

# ElectroMart Marketing Optimization Project

- **ELECTROMART MARKETING OPTIMIZATION PROJECT (March 2024 – April 2024)**
  - **Objective:** Analyzed sales, marketing, and operational data for ElectroMart (Ontario) to measure marketing channel effectiveness, optimize spend, and streamline SKU-level inventory allocation.
  - **Project Overview:**
    - \* Studied order patterns, revenue drivers, and SKU contribution to understand where marketing spend delivers the highest returns.
    - \* Created actionable metrics and implemented statistical and optimization methods for marketing and operational decisions.
  - **Methodology and Techniques:**
    - \* **Data Pre-processing:** Handled missing data using K-Nearest Neighbors and Multiple Imputation (MICE), created time-based indicators (month, campaign flags), SKU-level category labels, treated outliers (IQR), and standardized timestamps and units.
    - \* **Exploratory Data Analysis (EDA):** Analyzed SKU-wise revenue (Pareto), channel efficiency, and temporal sales patterns (daily peaks, weather effects). Created correlation heatmaps for media spend and revenue relationships.
    - \* **KPI Development:** Defined KPIs for sales, pricing (average spend, discount threshold), operational efficiency (delivery timeliness, SLA compliance), and risk metrics (churn, NPS).
    - \* **Hypotheses Testing:** Conducted t-tests and F-tests to assess statistical significance and reliability of marketing features.
    - \* **Marketing Spend Optimization Model:** Created a logarithmic spend–return model across ten marketing channels achieving a 128% ROI and a 28% net profit improvement by optimizing spend allocations.
    - \* **Inventory Optimization Model:** Prioritized high-revenue SKUs (e.g., DSLRs, speakers) based on sales contribution and service level metrics, while reducing focus and carrying costs for low-performing SKUs.
  - **Impact and Results:**
    - \* Created actionable dashboards for marketing and operational improvement.
    - \* Developed a structured approach for aligning marketing spend with revenue generation.
    - \* Supported future strategies such as real-time dashboards, reinforcement learning for automated spend optimization, and advanced statistical trend detection.