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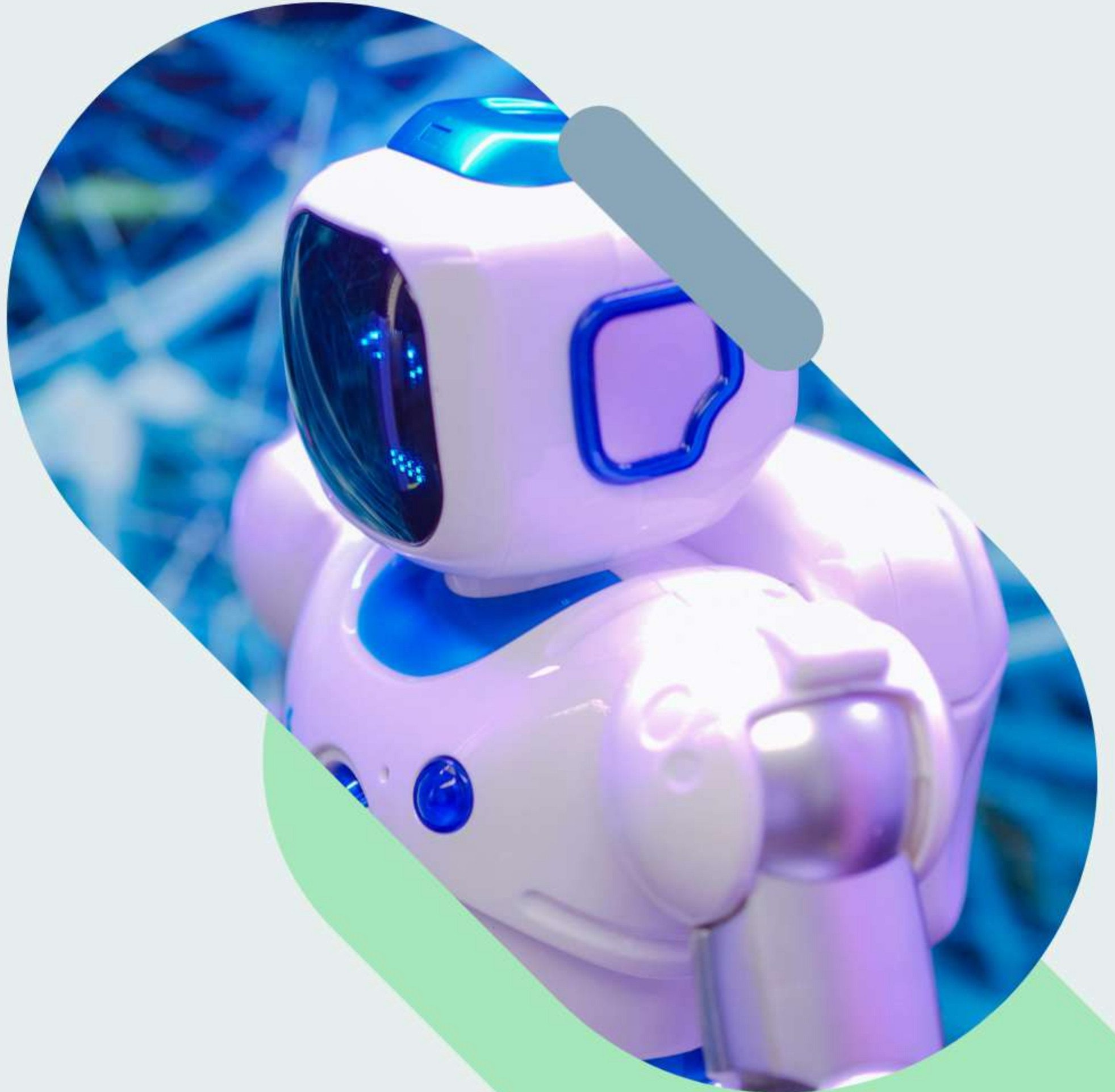
Customer Churn Analysis & Prediction

Using Machine Learning to Predict Customer Retention in Telecommunications

Project Given By: **GeeksForGeeks-BU**

Understanding the Churn Problem

It is said that its easier to Retain existing customers than bring in new ones.

High customer churn in telecommunications impacts profitability.

01

High Churn Rates

2024 Benchmark indicates telecom churn rates average around 20%.

02

Subscriber Losses

Vodafone Idea lost 27 lakh subscribers in June 2024, highlighting severe churn.
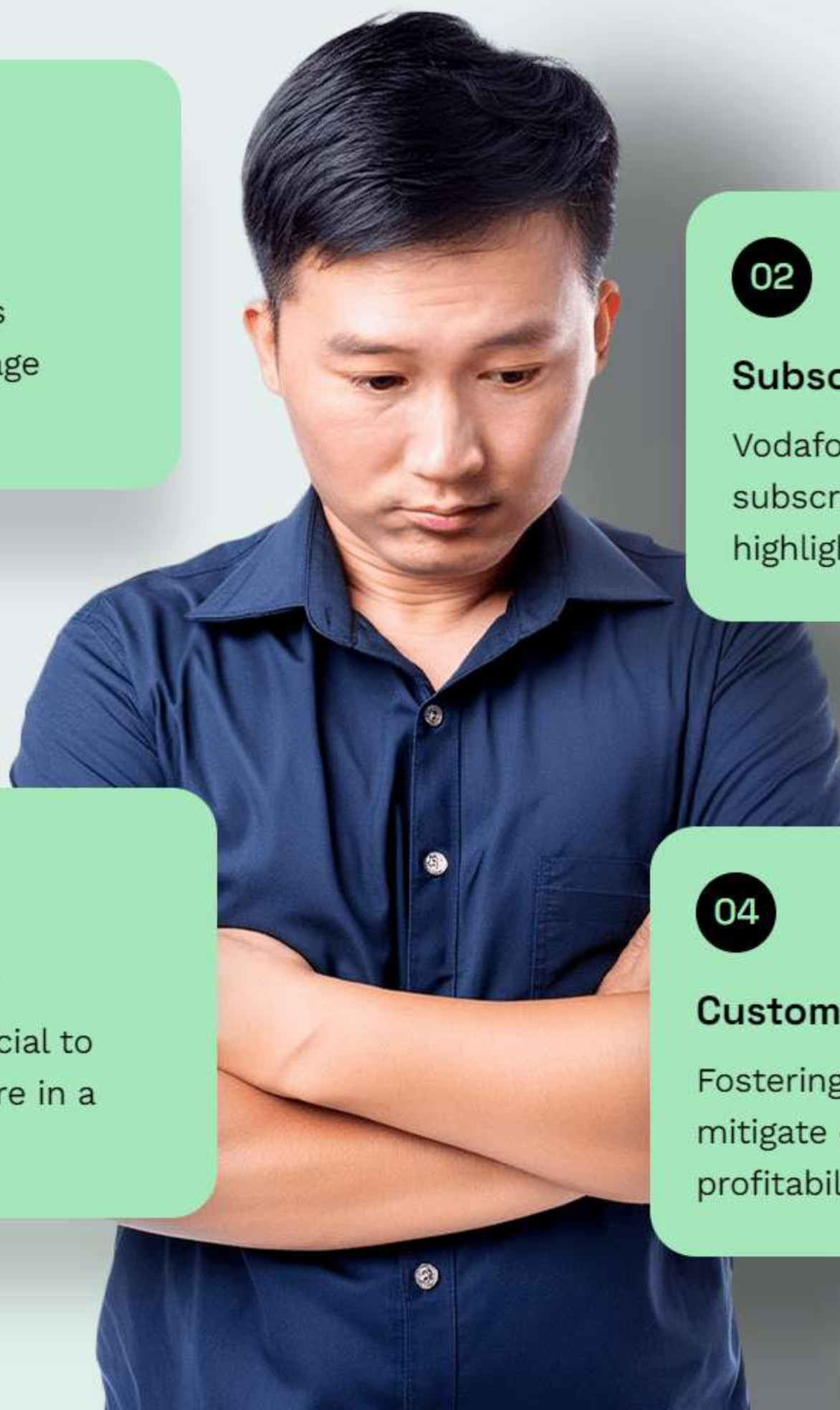
03

Market Share Threat

Addressing churn is crucial to maintaining market share in a competitive landscape.
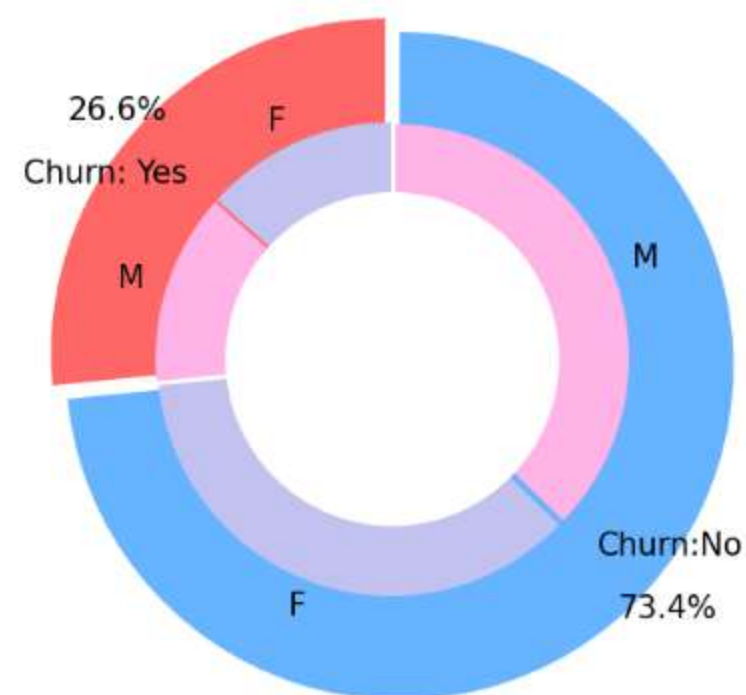
04

Customer Loyalty

Fostering customer loyalty can mitigate churn and enhance profitability.

Dataset Insights

Exploring Customer Churn Data for Predictive Analysis

Churn Distribution with respect to Gender: Male(M), Female(F)

Dataset Overview

The dataset contains customer demographics, service usage, and payment information crucial for churn analysis.

Data Preprocessing Steps

Key preprocessing includes handling null values, encoding categorical variables, and normalizing data for analysis.

Churn Predictors Identified

Analysis of customer demographics highlighted significant predictors of churn, guiding the modeling process.

Checking Distribution

Main Analysis on Churning based on Gender, Age Group, existing Dependants etc. has been made.

Proposed Solution: How do we solve the Churn Problem?

Our proposed solution aims to predict customer churn in the telecom industry by leveraging machine learning techniques on the Telco dataset.

We strive to identify customers at high risk of leaving the company, enabling targeted retention strategies to improve customer loyalty and reduce revenue loss.

To achieve this, we employ data preprocessing methods to clean and prepare the dataset, followed by exploratory data analysis to uncover patterns and correlations related to churn.

We utilize machine learning models, specifically Logistic Regression and Random Forest, optimizing their performance through techniques like Grid Search.

Finally, we evaluate our models using accuracy and precision metrics, while employing SHAP values to interpret feature importance, providing insights into the factors that drive churn.

Machine Learning Solutions Overview

Leveraging AI to Predict and Minimize Customer Churn is a Profitable Solution to this Problem.

Key Models

Logistic Regression, Random Forest, and Gradient Boosting are essential for churn prediction.

Predictive AI

AI analyzes customer behavior to identify early warning signs of churn effectively.

Personalized Communication

Tailored communication strategies engage customers and enhance retention rates.

Proactive Support

Offering proactive support can mitigate potential churn and strengthen customer loyalty.

Our Solution

01

Data Preprocessing:

Handled missing values, converted data types, and encoded categorical features.

02

EDA:

Visualized churn patterns and identified key factors influencing churn.

03

Models:

Used Logistic Regression and Random Forest to predict customer churn, optimizing with Grid Search.

04

Evaluation:

Assessed model performance with accuracy and precision, and explained feature importance using SHAP.

Model Performance Metrics

Evaluating the accuracy of machine learning models used in the Churn Prediction Project.
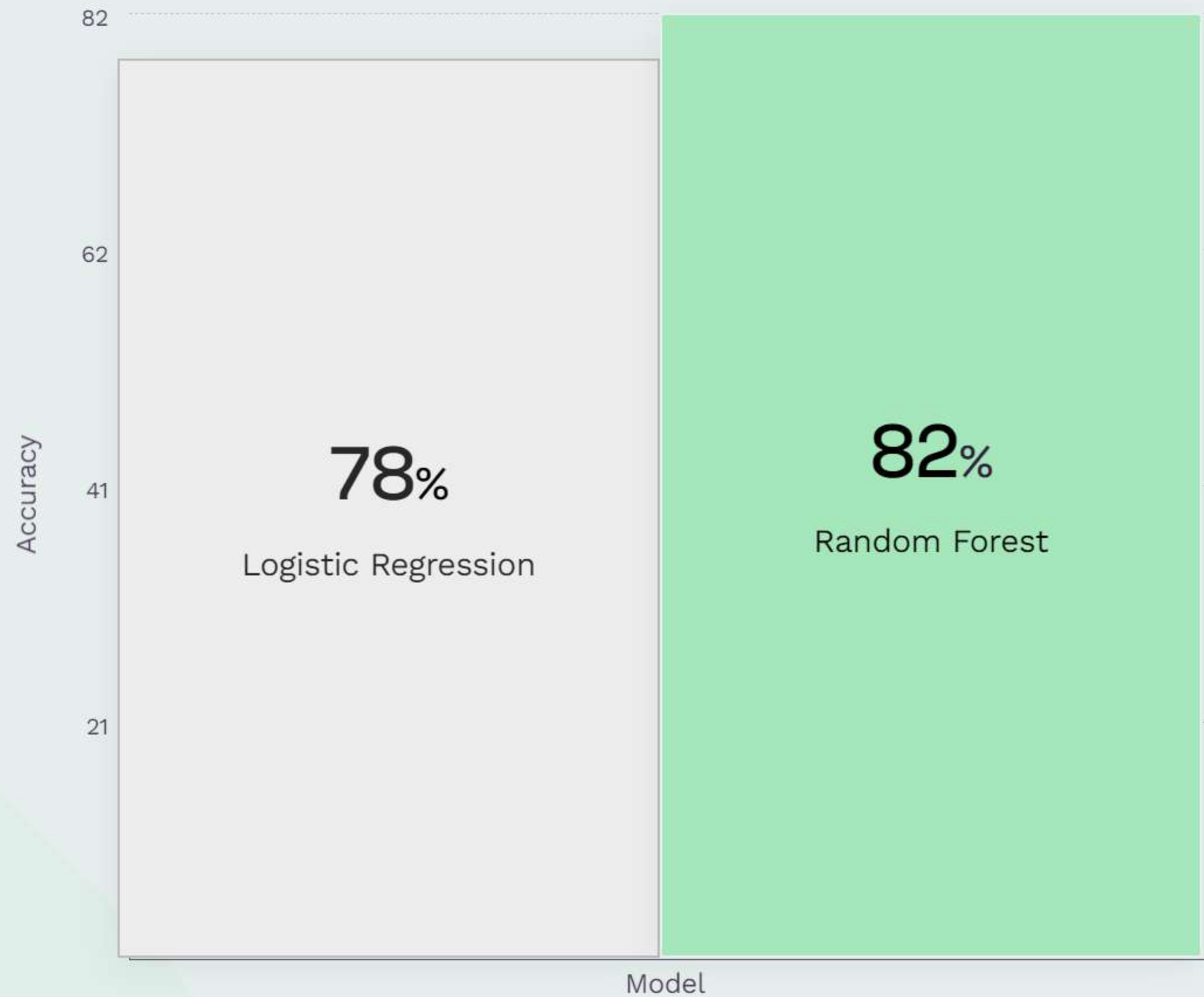
Churn Reduction Strategies

Implementing Effective Techniques to Enhance Retention

Predictive Insights

Leverage predictive analytics to identify upsell and cross-sell opportunities that can help retain customers.

04

Smarter Customer Segments

01

Utilize data analytics to create more effective customer segments for tailored retention campaigns.

Proactive Customer Support

Implement proactive support strategies by predicting churn risks and addressing issues before they escalate.

03

Personalized Communication

02

Enhance customer engagement by personalizing communication based on individual preferences and behaviors.

Challenges in Churn Management

Identifying Common Pitfalls in Churn Prevention Strategies

Neglecting Model Upkeep

Obsolete predictions arise from failing to maintain churn prediction models effectively.

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Choosing The Right ML Model

Using a specific Machine Learning Model can highly impact the outcome accuracy, especially for Churn Prediction.

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Misallocation of Resources

Ineffective measurement of success results in resources being improperly allocated.
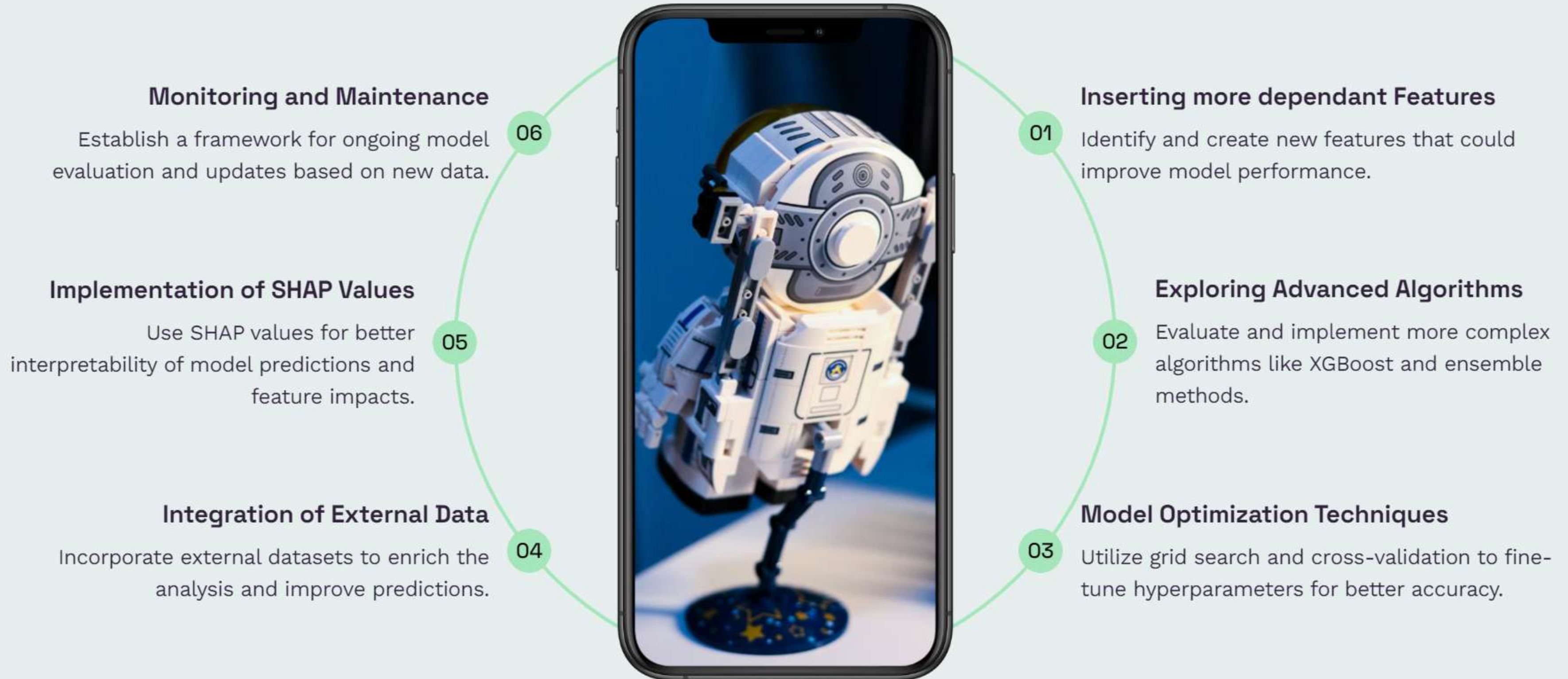
Importance of Continuous Monitoring

Regularly updating predictive models is crucial to stay relevant in churn prediction.

Future Steps and Scope

Exploring Machine Learning Approaches to Telco Customer Churn

Monitoring and Maintenance

Establish a framework for ongoing model evaluation and updates based on new data.

06

Implementation of SHAP Values

Use SHAP values for better interpretability of model predictions and feature impacts.

05

Integration of External Data

Incorporate external datasets to enrich the analysis and improve predictions.

04

01

Inserting more dependant Features

Identify and create new features that could improve model performance.

02

Exploring Advanced Algorithms

Evaluate and implement more complex algorithms like XGBoost and ensemble methods.

03

Model Optimization Techniques

Utilize grid search and cross-validation to fine-tune hyperparameters for better accuracy.

Thanks for Being Here with Us!

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