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Synopsis Report of Minor Project (ARP 455)

ON

**Platform that facilitates the Trend Analysis as well as Demand
Forecasting so that we are able to produce products in a better
quantity**

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Title: TrendyShop

A curated platform that enhances trend analysis and demand forecasting, enabling businesses to produce products in optimal quantities. By leveraging insights from consumer behaviour and market trends, TrendyShop helps brands align their offerings with customer needs, fostering innovation and improving resource utilization.

Objectives

1) Trend Analysis

Trend analysis involves monitoring social media to identify consumer preferences and emerging trends. By analysing this data, businesses can innovate their products to align with market demands. This approach enhances customer engagement and ensures that offerings resonate with current interests, ultimately leading to increased sales and brand loyalty.

2) Demand Forecasting

Demand forecasting predicts future consumer needs based on historical data and market analysis. By accurately estimating product demand, companies can optimize production levels, reduce waste, and effectively allocate resources. This process ensures that businesses meet customer expectations, minimize stockouts, and enhance operational efficiency, resulting in better overall performance.

3) Product Recommender

A product recommender personalizes cosmetic suggestions based on individual characteristics, such as skin tone. By analysing user data, this tool matches customers with suitable products, enhancing their shopping experience. Personalized recommendations foster confidence in product choices, increase conversion rates, and encourage customer loyalty, ultimately driving sales and satisfaction.

Proposed Methodology

TREND ANALYSIS

1. Extract Links

- SerpApi YouTube Search API:
 - Utilize SerpApi's YouTube Search functionality to look up trending products by keywords or specific queries.
 - The API returns links to videos that mention or discuss these trending products.
- YouTube Transcript:
 - Once the video links are retrieved, fetch the corresponding transcript using YouTube's transcript feature.
 - Parse through the transcript to identify the names or descriptions of the products mentioned in the video.

2. Retrieving Products

- Send Transcript to Gemini:
 - The fetched transcript is processed and sent to Google Gemini for AI-based analysis.
 - Gemini processes the transcript and extracts relevant product names or descriptions (e.g., makeup products).
- Extracting Products:
 - The response from Gemini is formatted in a way that lists out the mentioned products.
 - These extracted products are stored for further analysis.

3. Similar Products

- Match Products:
 - With the list of products extracted from Gemini, the system compares these with the existing product database.
 - It uses matching algorithms to find similar or related products.
- KNN Algorithm:
 - A K-Nearest Neighbours (KNN) algorithm is employed to find similar products based on features such as brand, category, or descriptions.
 - The system then displays these matched products, which can be further used for recommendations, trend tracking, or purchasing decisions.

Extract Links

With the help of SerpApi YouTube Search ApiKey . Through this we are able to search for a specific Trending Product

Using YouTube Transcript in order to fetch the transcript of the provided link and retrieve the Product mentioned

Retrieving Products

With the Generated Transcribed we are going to send these Transcript to Gemini

Specifying the format of the response generated by Gemini and in the response we will extract the List of the mentioned Makeup Products

Similar Products

With generated list of Products then after that we will match that products with our current Database and able to get the matching products

Similar Products matched using KNN Algorithm would be shown

DEMAND FORECASTING

1) Time Series Models:

- Moving Average: Smoothens historical data to predict future demand.
- Exponential Smoothing: Weights recent data more heavily.
- ARIMA (Auto-Regressive Integrated Moving Average): Captures seasonality and trends in time series data.

2) Causal Models:

- Regression Analysis: Determines relationships between demand and other variables like price or marketing spend.
- Machine Learning Models: Use algorithms like decision trees, random forests, or neural networks to predict demand based on large datasets.

Combining the Functionalities of Both and after that Using them so that we are able to get a model with greater Accuracy and Precision.

PRODUCT RECOMMENDER

1) Colour Extraction:

- The uploaded image is resized, and dominant colours are extracted using K-Means clustering.
- The resulting dominant face colour is converted into a hex code for further processing.

2) Colour Matching:

- The extracted face hex code is compared to a list of foundation hex codes.
- Delta E (CIE76) is used to calculate colour differences, selecting the top 6 closest matching shades.

3) Product Search:

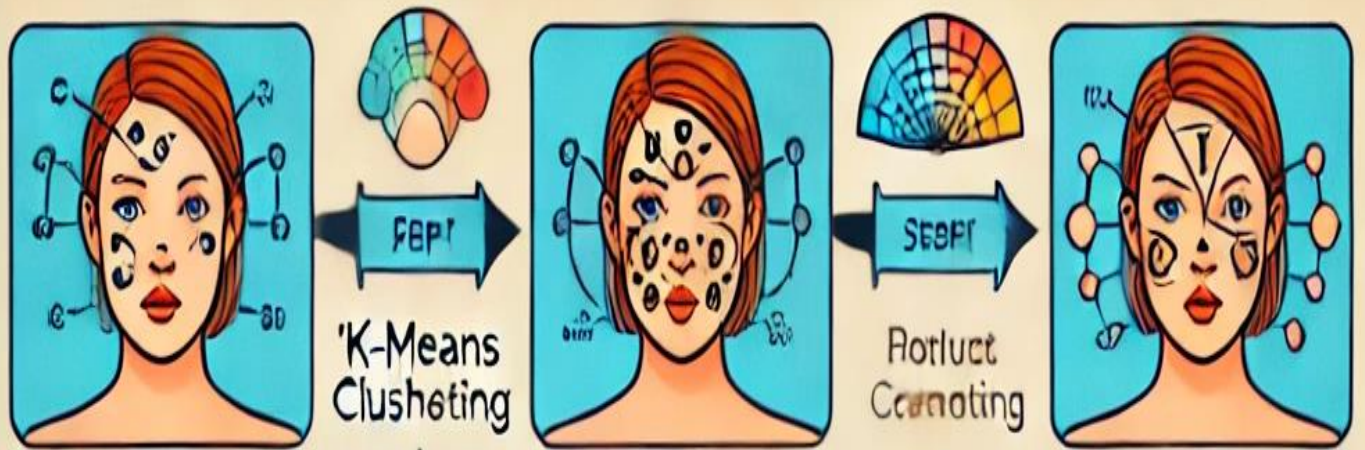
- The face hex colour is used to query the Sephora product API.
- User preferences like price range and sorting (e.g., by popularity or rating) are applied.

4) Results Display:

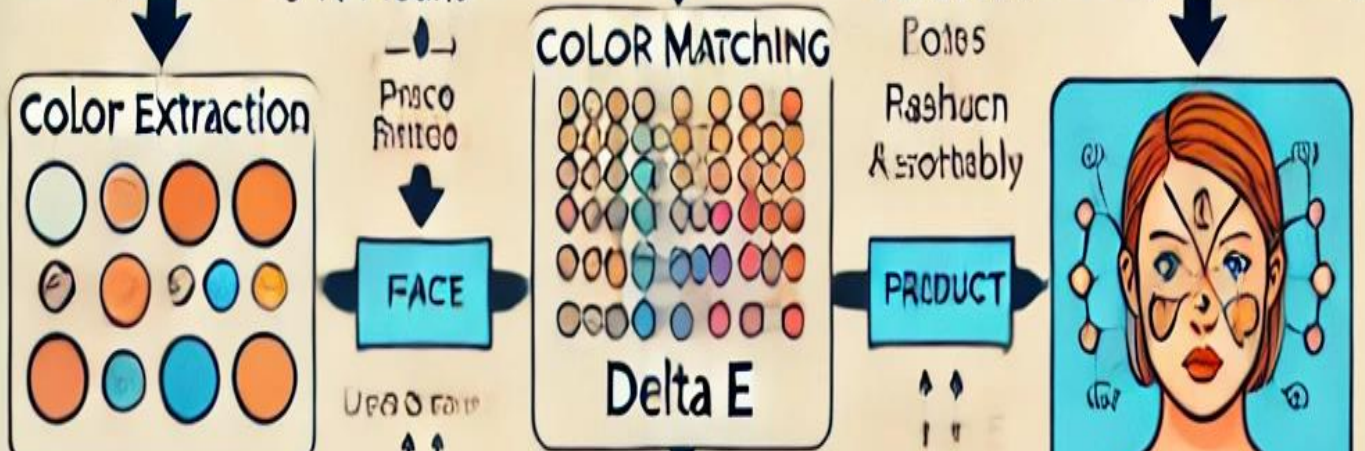
- The matched foundation products are retrieved and displayed.
- Product details like price, reviews, rating, and availability are included.

5) Gemini colour Analysis:

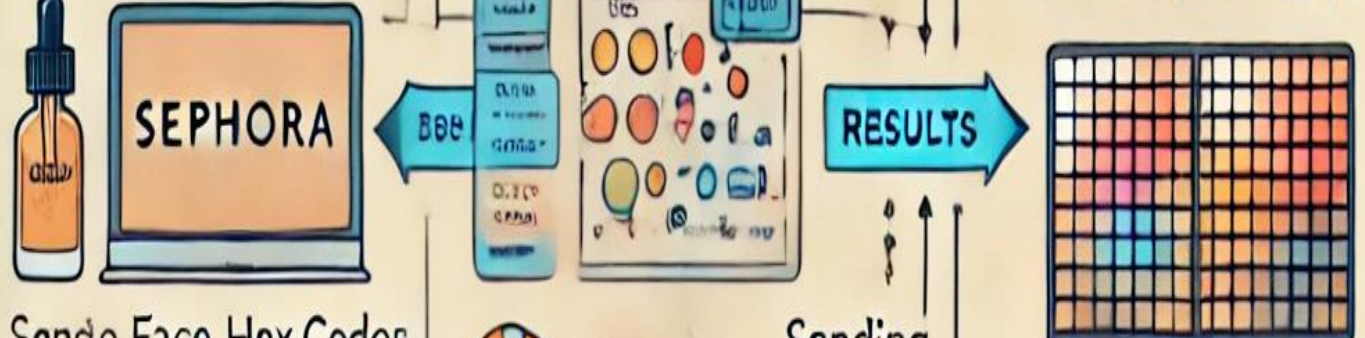
- The face and eye hex colours are sent to the Gemini model for personalized colour and fashion recommendations.
- The model suggests suitable clothing and colour palettes to complement the user's complexion.



'Color Extraction with Improving K-Means' 'K-Means Clustering' 'Color Extraction with Improving K-Means' 'Color Extraction with Improving K-Means'



Product Search Delta E Form Color Search



SEPHORA RESULTS Sends and Eye Hyes face Color Recommendation Gemini Color Analysis



Face Hex Code Sends and Eye Hyes face Color Recommendation Gemini Color Analysis

Software/Hardware Requirement

Hardware Requirements:

Internet Connection: For seamless API calls and interactions with external services like Google Gemini

Software Requirements:

- 1) Python Version: Python 3.8 or higher
- 2) Flask Framework: For creating the web application and APIs
- 3) Libraries/Modules:
 - PIL (Pillow) for image manipulation
 - scikit-learn for K-means clustering (MiniBatchKMeans)
 - skimage for colour analysis (deltaE_cie76)
 - colormap for converting RGB to HEX and vice-versa
 - NumPy for array manipulations
 - requests for API calls (e.g., Google Gemini, Sephora API)
 - google-GenerativeAI for connecting to Google Gemini API
 - undetected-chromedriver and Selenium for web scraping (if needed)
- 4) Database: MySQL or SQLite for storing product data and results
- 5) Browser: Chrome for testing the web application
- 6) APIs:
 - Google Gemini API for generative colour and fashion analysis
 - Sephora API for retrieving foundation products
 - SerpApi for extracting YouTube video links for trending products