project_data_genai_2025q1_with_google_gemini

April 17, 2025

1 *My profiles*

1.0.1 LinkedIn

1.0.2 BlueSky

1.0.3 Kaggle

2 Projet Data & GenAI – 2025Q1 avec Google & Gemini

2.1 Project: Market Research & Creative Branding with Gemini

Welcome to my capstone project as part of the **Google GenAI Intensive Course**.
In this notebook, I explore a real-world business scenario using three key Generative AI capabilities:

2.1.1 Goal

Design and plan the launch of a new organic energy drink called **GreenBoost**, by leveraging:

- Text generation for market research and strategy
- Visual insights using simulated data

[10]:
```
# Step 0: Install dependencies
!pip install -q --upgrade google-genai pandas matplotlib
```

```
The history saving thread hit an unexpected error (OperationalError('attempt to
write a readonly database')).History will not be written to the database.
                         154.7/154.7 kB
8.6 MB/s eta 0:00:00
                         8.6/8.6 MB
90.5 MB/s eta 0:00:00:00:0100:01
                         100.9/100.9 kB
5.5 MB/s eta 0:00:00
ERROR: pip's dependency resolver does not currently take into account
all the packages that are installed. This behaviour is the source of the
following dependency conflicts.
ydata-profiling 4.16.1 requires matplotlib<=3.10,>=3.5, but you have matplotlib
3.10.1 which is incompatible.
bigframes 1.36.0 requires rich<14,>=12.4.4, but you have rich 14.0.0 which is
incompatible.
mlxtend 0.23.4 requires scikit-learn>=1.3.1, but you have scikit-learn 1.2.2
which is incompatible.
```

2.2 Step 1: Import libraries and retrieve API key from Kaggle Secrets

We import all necessary libraries and configure access to the Gemini API using a secret key stored in Kaggle.

[11]:
```
import os
import google.generativeai as genai
import pandas as pd
import matplotlib.pyplot as plt
from kaggle_secrets import UserSecretsClient

user_secrets = UserSecretsClient()
api_key = user_secrets.get_secret("GOOGLE_API_KEY")
genai.configure(api_key=api_key)
```

2.3 Step 2: List available Gemini models

We verify our access to the Gemini models and select the best available for our needs.

[12]:
```
print("Available models for generateContent:")
models = genai.list_models()
for m in models:
    if "generateContent" in m.supported_generation_methods:
        print(m.name)

desired_model = "gemini-1.5-flash-latest"
if not any(desired_model == m.name for m in models if "generateContent" in m.
 ↪supported_generation_methods):
    for m in models:
        if "generateContent" in m.supported_generation_methods:
            desired_model = m.name
            break

print("\nUsing model:", desired_model)
```

```
Available models for generateContent:
models/gemini-1.0-pro-vision-latest
models/gemini-pro-vision
models/gemini-1.5-pro-latest
models/gemini-1.5-pro-001
models/gemini-1.5-pro-002
models/gemini-1.5-pro
models/gemini-1.5-flash-latest
models/gemini-1.5-flash-001
models/gemini-1.5-flash-001-tuning
models/gemini-1.5-flash
models/gemini-1.5-flash-002
models/gemini-1.5-flash-8b
models/gemini-1.5-flash-8b-001
models/gemini-1.5-flash-8b-latest
models/gemini-1.5-flash-8b-exp-0827
models/gemini-1.5-flash-8b-exp-0924
models/gemini-2.5-pro-exp-03-25
models/gemini-2.5-pro-preview-03-25
models/gemini-2.0-flash-exp
models/gemini-2.0-flash
models/gemini-2.0-flash-001
models/gemini-2.0-flash-exp-image-generation
models/gemini-2.0-flash-lite-001
models/gemini-2.0-flash-lite
models/gemini-2.0-flash-lite-preview-02-05
models/gemini-2.0-flash-lite-preview
models/gemini-2.0-pro-exp
models/gemini-2.0-pro-exp-02-05
models/gemini-exp-1206
models/gemini-2.0-flash-thinking-exp-01-21
```

```
models/gemini-2.0-flash-thinking-exp
models/gemini-2.0-flash-thinking-exp-1219
models/learnlm-1.5-pro-experimental
models/gemma-3-1b-it
models/gemma-3-4b-it
models/gemma-3-12b-it
models/gemma-3-27b-it

Using model: gemini-1.5-flash-latest
```

2.4 Step 3: Initialize the selected Gemini model

We configure our model with specific generation settings.

[13]:
```python
model = genai.GenerativeModel(
    model_name=desired_model,
    generation_config={
        "temperature": 0.7,
        "top_p": 1,
        "top_k": 1,
        "max_output_tokens": 2048,
    }
)
```

2.5 Step 4: Market Research – GreenBoost Brand

We ask the model to analyze the market and give insights for launching our product.

[14]:
```python
prompt1 = """I am launching a new organic energy drink brand called␣
 ↪"GreenBoost".
Please:
1. Identify the top market trends for organic energy drinks in 2024.
2. Describe what young consumers expect from such a product.
3. Suggest 3 creative marketing strategies to successfully launch the brand.
"""

response1 = model.generate_content(prompt1)
print("===== Market Research Analysis Response =====")
print(response1.text)
```

```
===== Market Research Analysis Response =====
## GreenBoost: Launching an Organic Energy Drink in 2024

**1. Top Market Trends for Organic Energy Drinks in 2024:**

* **Transparency and Traceability:** Consumers are increasingly demanding
transparency about ingredients and sourcing.  Knowing where ingredients come
from and how they are grown is crucial.  This includes certifications like USDA
```

Organic and fair trade practices.
* **Functional Benefits Beyond Energy:** The market is moving beyond simple caffeine boosts. Consumers want drinks that offer added benefits like improved cognitive function, immune support, gut health (probiotics), and enhanced athletic performance (electrolytes).
* **Sustainable Packaging:** Eco-conscious packaging is paramount. This includes using recycled materials, reducing plastic use, and ensuring recyclability or compostability.
* **Natural Sweeteners and Flavors:** Artificial sweeteners and flavors are losing favor. Consumers prefer naturally derived sweeteners (e.g., stevia, monk fruit) and unique, interesting flavor profiles.
* **Low Sugar/Sugar-Free Options:** Health-conscious consumers are seeking lower-sugar or sugar-free alternatives to traditional energy drinks.
* **Personalized Experiences:** Opportunities exist for customized drinks or subscription boxes offering tailored blends based on individual needs and preferences.
* **Clean Label:** Simple, easily understandable ingredient lists are highly valued. Avoid long lists of unfamiliar chemicals or additives.

2. Young Consumer Expectations for Organic Energy Drinks:

Young consumers (Gen Z and Millennials) expect:

* **Authenticity and Brand Values:** They want brands that align with their values, particularly sustainability, social responsibility, and ethical sourcing. Greenwashing will be immediately spotted and rejected.
* **Great Taste and Unique Flavors:** They are adventurous and want exciting, innovative flavor combinations beyond the standard.
* **Social Media Integration:** A strong social media presence is vital for engagement and building a community. User-generated content and influencer marketing will be key.
* **Convenience and Accessibility:** Easy access through online retailers, convenient store locations, and subscription services is crucial.
* **Health and Wellness Focus:** They prioritize health and well-being, seeking functional benefits beyond just energy. Transparency regarding ingredients and health claims is essential.
* **Sustainability and Ethical Practices:** They want to support brands committed to environmental protection and fair labor practices.

3. Creative Marketing Strategies for GreenBoost:

* **Experiential Marketing & Pop-Up Shops:** Host interactive pop-up shops in vibrant locations targeting young consumers. Offer free samples, interactive games, and educational content about sustainable practices and the ingredients in GreenBoost. This creates a memorable brand experience and generates social media buzz.

```
* **Influencer Marketing Campaign with a Twist:**  Instead of simply partnering
with large influencers, collaborate with micro-influencers and up-and-coming
athletes or artists who align with the brand's values.  Focus on authentic
storytelling and showcasing the drink's benefits through relatable content.
Encourage user-generated content by running contests and challenges.

* **Sustainability-Focused Social Media Campaign:**  Develop a social media
campaign highlighting GreenBoost's commitment to sustainability.  This could
include behind-the-scenes content showcasing ethical sourcing, eco-friendly
packaging, and partnerships with environmental organizations.  Partner with
relevant environmental influencers and use hashtags that promote sustainability
and healthy living.  Run contests promoting recycling or sustainable practices.


By focusing on these trends, expectations, and marketing strategies, GreenBoost
can establish itself as a leading brand in the burgeoning organic energy drink
market.  Remember that consistent brand messaging emphasizing authenticity,
transparency, and sustainability across all platforms will be crucial for long-
term success.
```

2.6 Step 5: Creative Product Naming

We ask Gemini to generate catchy and innovative product names for our energy drink.

[15]:
```
prompt2 = """Propose 3 innovative and catchy product names for a sugar-free␣
  ↪organic energy drink targeting college students.
For each name, provide a brief description explaining its appeal.
"""

response2 = model.generate_content(prompt2)
print("\n===== Creative Product Naming Response =====")
print(response2.text)
```

```
===== Creative Product Naming Response =====
1. **NovaBoost:**

* **Description:**  "Nova" evokes a sense of bright energy and innovation,
fitting the target demographic. "Boost" clearly communicates the product's
function. The combination is short, memorable, and suggests a powerful, positive
energy lift without the sugar crash.  The name also subtly hints at the "new"
and improved nature of a sugar-free energy drink.

2. **BrainSpark:**

* **Description:** This name directly targets the college student's need for
```

```
mental acuity. "Brain" clearly indicates cognitive benefits, while "Spark"
implies a quick, effective energy boost. It's playful and memorable, suggesting
a creative and intelligent energy. The organic and sugar-free aspects align with
health-conscious students seeking a clean energy source.


3. **AmplifyO:**

* **Description:** "Amplify" speaks to the energy boost, while "O" is a
shortened, modern-sounding version of "Organic."  The combination is sleek and
contemporary, fitting the aesthetics preferred by many college students.  The
slightly mysterious "O" adds a touch of intrigue and sophistication. It's a
shorter, punchier name that's easy to remember and pronounce.
```

2.7 Step 6: Explain ML Concepts

We use the model to simplify a key machine learning concept.

[16]:
```
prompt3 = """Explain in simple terms the difference between clustering and␣
 ↪classification in machine learning."""

response3 = model.generate_content(prompt3)
print("\n===== Clustering vs Classification Explanation =====")
print(response3.text)
```

```
===== Clustering vs Classification Explanation =====
Imagine you have a bunch of LEGO bricks.

**Classification** is like already having instructions to build a specific LEGO
model (e.g., a car). You're given a new brick and you need to figure out which
part of the car it belongs to (wheel, body, etc.). You already know the
categories (car parts) beforehand.

**Clustering** is like having a huge pile of LEGO bricks of all shapes, sizes,
and colors, but *no instructions*.  You need to group the bricks together based
on their similarities - maybe you'll group all the red bricks together, all the
square bricks, all the large bricks, etc. You don't know the categories
beforehand; you're discovering them.

In short:

* **Classification:**  You know the categories, and you assign data points to
them.  (Supervised learning)
* **Clustering:** You don't know the categories, and you discover them from the
data. (Unsupervised learning)
```

2.8 Step 7: Simulated Market Segment Analysis

We simulate data and create two visualizations to represent segment popularity and spending.

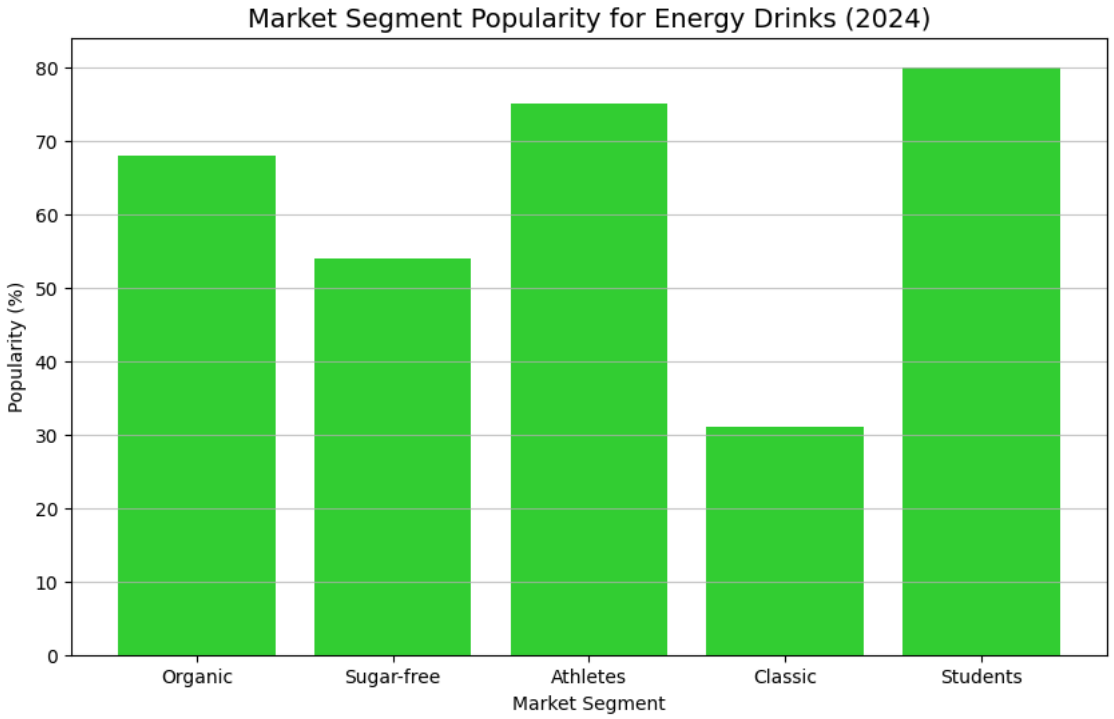
2.8.1 Data

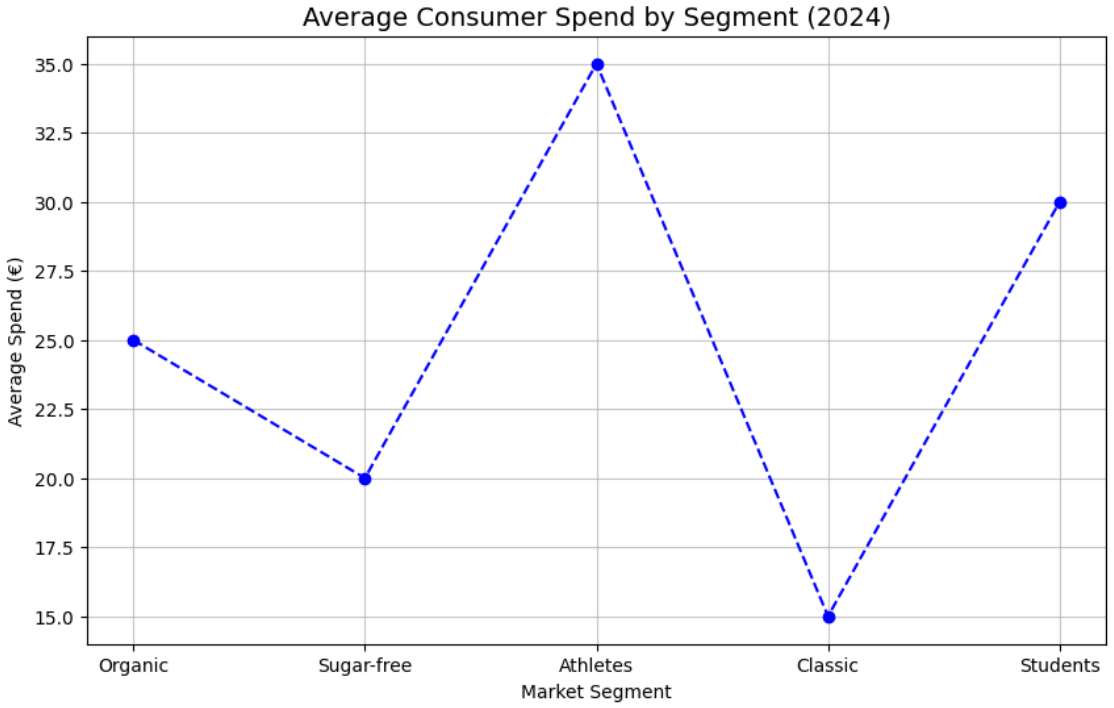
[17]:
```
data = {
    "Segment": ["Organic", "Sugar-free", "Athletes", "Classic", "Students"],
    "Popularity (%)": [68, 54, 75, 31, 80],
    "Average Spend (€)": [25, 20, 35, 15, 30]
}

df = pd.DataFrame(data)
df
```

[17]:

	Segment	Popularity (%)	Average Spend (€)
0	Organic	68	25
1	Sugar-free	54	20
2	Athletes	75	35
3	Classic	31	15
4	Students	80	30

[18]:
```
# Bar chart
plt.figure(figsize=(10, 6))
plt.bar(df["Segment"], df["Popularity (%)"], color="limegreen")
plt.title("Market Segment Popularity for Energy Drinks (2024)", fontsize=14)
plt.xlabel("Market Segment")
plt.ylabel("Popularity (%)")
plt.grid(axis='y', alpha=0.7)
plt.show()

# Line chart
plt.figure(figsize=(10, 6))
plt.plot(df["Segment"], df["Average Spend (€)"], marker="o", linestyle="--",␣
 ↪color="blue")
plt.title("Average Consumer Spend by Segment (2024)", fontsize=14)
plt.xlabel("Market Segment")
plt.ylabel("Average Spend (€)")
plt.grid(True, alpha=0.7)
plt.show()
```


Market Segment Popularity for Energy Drinks (2024)
Popularity (%)
0
10
20
30
40
50
60
70
80
Organic
Sugar-free
Athletes
Classic
Students
Market Segment


Average Consumer Spend by Segment (2024)
Average Spend (€)
15.0
17.5
20.0
22.5
25.0
27.5
30.0
32.5
35.0
Organic
Sugar-free
Athletes
Classic
Students
Market Segment