

# Outfit Recommendation System

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**Abstract** - The Outfit Recommendation System is a web-based fashion assistant that provides personalized suggestions for outfits, colors, and hairstyles. It bases its recommendations on the user's skin tone, gender, occasion, and hair texture. The system simplifies the outfit selection process and helps boost users' confidence by offering stylish choices that match their features and the event. The application was developed using Python and Flask for the backend, while HTML, CSS, Tailwind CSS, and JavaScript were used for the frontend. This setup creates an interactive and visually appealing user experience. It uses a rule-based recommendation system to match user inputs with appropriate dress colors, outfit styles, accessories, and hairstyle ideas. Each hairstyle suggestion comes with a link to a YouTube tutorial, making it easy for users to recreate the looks. For example, the system might suggest a teal or coral outfit with ethnic accessories for a user going to a festival, or it might recommend a navy formal suit for a job interview. Future updates will include features like AI-driven skin tone detection, machine learning for better personalization, and a database to store user preferences and history. By blending fashion knowledge with modern web technology, the Outfit Recommendation System provides a smart and user-friendly platform that connects personal styling with intelligent support.

**Keywords** — Personalized styling, fashion recommendation, outfit recommendation, web application, profiling.

## I. INTRODUCTION

Fashion plays an important role in shaping a person's personality and confidence. Selecting the appropriate attire that balances one's skin tone, gender, event, and hair texture may be a challenge for most individuals. A lack of fashion awareness, color matching skills, and access to personalized styling advice often causes confusion and

mismatched looks. To tackle this problem, the Outfit Recommendation System was created as a smart, user-friendly platform that offers personalized fashion suggestions.

This project is to help users pick suitable outfits, colors, accessories, and hairstyles that fit their physical traits and the event they are attending. By taking inputs like skin tone, gender, occasion, and hair texture into account, the system provides the best clothing options and matching hairstyles. It also includes YouTube tutorial links, making it easier for users to learn and apply the suggested hairstyles, resulting in a complete styling experience.

This project uses Python and Flask for the backend, which manages the logic, data processing, and navigation between different pages. HTML, CSS, Tailwind CSS, and JavaScript are used for the frontend, providing a responsive and interactive user interface. The recommendation process is rule-based, using predefined mappings to link each input combination with specific outfit colors, styles, and accessories. For instance, a user with a Warm Beige skin tone and Wavy hair attending a festival might get a suggestion for a teal or coral outfit, ethnic jewelry, and a half-braid hairstyle.

In the future, the system could be improved with AI-based skin tone detection, machine learning models for personalized recommendations, and a database to store user data and preferences. By combining technology with fashion insight, the Outfit Recommendation System simplifies outfit selection and helps people make confident, stylish choices easily.

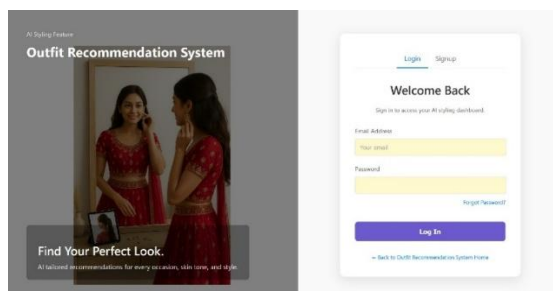


Fig.1 Login Page

## II. LITERATURE REVIEW

The rapid growth of artificial intelligence, machine learning, and web technologies has led to the creation of intelligent recommendation systems in various fields, including e-commerce, entertainment, and healthcare. Recently, several studies have focused on using similar techniques in the fashion industry. These studies help users choose suitable clothing and accessories based on their preferences and physical traits.

Traditional outfit selection relies on human perception and personal experience. With the rise of digital platforms, fashion recommendation systems have emerged to automate and personalize this process. These systems analyze user-specific details, such as body type, skin tone, gender, and occasion, to suggest fitting outfits and styles. For example, earlier systems like content-based filtering models matched user profiles with a set dataset of clothing attributes. Collaborative filtering approaches focused on user behavior and preferences to make recommendations.

Research has also looked into color theory and aesthetic analysis for fashion coordination. Literature shows that skin tone is key in choosing color palettes that improve appearance. Similarly, selecting hairstyles based on hair texture and facial structure has been discussed in many studies about personalized styling and beauty improvement. These studies highlight the need to consider various personal features to create meaningful recommendations.

However, existing systems often lack personalization and user interaction. Many only

focuses on outfit suggestions without factoring in complementary elements like hairstyles or accessories. Additionally, most require large datasets and complicated algorithms, making them less ideal for simple, web-based use.

The proposed Outfit Recommendation System builds on these existing ideas but introduces a rule-based approach that combines multiple fashion elements such as skin tone, gender, hair texture, and occasion within a single platform. By including YouTube tutorial links for hairstyles and creating an attractive web interface, this system connects the gap between fashion theories and practical use. This literature foundation emphasizes the increasing demand for smart, user-friendly fashion recommendation solutions that blend aesthetic reasoning with modern web technology.

## III. PROPOSED METHODOLOGY

The Outfit Recommendation System aims to provide personalized fashion suggestions by analyzing specific user features like skin tone, gender, occasion, and hair texture. The system uses a rule-based approach, mapping user inputs to predefined fashion attributes such as outfit color, style, accessories, and hairstyles. It involves several key stages: data collection, user input processing, recommendation generation, and output display, all integrated within a web-based framework.

### A. System Design

The system architecture consists of two major parts:

**Frontend Interface:** This is designed with HTML, CSS, Tailwind CSS, and JavaScript. It allows users to interact through an intuitive and attractive interface. Users can share their preferences by choosing options for gender, hair texture, occasion, and skin tone.

**Backend Logic:** Built with Python and Flask, the backend processes user inputs, applies rule-based logic, and generates relevant recommendations. Flask handles server requests, session management, and page routing.

### B. Data Mapping and Rule-Based Filtering

At the core of the system is a rule-based dataset that connects different combinations of user

attributes to suitable fashion suggestions. For instance, if a user with a caramel skin tone and curly hair selects "Festival" as the occasion, the system retrieves rules that recommend vibrant ethnic wear with gold accessories and a curly updo hairstyle. These rules are organized within the backend, allowing for quick retrieval and accurate output generation without needing large datasets.

Fig.2 User Input

#### C. Recommendation Generation

After receiving user inputs, the backend applies logical conditions to generate three main outputs:

- Outfit Color Recommendation based on skin tone.
- Occasion and Gender-Based Outfit Suggestions with matching accessories.
- Hairstyle Suggestions that match hair texture and outfit type, along with YouTube tutorial links for easy learning.

#### D. Output and User Interaction

The final recommendations appear dynamically on the frontend, using responsive layouts and a modern design. Users can view, explore, and refine the suggestions based on their preferences.

#### E. Future Enhancement

The methodology allows for easy scaling to integrate AI-driven color detection, machine learning-based personalization, and database storage (PostgreSQL) for saving user data and history. These improvements will boost recommendation accuracy and enable adaptive learning over time.

In summary, the proposed approach combines rule-based intelligence, interactive web design, and modular architecture to provide users with a smooth and personalized fashion recommendation experience.

#### IV. System design/flowchart

The System Design of the Outfit Recommendation System outlines the process from receiving user inputs to generating personalized outfit recommendations. The design promotes smooth interaction between the user interface and backend logic, resulting in reliable outcomes through a structured rule-based approach.

##### 1. System Overview

The system uses a modular architecture with two main components:

**Frontend Module:** This interface, built with HTML, CSS, Tailwind CSS, and JavaScript, allows users to enter their preferences such as gender, skin tone, hair texture, and occasion. It provides a smooth and interactive experience for data input.

**Backend Module:** This layer, created with Python Flask, processes the collected inputs, applies rule-based logic, and retrieves the appropriate outfit, color, and hairstyle data. It also includes relevant YouTube tutorial links for styling tips.

##### 2. Flow of Operations

The step-by-step flow of the system is outlined in the flowchart below:

**Start:** The system begins the recommendation process.

**Input Preferences:** The user provides input parameters like gender, occasion, skin tone, and hair texture.

**Analyze Preferences:** The system assesses the entered details to determine the user's needs.

**Fetch Outfit Data:** The backend gathers the relevant rule-based data from predefined mappings that link attributes to suitable outfits, colors, and hairstyles.

Process Data: The collected data is processed to find the best matching recommendations.

Match Found? The system checks if there is an appropriate match in the dataset.

If Yes, it moves to the next step.

If No, it retrieves alternative outfit combinations.

Recommend Outfit: The system shows the recommended outfit, color palette, accessories, and hairstyle along with tutorial links on the user interface.

End: The recommendation process finishes.

### 3. Flowchart Representation

The overall system flow is shown in the following diagram:

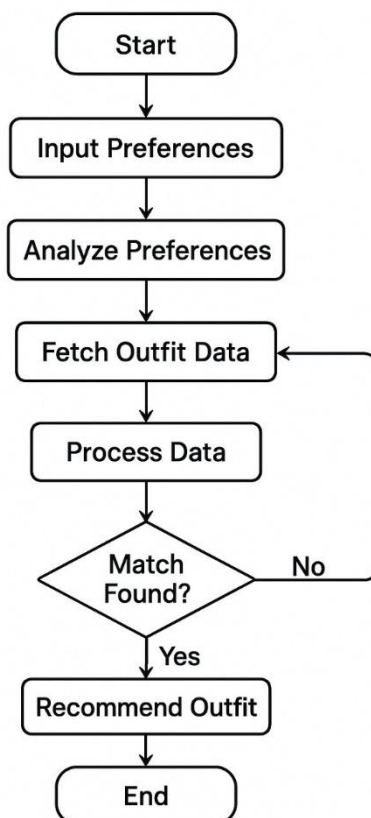


Fig.3 Flow chart

This design ensures that each user gets a personalized and reliable fashion suggestion based on their unique preferences. The modular structure is easy to update in the future, including features

like AI-based skin tone detection, database storage, and machine learning for adaptive recommendations.

## V. RESULTS

The Outfit Recommendation System generates personalized fashion suggestions based on the user's choices, including skin tone, gender, hair texture, and occasion. The rule-based logic ensures that each combination produces balanced outfit recommendations, complete with matching accessories and hairstyles.

When a user inputs their preferences through the web interface, the system processes these inputs using Python and Flask on the backend. The result is a clear, well-structured output displayed in the browser, featuring:

Dress Color Suggestions:

Colors that complement the user's skin tone are shown to enhance visual appeal. For example, users with a Warm Beige skin tone may receive suggestions like teal, coral, or emerald green.

Outfit and Accessory Recommendations:

The system provides occasion-specific and gender-appropriate outfit ideas, along with accessories such as watches, jewelry, or shoes that complete the overall look. For an Interview occasion, a male user might be suggested a navy suit with a white shirt and black formal shoes, while a female user could receive a recommendation for a beige formal outfit paired with subtle accessories.

Hairstyle Suggestions with Tutorial Links:

The system suggests hairstyles based on the selected hair texture that complement the outfit and includes direct YouTube tutorial links, allowing users to easily learn and recreate the look.

The output appears in a clean and responsive web layout created with HTML, CSS, Tailwind CSS, and JavaScript, ensuring an interactive and visually appealing experience. The system operates efficiently with minimal processing time, showing the effectiveness of the rule-based recommendation model.

This project demonstrates that even with a simple rule-based approach, a user-friendly outfit recommendation system can be developed. The results show that the system effectively connects fashion styling with technology, helping users make confident outfit decisions quickly and smartly.

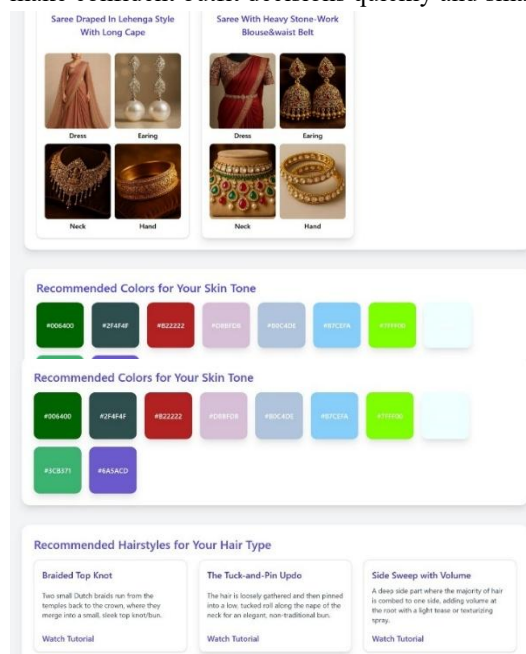


Fig.4 Output

## VI. CONCLUSION

The Outfit Recommendation System shows how technology and fashion can work together to create a personalized and user-friendly styling assistant. It makes outfit selection easier by offering recommendations based on an individual's skin tone, gender, occasion, and hair texture. With a rule-based approach, it provides useful and relevant suggestions without needing large datasets or complex algorithms.

Using Python and Flask for backend processing, and HTML, CSS, Tailwind CSS, and JavaScript for the frontend, the project creates an interactive and responsive web application. Including YouTube hairstyle tutorial links adds practicality, giving users a complete styling experience. The project's modular design promotes clarity, efficiency, and ease of use, allowing users to make confident fashion choices that suit their look and occasion.

The system performs well in generating quick and relevant recommendations, proving its efficiency and real-world usefulness. It also sets the stage for integrating more advanced technologies in the future, such as AI-based skin tone detection, machine learning-driven personalization, and database connections for storing user preferences.

In summary, the Outfit Recommendation System not only simplifies outfit selection but also highlights the potential of smart web-based fashion solutions. It sets the stage for future innovation in digital fashion guidance, linking personal style, self-confidence, and contemporary technology.

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