# Telco Customer Churn Analysis and Prediction

## Introduction

Telco companies often face challenges with customer churn, which can significantly impact their revenue and growth. This project aims to develop a web application using Streamlit to analyze and predict customer churn for a Telco company based on historical data.

## Goal

The goal of this project is to provide insights into factors contributing to customer churn and to build a predictive model that can help Telco managers identify at-risk customers and take proactive measures to retain them.

## Features

1. Exploratory Data Analysis (EDA):

- The application allows users to explore the Telco customer dataset using various filters and visualizations.

- It provides insights into customer demographics, services subscribed, contract types, etc.

2. Clustering Analysis:

- Utilizes K-Means clustering to group customers based on similar characteristics.

- Displays cluster centroids to understand different customer segments.

3. Customer Search:

- Enables users to search for specific customer records by ID.

- Provides detailed information about the searched customer.

4. Centroid Search:

- Allows users to search for a cluster centroid by entering the cluster number.

- Provides insights into the characteristics of the selected cluster.

5. Customized Use Case:

- Users can customize a use case by selecting various parameters such as internet service, tenure, etc.

- The application displays the customized record and predicts churn probability based on the selected parameters.

## Methodology

1. Data Preprocessing:

- Handle missing values, encode categorical variables, and prepare data for analysis.

2. Clustering Analysis:

- Use K-Means clustering to identify customer segments.

- Display cluster centroids for interpretation.

3. Model Training

- Train a Random Forest model on historical data to predict churn probability.

4. Web Application Development

- Use Streamlit to create an interactive web application.

- Implement features for data exploration, customer search, centroid search, and customized use cases.

## Expected Outcome

- A user-friendly web application that provides valuable insights into Telco customer churn.

- Predictive model capable of accurately predicting churn probability.

- Recommendations for Telco managers to reduce churn and improve customer retention.

## Conclusion:

- This project aims to provide a comprehensive solution for Telco companies to analyze customer churn and take proactive measures to retain customers. The interactive web application developed using Streamlit will empower Telco managers with actionable insights to optimize customer retention strategies.