

Capstone Project Template

Course: Applied Business Analytics for Decision Making

Duration: Week 7

Project Title

marketing – Email Marketing Campaign Personalization and Analytics

Business Context & Problem Statement

In today's highly competitive marketing landscape, businesses rely heavily on email campaigns to engage and convert potential customers. Despite the broad reach of email marketing, many campaigns suffer from **low open and conversion rates**, which significantly reduces their effectiveness. The retail sector, in particular, faces challenges in cutting through the noise to deliver relevant content to users.

The central problem is to **improve engagement metrics**—such as open, click-through, and conversion rates—by leveraging customer data for **personalized campaign strategies**. This issue is crucial because poor targeting leads to wasted marketing spend and missed revenue opportunities. Addressing this challenge can drive **customer retention, increased ROI, and optimized marketing efforts**.

Key questions include:

Which customer segments are most responsive?

What factors influence email engagement?

How can content/timing be tailored to boost conversions?

Project Objectives:

Clean and explore customer and campaign data for inconsistencies and missing values

Segment customer base using demographic and behavioral data

Build predictive models to identify key drivers of engagement

Visualize campaign performance and insights through dashboards

Recommend actionable strategies for marketing teams

Data Sources & Collection :

https://www.kaggle.com/datasets/manishabhattach22/marketing-campaign-performance-dataset?utm_source=chatgpt.com

Type of Data: Structured data

Source: Excel customer datasets, SQL campaign database

Sample Variables: Customer Age, Gender, Campaign ID, Email Opened (Yes/No), Clicked, Converted, Send Time, Engagement Score, Purchase History

Tools & Technologies Used:

Excel – Customer data cleaning, handling missing values, segmentation

SQL – Historical campaign data querying and aggregation

Python – EDA, clustering (K Means), classification (e.g., logistic regression), visualization (pandas, seaborn)

Tableau – Dashboard development for KPIs (open rate, CTR, conversion rate)

Project Workflow

Day 1–2: Project Initiation

Understand business problem: low engagement in email campaigns

Define scope: Analyze customer and campaign data

Set timeline and deliverables (daily tasks, model development, dashboard design)

Day 3–5: Analysis Execution

Excel: Clean raw customer list; create segments by age, gender, behavior

SQL: Extract campaign data such as open/click rates per segment

Python:

Conduct exploratory data analysis

Perform clustering (e.g., KMeans) to group customers

Train classification model (e.g., logistic regression) to predict conversions

Validate findings using accuracy, AUC, etc.

Day 6–8: Final Output

Design Tableau dashboards: Segment performance, campaign KPIs

Summarize model outcomes and feature importance

Prepare a final report and business presentation with insights and recommendations

Methodology

Excel → Data Cleaning and Segmentation

Raw customer data was cleaned to remove duplicates, correct data types, and handle missing values.

Customers were segmented based on demographic attributes such as age and gender, as well as behavioral factors like purchase frequency and total spend.

SQL → Data Extraction

SQL queries were used to extract historical data on email campaigns, including open rates, click rates, and conversions.

Time-series data on campaign performance was collected to track engagement trends over time.

Python → Predictive Modeling and Clustering

Exploratory Data Analysis (EDA) was performed using pandas, matplotlib, and seaborn to identify patterns and correlations.

Clustering (KMeans) was used to segment customers based on engagement metrics.

Classification models (e.g., Logistic Regression) were applied to predict the likelihood of email conversion based on user behavior.

Tableau → Visualization of Performance Metrics

Dashboards were built to visualize KPIs such as open rate by segment, CTR by campaign, and conversion over time.

Filters and interactive elements enabled deeper insights for stakeholders.

Recommendations

Timing Optimization: Schedule marketing emails between 6 PM – 9 PM to maximize open rates.

Content Personalization: Customize subject lines and body content based on purchase history and preferred categories.

Segment Targeting: Focus budget on high and moderate engagement clusters for better ROI.

Ongoing Testing: Implement A/B testing across different subject lines and visuals to continuously optimize campaign elements.

