

PHASE-2

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COLLEGE CODE : 7177

CUSTOMER CHURN PREDICTION USING DATA ANALYTICS WITH COGNOS

PROJECT OVERVIEW:

The project at hand revolves around harnessing the capabilities of IBM Cognos to address a critical business challenge – predicting customer churn and enhancing customer retention strategies. The overarching goal is to empower businesses with the means to reduce customer attrition by gaining deep insights into the underlying patterns and drivers of customer departures.

DATASET DETAILS:

Data set from kaggle:

Link : <https://www.kaggle.com/datasets/blastchar/telco-customer-churn>

Content

Each row represents a customer, each column contains customer's attributes described on the column Metadata.

The data set includes information about:

- Customers who left within the last month – the column is called Churn

- Services that each customer has signed up for – phone, multiple lines, internet, online security, online backup, device protection, tech support, and streaming TV and movies
- Customer account information – how long they've been a customer, contract, payment method, paperless billing, monthly charges, and total charges
- Demographic info about customers – gender, age range, and if they have partners and dependents

LIBRARIES

```
import missingno as msno
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
import plotly.graph_objects as go
from plotly.subplots import make_subplots
```

MACHINE LEARNING ALGORITHM:

LOGISTIC REGRESSION:

- Logistic regression is a fundamental and interpretable method widely used in churn prediction. It's essential because it provides a clear understanding of the impact of predictor variables on the likelihood of churn.
- Logistic regression allows you to quantify the relationships between individual customer attributes (e.g., demographics, usage behavior) and churn probability. This method is valuable for identifying which factors have a significant influence on customer churn, helping businesses make data-driven decisions.

FEATURE ENGINEERING:

- Feature engineering is a critical method because it directly impacts the quality of input features used in predictive models. Well-engineered features can enhance the performance of any machine learning algorithm.
- In customer churn prediction, the quality and relevance of features (e.g., creating customer tenure, calculating customer lifetime value) are vital. Effective feature engineering can uncover hidden insights in the data, improve model accuracy, and help in understanding the root causes of churn.

ENSEMBLE METHOD

ADABOOST CLASSIFIER:

AdaBoost can be a useful tool for customer churn prediction due to its ability to combine multiple weak learners into a strong classifier, handle imbalanced data, and provide interpretability.

For customer churn prediction, AdaBoost is beneficial because:

- It often provides higher accuracy through ensemble decision-making.
- It can handle imbalanced data, commonly seen in churn scenarios.
- It offers interpretability, allowing businesses to understand factors leading to churn.
- Its adaptive nature adjusts to challenging data points, accommodating unpredictable customer behavior.

INNOVATIVE IDEA:

Three key innovations for addressing customer churn using ML:

- Predictive Modeling: ML analyzes historical data to forecast churn, helping businesses take proactive preventive measures.

- **Personalization:** ML tailors offers and incentives for individual customers, enhancing their experience and increasing retention.
- **Real-time Insights:** ML models can continuously monitor customer data, enabling real-time identification of potential churn. This allows businesses to respond promptly and address customer concerns before they decide to leave.

Conclusion:

This project amalgamates cutting-edge analytics, innovative strategies, and ethical considerations to address the critical challenge of customer churn. The outcome will empower businesses with actionable insights and personalized retention strategies, ultimately fostering long-term customer loyalty and profitability.