Title:

Customer Churn Prediction in the Telecom Sector Using Machine Learning

Problem Statement:

Customer retention is a key challenge for telecom companies. Identifying customers likely to leave (churn) allows businesses to take action to retain them, reducing revenue loss. This project aims to use historical customer data to predict customer churn using machine learning techniques.

Dataset:

We will use the **Telco Customer Churn Dataset** from Kaggle, which includes customer demographics, service usage, account information, and whether a customer has churned.

- **Source:** https://www.kaggle.com/datasets/blastchar/telco-customer-churn

Objectives:

- Preprocess and explore the dataset to understand key factors influencing churn.
- Build and compare different machine learning models (Logistic Regression, Decision Tree, Random Forest, ANN) for churn prediction.
- Evaluate models using appropriate metrics (accuracy, F1-score, ROC-AUC).
- Build a simple user interface to demonstrate predictions for new customers.
- Provide business insights based on model findings.

Methodology:

- **Data Preprocessing:** Handle missing values, encode categorical features, scale numerical features, manage class imbalance.
- **Exploratory Data Analysis:** Visualize and analyze churn trends and feature impacts.
- **Model Development:** Train and compare classification models including ANN.
- **Evaluation:** Use confusion matrix, accuracy, precision, recall, F1-score, ROC-AUC.
- **UI Development:** Create a basic web interface for input and prediction.
- **Interpretability:** Analyze feature importance to guide business decisions.

Expected Outcomes:

- A machine learning model that predicts customer churn with good accuracy.
- Insights into which customer features most strongly predict churn.
- A simple, interactive app for demoing churn prediction.
- Actionable recommendations for improving customer retention.

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