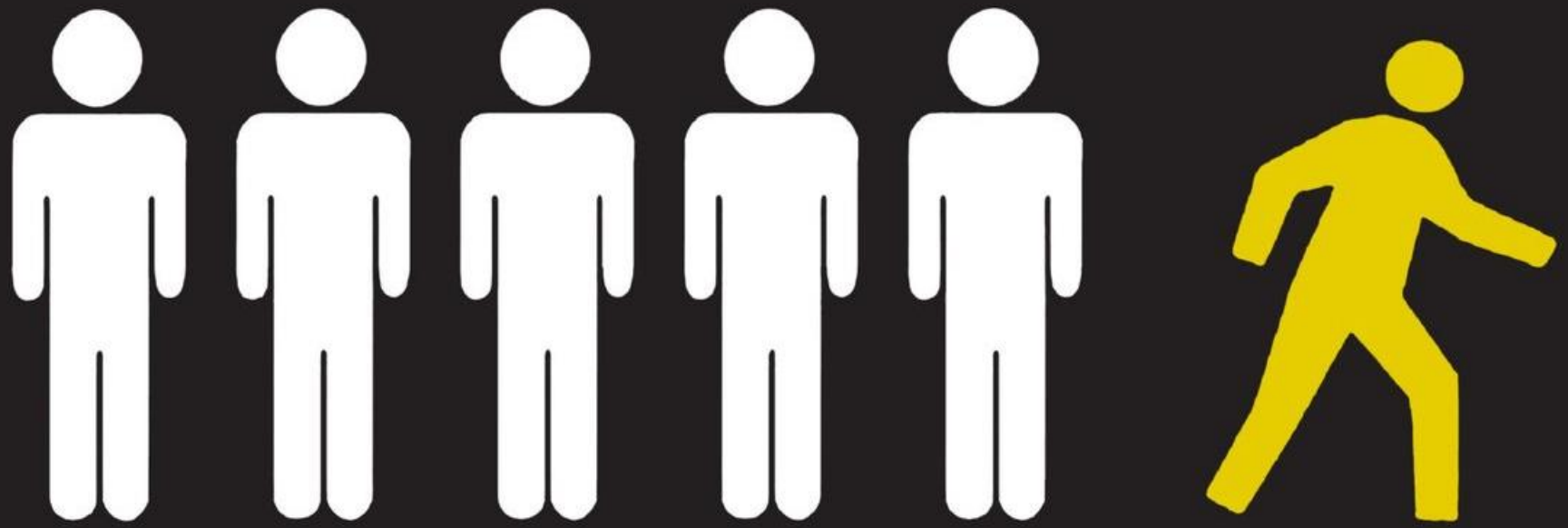


Customer Churn Prediction

Supervisor: Dr Haitham El-Gharib

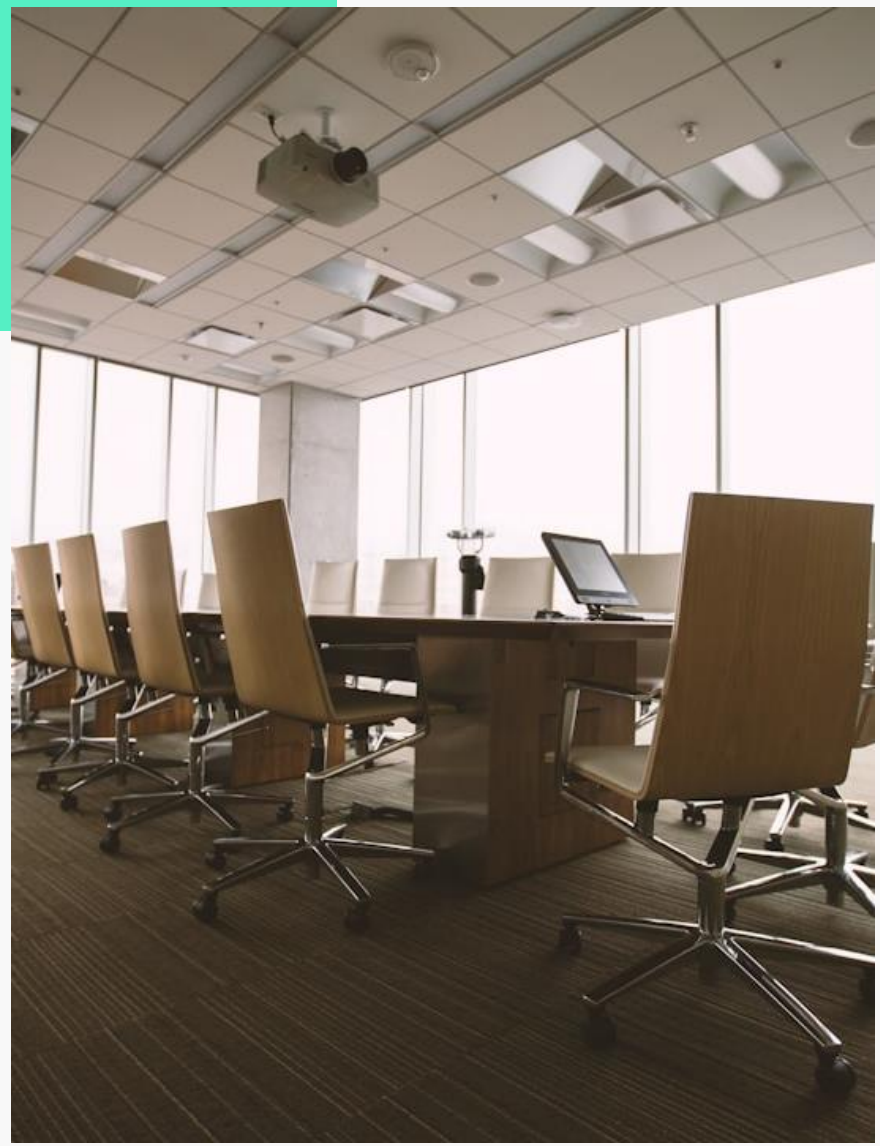
CREATED BY: Mostafa El-Gallad

DATE: October - 2024

Churn Impact Overview

UNDERSTANDING CHURN IMPORTANCE

Customer churn represents the rate at which customers stop doing business with an entity. It can significantly affect revenue; therefore, understanding churn is critical.



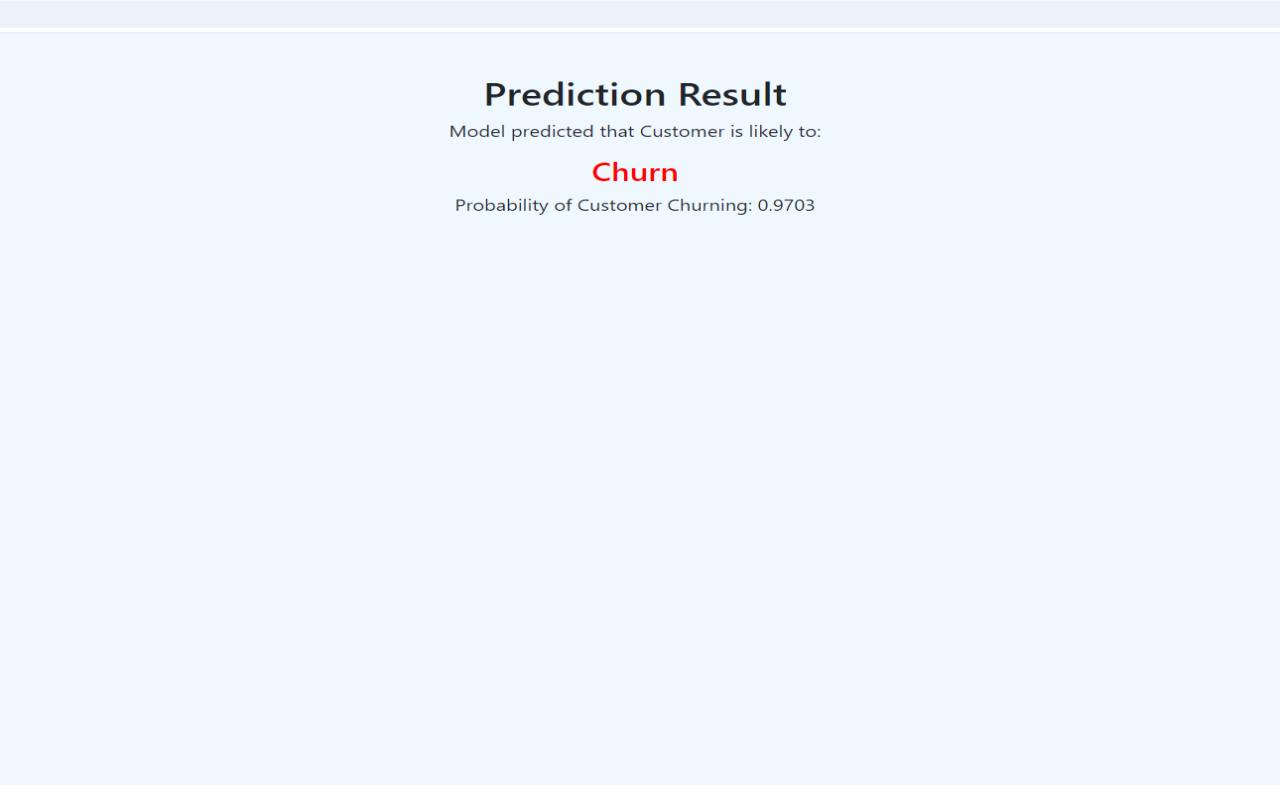
Churn Prediction Model

BENEFITS OF PREDICTION

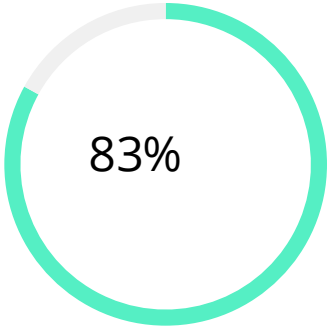
Predicting churn helps streamline customer retention strategies, improving overall customer satisfaction and increasing profitability.

MACHINE LEARNING IMPORTANCE

Machine learning algorithms enable businesses to predict potential churners based on historical data, allowing proactive retention efforts.

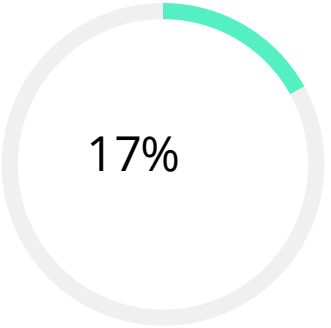


Data Analysis Insights



RETENTION

A large percentage of customers remain engaged with the business.



CHURN

Churn represents the minority, but understanding it is crucial to business health.

Data Preprocessing Steps

Various data preprocessing techniques are essential to prepare the dataset for effective model training and evaluation.

METHOD	DESCRIPTION	PURPOSE
Random Forest Imputer	Used to fill missing values	Ensures data integrity
SMOTE	Synthetic method to balance classes	Addresses class imbalance
Train/Test Split	Data divided for model evaluation	Validates model performance

Model Performance Metrics

model_name	test_accuracy	test_precision	test_recall	tes
XGBClassifier	99.400000	98.300000	98.100000	98.200
RandomForestClassifier	98.500000	99.200000	91.700000	95.200
BaggingClassifier	98.000000	97.600000	90.400000	93.900
radientBoostingClassifier	91.900000	85.200000	62.900000	72.300
AdaBoostClassifier	89.800000	75.800000	58.200000	65.800
LogisticRegressionCV	89.400000	77.300000	52.300000	62.300
KNeighborsClassifier	87.500000	70.400000	44.800000	54.800
RidgeClassifierCV	87.400000	86.500000	29.700000	44.300

KEY METRICS OVERVIEW

Performance attributes such as accuracy and F1 score evaluate the prediction model's effectiveness, which is vital for improving functionality.

FEATURE SIGNIFICANCE

Identifying vital features influencing churn assists in refining strategies, enhancing retention efforts, and optimizing resources.

Conclusion & Future Work

SUMMARY OF FINDINGS

Churn prediction plays a critical role in refining customer retention strategies, leading to optimized customer relationships.

POTENTIAL ENHANCEMENTS

Incorporating additional features like customer feedback could strengthen model accuracy.

NEXT STEPS

Real-time data integration within the model could further enhance its responsiveness, allowing quicker adaptation to changing behaviors.