A PREDICTIVE ANALYSIS FOR CUSTOMER RETENTION AND REVENUE OPTIMIZATION AT POWERCO

A PROPOSAL REPORT FOR THE BDM CAPSTONE PROJECT

SUBMITTED BY

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DECLARATION STATEMENT

I am working on a project titled **"A Predictive Analysis for Customer Retention and Revenue Optimization at PowerCo"**. I extend my appreciation to **PowerCo Ltd**, for providing the necessary resources that enabled me to conduct my project.

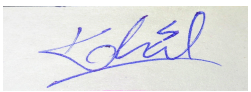
I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered through primary sources and carefully analyzed to assure its reliability.

Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the information of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report.

I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. In the event that plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority.

I agree that all the recommendations are business-specific and limited to this project exclusively, and cannot be utilized for any other purpose with an IIT Madras tag. I understand that IIT Madras does not endorse this.



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Date: 10TH NOVEMBER, 2024

I. EXECUTIVE SUMMARY

PowerCo is a New Zealand utility provider offering gas and electricity services to residential customers, small and medium enterprises (SMEs), and corporations. Serving both B2C and B2B markets, PowerCo is a prominent player in the energy sector.

The organization is currently dealing with two main challenges. First, they're seeing a high turnover of small and medium business customers, who are often drawn away by competitive pricing. Second, their revenue isn't steady, as it fluctuates with seasonal changes in energy use. Together, these issues affect PowerCo's profits and customer loyalty, especially as competition heats up in an open energy market.

In this project, I'll tackle these challenges by digging into customer and usage data with a range of analytical methods. Through exploratory data analysis (EDA) and predictive modeling (e.g. logistic regression, decision trees), I aim to spot high-risk customers and understand revenue trends to see how peak and off-peak seasons affect them.

The goal is to help PowerCo build targeted strategies to retain at-risk customers by offering them discounts and improve revenue forecasting, which will ultimately support steady growth and stability for the business.

II. ORGANIZATION BACKGROUND

I'm working with PowerCo, a major New Zealand utility company that provides gas and electricity to a wide range of customers - from homeowners to small businesses and large corporations. Known for its reliable service and solid infrastructure, PowerCo operates with a network of distribution channels and customer support teams, using data-driven tools to make its operations smooth and efficient.

III. PROBLEM STATEMENTS

A. PowerCo is experiencing a high turnover of small and medium business customers due to strong competition in the open energy market.

B. Seasonal shifts in energy consumption are creating unpredictable revenue streams.

These issues impact PowerCo's profitability, customer loyalty, and long-term financial stability in a competitive market environment.

IV. BACKGROUND OF THE PROBLEMS

The New Zealand energy market's recent liberalization has ramped up competition, allowing customers to pick from multiple energy providers. For established players like PowerCo, this change has led to higher turnover, especially among small and medium businesses, which are more likely to switch providers for better prices or services. This increase in customer churn is a real challenge for PowerCo, as keeping current customers is key to steady revenue and holding market share in a crowded field.

On top of that, PowerCo's revenue is affected by seasonal swings in energy demand, leading to unpredictable cash flows that complicate financial planning. To maintain financial stability and support growth, PowerCo needs to tackle both customer retention and revenue consistency. By taking a data-driven approach to these issues, PowerCo could make smarter decisions, applying targeted strategies to keep customers loyal and stabilize revenue across the year.

V. PROBLEM SOLVING APPROACH

A. Data Collection

- **Customer Data**: Information on customer demographics, industry type, contract length, energy consumption history, and tenure with PowerCo. This data will help segment customers and identify high-risk groups.
- **Churn Data**: Historical churn data, which indicates whether a customer has left PowerCo. This will serve as a key variable for building a predictive model to identify churn likelihood.
- **Pricing Data**: Historical pricing data, capturing any fluctuations in energy costs that customers may have experienced over time, to assess its impact on

churn.

- **Consumption Data**: Track seasonal usage patterns to understand revenue fluctuations and identify times of peak and off-peak consumption.

B. Exploratory Data Analysis (EDA)

- Conduct an initial analysis to identify patterns in customer demographics, usage, pricing, and churn rates. This will help uncover relationships between variables, such as the correlation between pricing changes and churn or seasonal usage trends.
- Visualize trends in churn and consumption across different customer segments, helping to identify specific groups that may be more susceptible to churn or contribute to seasonal revenue shifts.

C. Predictive Modeling

- **Churn Prediction Model**: Build a binary classification model using algorithms like logistic regression, decision trees, or random forests to predict which customers are most likely to churn.
- **Revenue Forecasting**: Develop a time-series or regression model to analyze consumption patterns and forecast seasonal revenue changes, supporting better financial planning.
- **Feature Engineering**: Create additional features from the data, such as average usage per season, customer tenure, and price sensitivity, to enhance the model's predictive accuracy.

D. Model Evaluation

- Assess model performance using metrics such as accuracy, precision, recall, and F1 scores to ensure reliability in churn prediction.
- For revenue forecasting, evaluate the model's effectiveness by comparing predicted versus actual revenue during peak and off-peak periods.

E. Strategic Recommendations

- Use model insights to recommend targeted retention strategies, such as discounts or loyalty programs, for customers identified as high churn risks.
- Suggest adjustments to pricing and marketing strategies during peak seasons

to capitalize on increased demand, as well as measures to stabilize cash flow during off-peak periods.

For this project, I'll be using a variety of analytical tools to process data, build predictive models, and generate insights. I'll primarily work with **Python**, leveraging **Pandas** and **NumPy** for data cleaning and preprocessing to efficiently handle large datasets. To explore trends and relationships, I'll use **Matplotlib** and **Seaborn** for data visualization. For predictive modeling, **scikit-learn** will be essential, as it provides machine learning algorithms like logistic regression, decision trees, and random forest for developing the churn prediction model. Additionally, I'll use **statsmodels** and **ARIMA** models in Python for time-series analysis to help forecast seasonal revenue patterns. **Jupyter Notebook** will be my development environment, allowing me to organize, document, and visualize my code in a single place. Lastly, I may use **Excel** or **Google Sheets** to create the Work Breakdown Structure (WBS) and Gantt chart for mapping out the project timeline. These tools together will support a thorough data analysis, model building, and effective presentation of findings.

VI. EXPECTED TIMELINE

A. Work Breakdown Structure

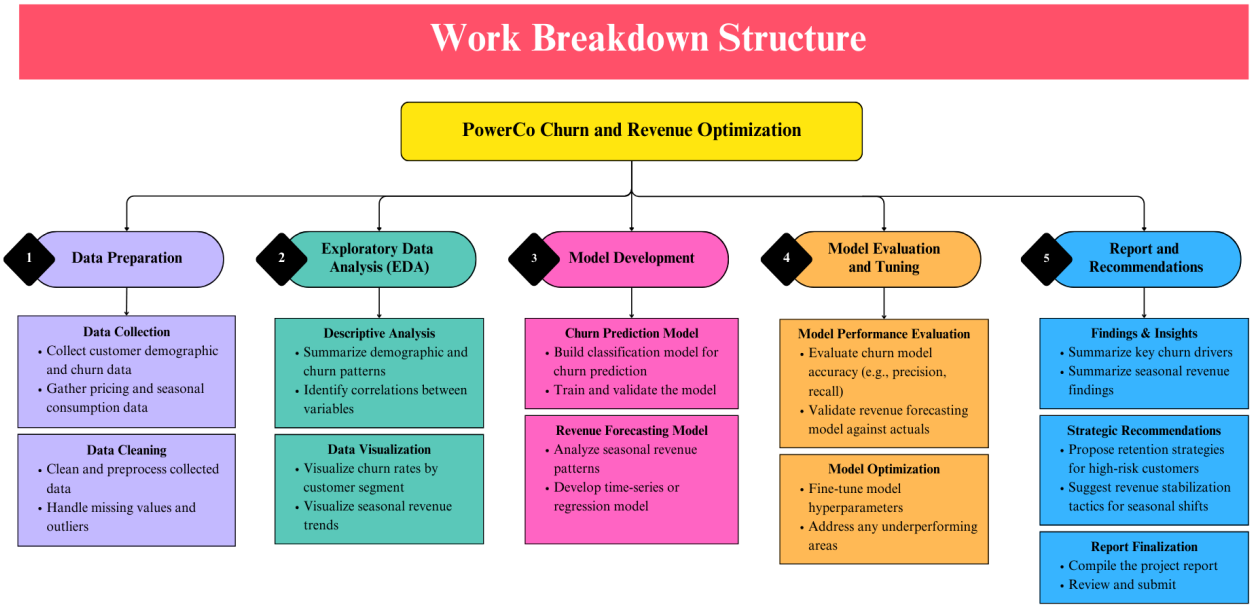

Fig. 1 Work Breakdown Structure

B. Gantt chart

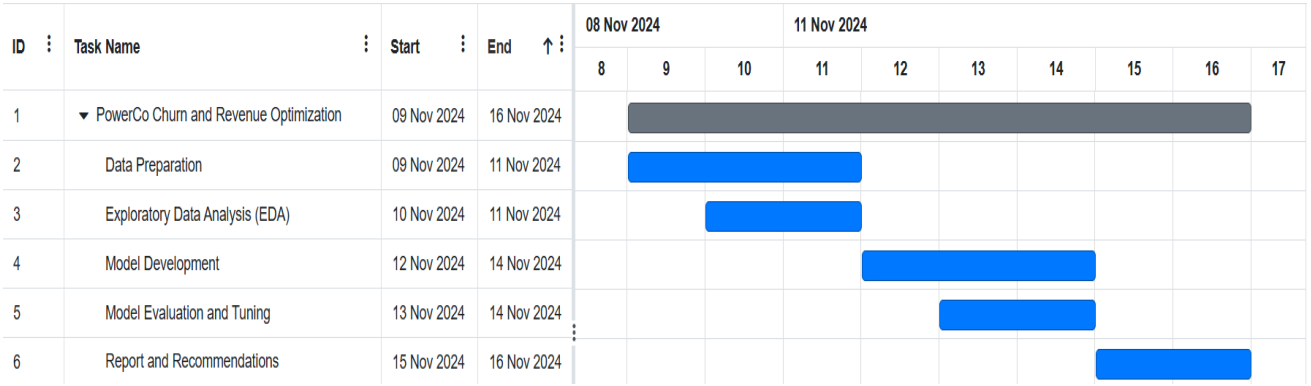

Fig. 2 Expected timeline for completion of project

VII. EXPECTED OUTCOMES

- **Churn Prediction Model**: A tool to identify at-risk SME customers so PowerCo can reach out proactively with targeted retention strategies, helping to reduce the churn rate.
- **Revenue Forecasting Model**: A model that tracks seasonal consumption trends to forecast revenue patterns, allowing PowerCo to plan for cash flow changes and adjust pricing or marketing when needed.
- **Insight into Churn Drivers**: A clear view of the main factors behind customer churn, such as price sensitivity and seasonal usage habits, which will help shape PowerCo's engagement and pricing strategies.