Problem Statement Document

A/B Testing Analysis of Facebook vs Google AdWords Marketing Campaigns

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1. Business Context

Our company is running paid ad campaigns on both **Facebook** and **Google AdWords**. Management wants to identify which platform delivers better marketing performance in terms of attracting potential customers and driving conversions, while keeping costs low. The goal is to optimize future ad spend by focusing on the higher-performing platform.

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2. Objective

The primary goal is to identify which advertising platform delivers better overall performance to help the company:

- Optimize future ad spend.

- Maximize returns on marketing investment.

- Improve customer acquisition efficiency.

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3. Key Research Questions

- Is there a statistically significant difference in **Click-Through Rate (CTR)** between Facebook and Google AdWords campaigns?
- Which platform shows a **higher average Conversion Rate (CVR)**?
- Which platform offers better **Cost per Click (CPC)** performance?
- Are differences in performance metrics statistically significant?
- How do performance trends evolve over **time** (monthly or quarterly)?
- Is there any evidence of **seasonality** or **ad fatigue**?

- Based on the analysis, should the company increase, reduce, or redistribute its budget allocation between Facebook and AdWords?

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4. Methodology

- Perform **Exploratory Data Analysis (EDA)** to understand campaign performance.

- Conduct **statistical hypothesis testing (t-tests or ANOVA)** to evaluate differences in CTR, CVR, and CPC.

- Use **visualizations** to identify patterns and trends.

- Draw **data-driven recommendations** based on insights.

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5. Success Criteria

The analysis will be considered successful if it provides:

- A clear answer to whether Facebook or Google AdWords is more effective.

- Statistically backed evidence to support budget allocation recommendations.

- Actionable insights to guide future marketing strategy.