A logo for university computing

Auto-generated description

**Evaluation cover page**

|  |  |
| --- | --- |
| *Student's Full Name:* | Taylan Ozgur Ozkan |
| *Student Number:* | 2024140 |
| *Module Title:* | Strategic Thinking |
| *Evaluation Title:* | CA 1 – Assignment of the final project proposal. |
| *Assessment Due Date:* | 29/03/2024. |
| *Presentation Date* | 17/05/2024. |

**Declaration**

By submitting this review, I confirm that I have read CCT's policy on academic misconduct and understand the implications of submitting work that is not mine or that does not appropriately reference material taken from a third party or other source.

I declare that it is my own work and that all third-party material has been properly referenced.

I further confirm that this work has not previously been submitted for evaluation by me or anyone else at CCT College Dublin or any other higher education institution.

Contents

[Using Machine Learning Techniques to Predict Customer Churn Rates 2](#_Toc166800929)

[Introduction 2](#_Toc166800930)

[Objectives 3](#_Toc166800931)

[Problem Definition 3](#_Toc166800932)

[Scope and Methodology 3](#_Toc166800933)

[Data Sources 4](#_Toc166800934)

[Ethical Considerations 4](#_Toc166800935)

[Conclusion 5](#_Toc166800936)

# Using Machine Learning Techniques to Predict Customer Churn Rates

## Introduction

The rapid growth of e-commerce has increased competition among online retailers. Maintaining customer loyalty has become a critical factor in ensuring profitability because acquiring new customers is much more costly than retaining existing customers. This capstone project aims to identify customers at risk of abandonment using predictive analytics and develop retention strategies. The project will help businesses increase customer loyalty and revenue by analyzing customer behavior and predicting customer churn.

Rapid changes in consumer behavior and increasing competition make it difficult for e-commerce businesses to maintain customer loyalty. High customer abandonment rates create a huge financial burden for businesses and represent a significant obstacle to sustainable growth. This project aims to help businesses increase customer loyalty and thus optimize their revenue by predicting customer abandonment.

## Objectives

The main goals of this capstone project are:

**Predicting Customer Abandonment**: Creating a machine learning model to predict customer churn based on historical customer data. This allows the company to take preventative measures by knowing in advance which customers are at risk of churn. For example, customer satisfaction and loyalty can be increased by offering special discounts or promotions to at-risk customers.

**Identifying Key Factors**: Identifying key factors that cause customer churn in the context of e-commerce. This helps companies understand what drives customer dissatisfaction and improve them. Data such as analysis of customer complaints, product feedback, and customer service interactions can be used to understand the root causes of churn.

**Developing Retention Strategies**: Suggesting feasible strategies to reduce customer churn based on the model's predictions. For example, loyalty programs and personalized offers. These strategies can increase customers' loyalty to the brand by improving the customer experience.

**Assessing Business Impact**: Evaluating the potential business impacts of implementing the forecasting model and retention strategies. This helps the company understand how much benefit it can get from these strategies and the return on investment (ROI). The extent to which the business reduces customer churn and its financial returns will be evaluated through detailed analysis.

## Problem Definition

Customer churn is a major problem in the e-commerce industry, resulting in significant revenue loss if a customer is lost. The challenge is to accurately identify which customers are most likely to churn and the underlying reasons for their departure. Traditional methods are inadequate to solve this problem. This project aims to predict customer churn and develop strategies to reduce this churn by analyzing customer data and using machine learning algorithms.

For e-commerce businesses, preventing customer churn is critical not only from a financial perspective, but also from a brand reputation and customer satisfaction perspective. Customer loss weakens the competitiveness of the business by reducing its market share. Additionally, a lack of strategies to prevent customer churn jeopardizes the sustainability of the business in the long run. Using data-driven approaches, this project will delve into the causes of customer churn and develop solutions to help businesses deal with this problem effectively.

## Scope and Methodology

The project covers in-depth analysis and solution development over two periods. The following steps will be followed:

**Data Collection**: Collection of historical customer data from e-commerce platforms, including purchase history, browsing behavior, customer demographics and interaction data. This data is critical to understanding customer behavior and habits.

**Data Preprocessing**: Cleaning data, filling in missing data, and coding categorical variables. This step ensures that the data is made available for analysis and improves model performance.

**Exploratory Data Analysis (EDA)**: Analyzing data with descriptive statistics and visualizations. EDA is used to understand the distribution, relationships, and potential anomalies of data.

**Model Development**: Creating and evaluating machine learning models (logistic regression, decision trees, etc.) to predict customer churn. During the model development process, the performances of different algorithms will be compared and the model that gives the best results will be selected.

**Feature Engineering**: Increasing model performance by creating new features from existing data. This step is critical to increase the accuracy and generalizability of the model.

**Model Validation**: Evaluating the performance of the model through cross-validation and other methods. The accuracy of the model will be evaluated through metrics such as precision, sensitivity, and F1 score.

**Strategy Development**: Determining alternative strategies to reduce customer churn. These strategies will be personalized based on the model's predictions.

**Implementation Plan:** Establishing a timeline and milestones for the implementation of the project. This plan will ensure that each phase of the project is completed on time and within budget.

## Data Sources

The data of the project will be provided from the database of the e-commerce platform. Main data points will include:

**Transaction Data**: Customer purchase details such as product categories, purchase frequency, and monetary value.

**Customer Demographics**: Information such as age, gender, location and membership status.

**Navigational Behaviors**: Data such as page views, time spent and clicks that the customer performs on the website.

**Customer Feedback**: Reviews and ratings that provide insights into customer satisfaction levels. Permission will be obtained from the e-commerce platform management for access and use of this data. Additionally, data privacy and security measures will be strictly implemented and relevant regulations will be complied with.

## Ethical Considerations

The following ethical issues will be taken into account within the scope of the project:

**Data Privacy**: Anonymization and secure storage of customer data.

**Informed Consent**: Obtaining explicit consent for the use of data.

**Fairness and Impartiality**: Addressing biases so that the model does not discriminate against any group.

**Transparency**: Transparent disclosure of data usage and model predictions.

**Compliance**: Ensuring compliance with GDPR and other data protection laws.

## Conclusion

This capstone project aims to use predictive analytics to address customer churn in the e-commerce industry. With the forecasting model and applicable strategies to be developed, businesses will be able to increase customer loyalty, improve their revenues and gain a competitive advantage in the market. The scope and ethical considerations outlined in the project provide a comprehensive and responsible approach to solving this real-world problem.