

Customer Churn Prediction

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I. Introduction

In today's highly competitive business landscape, customer retention is as crucial as customer acquisition. Companies invest substantial resources in marketing and sales to attract new customers, yet retaining existing customers often proves to be more cost-effective and beneficial in the long run. One of the significant challenges businesses face is customer churn—the *phenomenon where customers stop using a company's products or services*.

II. Problem Statement

Develop a machine learning model to predict which customers are likely to stop using a company's services (churn) based on their historical data. The goal is to identify at-risk customers early so that the company can take proactive measures to retain them. The solution should include data preprocessing, feature engineering, model training and evaluation, and a user interface to visualize the predictions and insights.

Customer churn, also known as *customer attrition*, refers to the phenomenon *where customers stop doing business with a company over a given period*. It is a critical metric for businesses as it directly impacts revenue and profitability.

Customer churn prediction involves *using historical customer data and machine learning techniques to identify patterns and signals that indicate a customer is likely to leave*. By accurately predicting which customers are at risk of churning, businesses can take proactive steps to retain them, such as personalized marketing, improved customer service, and targeted incentives.

III. Proposed solution

1. Dataset collection:

Dataset collection can be satisfied via:

[Telco Customer Churn Dataset on Kaggle](#)

2. Data Collection and Preprocessing:

- 2.1. *Data Source*
- 2.2. *Data Cleaning*
- 2.3. *Feature Encoding*
- 2.4. *Feature Scaling*

3. Exploratory Data Analysis (EDA):

- 3.1. *Descriptive Statistics*
- 3.2. *Visualization*
- 3.3. *Correlation Analysis*

4. Feature Engineering

- 4.1. *New Features*
- 4.2. *Feature Selection*

5. Model Building and Training:

- 5.1. *Algorithm Selection*
- 5.2. *Model Training*
- 5.3. *Hyperparameter Tuning*

6. Model Evaluation:

- 6.1. *Performance Metrics*
- 6.2. *Comparison*

7. UI Development:

- 7.1. *Backend*
- 7.2. *Frontend*
- 7.3. *Integration*

8. Expected Outcomes:

- 8.1. *Accurate Predictions*
- 8.2. *Actionable Insights*
- 8.3. *Proactive Retention Strategies*
- 8.4. *User Interface*