**Day 4: Data Ingestion & SQL Analysis**

**Goal:**

To import the generated synthetic marketing campaign data into MySQL, verify data consistency, and perform analytical SQL queries that measure and compare campaign performance across platforms, regions, and objectives.

This phase transforms raw data into meaningful marketing insights.

**Tasks Performed**

1. **Imported CSVs into MySQL:**
   * Loaded campaigns.csv and metrics.csv into their respective tables using MySQL Workbench.
   * Verified successful import using SELECT COUNT(\*) and sample queries.
2. **Verified Schema Relationships:**
   * Ensured joins between platforms, campaigns, and metrics worked correctly.
   * Tested referential integrity via JOIN queries.
3. **Wrote Analytical Queries:**
   * Computed marketing KPIs: CTR, CPC, CPA, and ROI.
   * Performed campaign, platform, and region-level analysis.
   * Created advanced insights such as daily trends and objective-based performance.

**Key SQL Concepts Used:**

| **Concept** | **Purpose** | **Example** |
| --- | --- | --- |
| JOIN | Combine multiple tables (platforms, campaigns, metrics) | JOIN campaigns c ON c.platform\_id = p.platform\_id |
| GROUP BY | Aggregate metrics by campaign, region, or platform | GROUP BY c.region |
| SUM() | Add up total impressions, clicks, spend, etc. | SUM(m.impressions) |
| ROUND() | Format KPI outputs for readability | ROUND(SUM(m.spend)/SUM(m.clicks),2) |
| ORDER BY | Sort results (e.g., by ROI descending) | ORDER BY ROI\_percent DESC |

**KPI’s Calculated:**

| **KPI** | **Formula** | **Meaning** |
| --- | --- | --- |
| **CTR (Click-Through Rate)** | (clicks / impressions) \* 100 | Engagement rate |
| **CPC (Cost Per Click)** | spend / clicks | Cost per user click |
| **CPA (Cost Per Acquisition)** | spend / conversions | Cost per successful conversion |
| **ROI (Return on Investment)** | (revenue - spend) / spend \* 100 | Profitability measure |

**Analytical Insights Generated**

1. **Campaign Performance Overview**

* Calculated campaign-level CTR, CPC, CPA, and ROI.
* Identified top 5 campaigns by ROI using ORDER BY ROI DESC.

1. **Platform-Wise Insights**

* Compared Google Ads, Facebook Ads, and YouTube performance.
* Found the platform with the highest ROI and lowest CPC.

1. **Region-Wise Insights**

* Grouped campaigns by region (India, USA, UK).
* Found which geography provides the best returns.

1. **Objective-Based Analysis**

* Evaluated objectives such as “Sales,” “Awareness,” “Traffic,” and “Engagement.”
* Found which goal achieved the best ROI and conversion rate.

1. **Daily Trend Analysis**

* Aggregated daily impressions, spend, and revenue to visualize trends over time.
* Helped simulate day-by-day performance monitoring.

**6. Optimization Query**

* Created a “High CTR but Low ROI” filter query to identify underperforming campaigns.
* Adjusted threshold to ROI < 300 (based on dataset) to analyze low-profit yet high-engagement ads.
* This reflects how analysts set custom benchmarks in real organizations.

**Key Learnings:**

* Learned to import and analyze structured data in MySQL.
* Practiced analytical SQL queries to measure real-world KPIs.
* Understood the relationship between business metrics and database design.
* Adapted ROI thresholds dynamically to make the analysis more realistic.
* Strengthened understanding of JOIN, GROUP BY, and aggregate functions.