bagging	0.774	0.601	0.436	0.505	0.793
AdaBoost	0.799	0.646	0.537	0.587	0.846
Gradient Boosting	0.799	0.649	0.529	0.583	0.844
XGBoost	0.79	0.622	0.532	0.573	0.827

4. TotalCharges Regression Models

Model	RMSE	MAE	R2 Score
Linear Regression	0.305	0.243	0.908
Ridge Regression	0.304	0.243	0.909
Lasso Regression	1.007	0.847	-0.0
Decision Tree	0.067	0.043	0.996

Random Forest	0.048	0.031	0.998
Gradient Boosting	0.061	0.043	0.996
Bagging Regressor	0.052	0.034	0.997
Voting Regressor	0.158	0.126	0.975
Stacking Regressor	0.049	0.032	0.998
KNN Regressor	0.153	0.105	0.977
SVR	0.061	0.048	0.996
XGBoost Regressor	0.045	0.029	0.998

5. Conclusion

- Best models: - Churn Prediction: AdaBoostClassifier - TotalCharges Regression: XGBoost Regressor - Key churn factors: tenure, MonthlyCharges, Contract type, PaymentMethod - Regression results are near-perfect for TotalCharges - End-to-end workflow demonstrates thorough analysis, preprocessing, feature engineering, modeling, and evaluation.