

GenWardrobe: A Fully Generative System for Travel Fashion Wardrobe Construction

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Abstract

With the increasing demand for outfit planning in real-world travel scenarios, the need for constructing a travel fashion wardrobe, a series of outfits tailored to a user's personalization and destination-specific context over a short travel period, has grown significantly. However, existing systems or works often focus on isolated factors and rely on retrieval-based methods, with insufficient utilization of generative models, limiting their adaptability to real-world travel scenarios. To address this issue, this study introduces GenWardrobe, a fully generative system for travel fashion wardrobe construction. GenWardrobe consists of three key modules: user query analysis, fashion knowledge retrieval via retrieval-augmented generation and wardrobe image generation. To facilitate users' usage, we encapsulate the solution into an interactive web application. Expert-level evaluation shows that GenWardrobe significantly outperforms traditional systems in both personalization and visual appeal. PowerPoint file and more materials of Genwardrobe can be found on our Github repository: <https://github.com/ShanFengShanFeng/GenWardrobe>.

CCS Concepts

• **Information systems** → **Multimedia and multimodal retrieval**; • **Computing methodologies** → **Artificial intelligence**.

Keywords

Fashion Wardrobe Construction; Image Generation; Multimodality

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1 Introduction

People frequently travel for vacations, business, or social events, requiring a coherent set of fashion items—collectively a travel fashion wardrobe. Building it is complex, involving consideration of three key factors: **human** (e.g., body shape, skin tone), **contextual constraints** (e.g., destination, timing, purpose), and **fashion knowledge** (e.g., style, popularity). With rising demand in both travel and fashion—industries worth hundreds of billions globally—intelligent wardrobe planning holds significant practical value [1].

However, existing works typically address only parts of the problem, such as personalized outfit generation or occasion-aware recommendation, without a unified framework that integrates {human factors}, {contextual constraints}, and {fashion knowledge} holistically [3]. Most rely on retrieval-based pipelines or heuristic rules [2], limiting diversity and adaptability in real-world scenarios. In contrast, recent advances in generative AI—large language models (LLMs), retrieval-augmented generation (RAG), and AI-generated content (AIGC)—offer strong creative potential but remain under-explored in travel wardrobe construction [4, 5].

To address these gaps, we present **GenWardrobe**, a fully generative system for travel fashion wardrobe construction. Given a user's photo and travel plan, GenWardrobe outputs coherent, visually engaging wardrobes, enhancing user experience and satisfaction.

2 System Design

The system includes three key modules, as shown in Figure 1.

User Query Analysis. The system begins with two user inputs: a full-body photo and a textual travel plan. Using Gemini, we extract

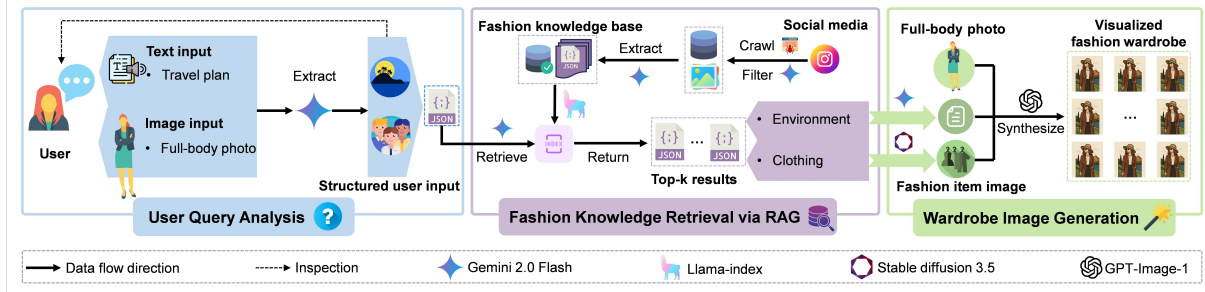


Figure 1: Illustration of the overall system design.

structured user input, which covers essential user information and travel plan..

Fashion Knowledge Retrieval via RAG. Given the structured user query, we leverage a RAG framework to obtain a set of fashion knowledge from a well-curated large-scale fashion knowledge base. Specifically, we first crawl fashion images from social media platforms, filter low-quality images using Gemini, and extract structured fashion knowledge from the high-quality images—resulting in a large fashion knowledge base with approximately 600,000 entries. Next, we employ the popular Llama-Index framework to match the user query with top-k entries that include both clothing and environmental context. See detailed schema in our GitHub README file.

Wardrobe Image Generation. Using the retrieved fashion knowledge, we generate wardrobe images via Stable Diffusion 3.5, tailored to the clothing descriptions. To further enhance user’s experience, we put on the fashion items to the given full-body photo of the user, as well as generating a photorealistic background based on the environment information of the retrieved knowledge. These two processes are implemented using the GPT-image-1 model. Ultimately, we provide both pure fashion wardrobe and visualized fashion wardrobe.

3 System Implementation and Demonstration

Following the above design, we implement the system as a web application using a frontend-backend architecture. The frontend, built with Vue.js, handles user input and result display, while the backend is developed with Flask and Python. The RAG module runs on our own server, and all LLM-related functions rely on proprietary APIs. Processing details are available in the GitHub repository.

To demonstrate the full pipeline, we provide an interactive demo. An example of a user query and its corresponding generated fashion wardrobe is illustrated in Figure 2. We also recruit a panel of professional fashion experts to perform Academicism Aesthetic Test, and the evaluation results justify that our system significantly outperforms existing systems. More details of the evaluation are available in the GitHub README file.

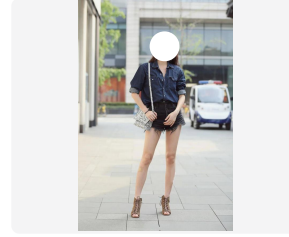
4 Conclusion and Future Work

This study proposes GenWardrobe, a fully generative system for travel fashion wardrobe construction that seamlessly integrates user intent analysis, a RAG framework, and image synthesis. In the future, this system can be extended to a broader range of application scenarios, by integrating with AR/VR technologies, it holds the

(a) Raw user input

Image

Please upload one full-body photo of yourself.



Text Description

Please upload a brief descriptive statement outlining your travel time, destination, and purpose of travel

I'm traveling to Bali in July for about three days, and afterward, I'll attend a wedding in Shanghai. Please recommend suitable outfits for both occasions.

(b) Fashion wardrobe



(c) Visualized fashion wardrobe



Figure 2: Illustration of the interface of the demo system. potential to further enhance user experience and unlock greater commercial value.

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