

ABSTRACT

This project aims to support Marburg Vehicles and Parts (MVP) in launching a targeted advertising campaign by leveraging AI-driven insights from their sales dataset. The dataset comprises 2,823 records spanning from 2003 to 2005, covering key attributes such as product lines, geographic sales, customer information, and transaction details. Using the Team Data Science Process (TDSP) methodology, we conducted exploratory data analysis and applied machine learning techniques, including the Gaussian Mixture Model (GMM), to uncover actionable patterns. Our analysis identifies seasonal trends, top-performing product lines (e.g., Classic Cars and Vintage Cars), and high-revenue markets (e.g., USA, Spain, France). Additionally, we examine deal sizes and customer segments to optimize ad targeting. Based on these insights, we recommend prioritizing high-demand periods, tailoring creatives to regional preferences, and converting small deals to medium-sized ones. This project demonstrates how AI-powered, data-driven strategies, underpinned by structured methodologies like TDSP, can significantly enhance MVP's marketing efficiency.

INTRODUCTION

Marburg Vehicles and Parts (MVP), a global automotive retailer, seeks to optimize its advertising strategy through targeted campaigns informed by historical sales data. The dataset provided includes transactional records from 2003 to 2005, offering insights into product performance, customer behaviour, and geographic sales distribution.

To guide this initiative, we employ the Team Data Science Process (TDSP) methodology, ensuring a structured and repeatable approach to data exploration, modelling, and deployment. A key component of our analysis is the application of Gaussian Mixture Model (GMM) clustering, an AI technique used to uncover latent customer segments and identify nuanced patterns within the data.

Key challenges include addressing missing geographic data (e.g., 52.7% missing STATE values) and outdated temporal information, which may limit hyper-local targeting. However, the dataset reveals actionable patterns:

- **Product Performance:** Classic Cars and Vintage Cars dominate sales, while Trains underperform.
- **Geographic Hotspots:** The USA, Spain, and France account for the highest revenue, with EMEA being the top territory.
- **Seasonality:** Sales peak in November, suggesting strategic timing for promotions.

By applying GMM analysis and segmentation techniques, we aim to refine MVP's ad targeting strategy. This report outlines our methodology, derived insights, and actionable recommendations to maximize campaign effectiveness. Our approach aligns with MVP's goal of leveraging AI and data to drive precision marketing and operational efficiency.