AI-Driven Promotion Suggestions Plan

1. Goal

Analyse sales data to identify low-performing and popular products, then suggest appropriate promotion strategies to increase revenue.

2. Feature Details

6.a. Identify Low-Selling Products

This feature identifies products with low sales performance and provides appropriate promotion or price change suggestions:

- Substantial discounts to stimulate demand
- Bundling with popular products to increase visibility
- Focused social media promotion to increase product awareness
- Special limited-time offers to create urgency

6.b. Promote Best-Selling Products

This feature identifies popular products and provides marketing campaign suggestions:

- Small discounts on already popular items
- Bundle deals with less popular items
- Social media campaigns highlighting the popularity
- Limited edition or seasonal variations

3. Workflow

1. Sales Data Collection

Sales data can be collected in two ways.

The first is through **CSV file upload**, where users can select and upload CSV files from the *Manage Sales Data* page under the Settings menu.

The second method is through **Square account integration**, where users can link their Square account from the *Link Square Account* page in the Settings menu. After integration is complete, recent sales data is automatically uploaded. Data is automatically synchronised upon subsequent logins, and users can also manually refresh the latest data by clicking the **refresh button** on the *Manage Sales Data* page.

2. Data Processing and Storage

Once sales data is collected, the system automatically analyses the **daily sales performance of each product** and stores the results in the database. The data is organised by **product id, product name, transaction price, sale date, and quantity sold**.

3. Data Analysis and Presentation

The stored data is used in two main ways.

First, users can view analysis results on the *Manage Sales Data* page, where they can see charts displaying the **daily sales trends** of the **Top 3 Best-Selling** and **Bottom 3 Least-Selling Products** over time. A **toggle feature** at the top of the chart allows users to easily switch between these two views.

Second, the data is processed and prepared for **AI-driven promotion suggestion generation**.

4. Promotion Suggestions

Users can click the **Request Suggestions** button in the *Suggestions* section of the *Promotions* menu to generate promotion ideas based on the analysed sales data. For both low- and high-performing products, the system provides promotion suggestions, including tactics like price discounts, bundled sales, and social media campaigns. Once the suggestions are generated, users can review them and, if suitable, click **Create Promotion** to apply the ones they like.

5. Post Creation

Users can view applied promotions in the *Promotions* section and create social media posts with ease. After reviewing the promotion details, users can click the **Create Post** button to be redirected to the post creation page. Here, users can upload a photo and provide additional details, such as item descriptions or custom prompts. The **promotion description** is automatically pre-filled in the relevant fields to make the process faster.

6. Promotion Tracking

The *Promotions* section also provides a comprehensive view of **scheduled, ongoing, and completed promotions**. For each promotion, metrics are displayed to compare cumulative sales after the promotion with the average sales during the same period prior to the promotion. This allows users to intuitively assess the **effectiveness of each promotion** and improve future marketing strategies. Additionally, users can edit promotion dates or duplicate promotions to create new ones for different dates, making it easier to manage and adjust ongoing campaigns.

4. Related Data Fields

1. Business

Stores information related to a business

name	**description**
PK	**Auto-generated ID**
square_access_token	OAuth token for Square API authentication
last_square_synk_at	Timestamp of last Square data synchronisation
other fields	*Contains other business-specific details*

2. SalesData

Stores sales data for a business from CSV file uploads

name	description
PK	**Auto-generated ID**
business	ForeignKey to Business model
file	Uploaded sales data file
filename	Name of the uploaded file
file_type	Type of file (currently supports CSV only)
uploaded_at	Timestamp of file upload
processed	Flag indicating if the file has been processed (currently `True` only)
processed_at	Timestamp of processing completion (currently the same as `uploaded_at`)

3. SalesDataPoint

Stores detailed information about individual sales transactions

name	description
PK	**Auto-generated ID**
Unique Key	**Composite key on business, date, source, product_name, product_price**
business	ForeignKey to Business model
date	Date
product_name	Name of the product
product_price	Price of the product
units_sold	Number of units sold
source_file	ForeignKey to SalesData (optional)
source	Source of data ('upload' or 'square')

4. SalesDataPointSerializer

Serializes daily revenue for each product, based on `SalesDataPoint`

name	description
product_name	Name of the product
daily_sales	Sales data for the product by date
price_performance	Sales data for the product by price

```
# Example
{
```

```
  "product_name": "Iced Latte",
  "daily_sales": [
    {
      "date": "2025-04-01",
      "total_revenue": 17.5,
      "total_units": 5
    },
    ...
  ],
  "price_performance": [
    {
      "price": 3.50,
      "total_units": 42,
      "period": ["2025-04-01", "2025-04-10"]
    },
    {
      "price": 4.00,
      "total_units": 12,
      "period": ["2025-04-11", "2025-04-20"]
    },
  ]
}
```

5. SalesChartSummarySerializer

Serializes chart data of top and bottom-selling products, based on data from `SalesDataPoint`

name	description
top_selling	Chart data of top 3 best-selling products
bottom_selling	Chart data of bottom 3 least-selling products

```
# Example: top_selling_chart_data
{
  "labels": ["2025-04-01", "2025-04-02", "2025-04-03"],
  "datasets": [
    {
      "label": "Product A",
      "data": [30, 45, 50]
    },
    {
      "label": "Product B",
      "data": [20, 35, 40]
    }
  ]
}
```

6. SalesDataForAISerializer

Serializes data for AI-driven analysis to generate promotion suggestions, based on data from `SalesDataPointSerializer` and `Business`

name	description
products_performance	Performance data for products
pricing_data	Pricing history and sales comparison by price range
context_data	Business context

```
# Example
{
  "products_performance": [
    {
      "product_name": "Iced Latte",
      "total_revenue": 195.0,
      "total_units": 54,
      "trend": "downward",          // "upward", "downward", "flat"
      "category": "top_10_percent"  // "top_10_percent", "bottom_10_percent",
"average"
    },
    ...
  ],
  "pricing_data": [
    {
      "product_name": "Iced Latte",
      "price_performance": [
        {
          "price": 3.50,
          "total_units": 42,
          "period": ["2025-04-01", "2025-04-10"]
        },
        {
          "price": 4.00,
          "total_units": 12,
          "period": ["2025-04-11", "2025-04-20"]
        }
      ]
    },
    ...
  ]
}
```

7. PromotionSuggestion

Stores promotion suggestions from AI

name	description
PK	**Auto-generated ID**

name	description
business	ForeignKey to Business model
categories	ManyToMany to PromotionCategories
title	Text description of the promotion
description	Text description of the promotion
created_at	Timestamp when promotion was created

8. Promotion

Stores applied promotion from suggestions

name	description
PK	**Auto-generated ID**
business	ForeignKey to Business model
categories	ManyToMany to PromotionCategories
description	Text description of the promotion
start_date	Date when the promotion starts
end_date	Date when the promotion ends
created_at	Timestamp when promotion was created
sold_count	Number of items sold during promotion

9. PromotionSerializer

Serializes promotion data and tracks its effect on sales, based on data from `Promotion` and `SalesDataPointSerializer`

name	description
id	Auto-generated ID
posts	List of posts related to the promotion
category_ids	List of category IDs associated with the promotion
categories	List of category infos associated with the promotion
description	Description of the promotion
start_date	Date when the promotion starts
end_date	Date when the promotion ends
status	Current status of the promotion (upcoming, ongoing, ended)
total_units	Total number of items sold during the promotion

name	description
sales_change	The sales change compared to the same period before the promotion

5. Implementation Plan

Phase 1: Planning & Data Collection & Presentation (Week 8: 21/04 - 27/04)

Goal: Set a strong foundation with clear planning, data structures, and initial backend setup.

Tasks

Sales Data Collection:

- Implement CSV file upload.
- Integrate Square account for automatic data syncing.

Data Processing & Storage:

- Process and store daily sales data.

Data Analysis & Presentation (first):

- Display Top 3 Best-Selling and Bottom 3 Least-Selling products on the frontend with charts.

Testing

- Verify that sales data is correctly stored and displayed.
- Ensure that charts for sales trends are functional.

Phase 2: AI Promotion Suggestions (Week 9: 28/04 - 04/05)

Goal: Build the logic for analyzing product performance and generating AI-powered suggestions.

Tasks

Data Analysis & Presentation (second):

- Implement AI-based promotion suggestion logic.
- Generate suggestions based on sales data.

Promotion Suggestions:

- Allow users to request promotion ideas for products using AI.

Testing:

- Ensure AI generates correct promotion suggestions.
- Verify frontend-backend data flow for promotion suggestions.

Phase 3: Post Creation & Promotion Tracking & Testing (Week 10: 05/05 - 11/05)

Goal: Connect the backend features to the UI, refine the user experience, and ensure overall quality.

Tasks

Post Creation:

- Implement automatic social media post creation from promotions.
- Pre-fill promotion details (description) in post creation.

Promotion Tracking:

- Implement sales tracking for promotions (compare sales before and after).

Final Integration & Testing:

- Integrate all features and perform final system tests.

Testing:

- Test post creation and promotion tracking.
- Conduct full system integration tests.