

Case Study: Customer Churn and Segmentation Analysis for Accenture

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Tools Used: Microsoft Excel, Python, Power BI

Project Type: End-to-End Business Intelligence and AI Project

In this project, I worked on a simulated use case for Accenture that involved analyzing customer behavior to understand churn patterns and segment customers into meaningful categories. The goal was to uncover what drives customers to leave and how they can be grouped based on their risk levels and product usage behavior. The project integrated multiple tools across different stages—Excel for initial data structure, Python for machine learning and segmentation, and Power BI for dashboard visualization.

The data was structured into four main sheets within Excel: *Raw Data*, *Feature Engineering*, *Churn Analysis*, and *Segmentation*. The *Raw Data* sheet served as the foundation, containing original customer details. From there, I moved to the *Feature Engineering* sheet, where I refined the dataset by handling missing values, encoding categorical variables, and creating important new fields like the *Risk Score*. This sheet served as the bridge between the original data and machine learning-ready data.

Using Python, I began with loading and exploring the dataset, identifying trends and correlations. After ensuring data quality, I performed feature engineering to prepare the dataset for machine learning. I used a Random Forest model to predict whether a customer would churn or not. This model helped understand the influence of variables like customer tenure, spend, number of products used, and complaint count on churn behavior. In parallel, I applied AI through KMeans clustering to divide customers into distinct segments based on their risk and behavioral profiles. These clusters provided clarity on which customer groups are more likely to churn and which are loyal or low-risk.

Once the outputs were ready, I exported them to Excel to keep a record of model predictions and cluster assignments. These sheets then formed the basis of an interactive Power BI dashboard. The dashboard featured several types of visuals designed for business decision-makers. Cards displayed key metrics such as Average Risk Score, Total Churned Customers, and Average Spend. Bar and column charts illustrated churn by segment and by product usage. A pie chart showed the proportion of churned vs active customers, while scatter plots highlighted relationships such as Spend versus Risk. Slicers were used to allow filtering by different dimensions like gender and tenure, helping stakeholders focus on specific customer profiles.

Throughout the project, the insights became clearer. I discovered that customers with short tenure and high risk scores were most likely to churn. Also, those using fewer products or having a higher complaint count showed strong signs of dissatisfaction. From the segmentation analysis, three customer types were identified: low-risk loyal customers, moderate-risk customers needing attention, and high-risk customers likely to churn soon.

The final outcome of this project is a comprehensive decision-support tool for Accenture's simulated client base. The model offers predictions on customer churn and provides clear segmentation to inform retention strategies. The dashboard enables business stakeholders to make data-driven decisions without diving into the technical aspects. By combining machine

learning with visual analytics, this project demonstrates how AI can be used to improve customer relationship management.

Going forward, this type of analysis can be scaled to include live customer data for real-time insights. It can also be extended to incorporate behavioral and transactional data from CRM systems for even more accurate predictions.

This case study represents not just a technical exercise, but a business solution—bridging raw data to strategic action in a way that's understandable and impactful for both data teams and business stakeholders.