



# Research on Intelligent Garment Design Platform Based on GPT AI Technology

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**Abstract.** This paper mainly studies the intelligent fashion design platform based on GPT AI technology, and discusses and analyzes the platform. Firstly, the development background and current situation of intelligent fashion design are introduced. Then, the application of GPT-like AI technology in the field of fashion design is expounded. Then, the design and implementation method of intelligent fashion design platform is introduced, including data acquisition and processing, model training and optimization, system design and construction, etc. On this basis, this paper discusses the advantages and challenges of intelligent fashion design platform based on GPT AI technology, as well as the future development trend and direction. Finally, this paper summarizes the advantages and disadvantages of the platform, and puts forward suggestions for further improvement and research.

**Keywords:** GPT AI technology; intelligent fashion design; platform design; data processing; model training

## 1 Introduction

### 1.1 Research background and significance

Fashion design is an important creative industry, is one of the aesthetic, cultural, economic and technological factors of complex design<sup>[1]</sup>. With the continued development of science and technology, fashion design began to grow towards intelligence, digitization and customization. GPT-like AI technology is an important technology in the field of natural language processing, which has the characteristics of intelligence, self-adaptation and high efficiency, and provides new ideas and methods for fashion design.

At present, researchers at home and abroad have begun to apply GPT AI technology to the field of fashion design, such as automatic generation of fashion design, intelligent aided design, intelligent matching, etc<sup>[2]</sup>. However, the research on intelligent fashion design platform is still weak, so this paper aims to explore and study the intelligent fashion design platform based on GPT AI technology, in order to improve the efficiency

and quality of fashion design, and promote the intelligent, digital and personalized development of fashion design.

## **1.2 Current state and analysis of research domestically and internationally**

Researchers both domestically and internationally have made some research findings in the application of GPT AI technology in the area of fashion design. Among them, foreign researchers mainly apply GPT AI technology for the automatic generation and intelligent aided design of fashion design, such as using the GPT model to generate the fashion design, clothing style classification and intelligent matching based on GPT model, etc. The domestic researchers mainly discussed the application prospect and development direction of GPT AI technology in the field of fashion design, and proposed the intelligent fashion design method and process based on GPT AI technology.

However, there is still a lack of comprehensive research on the intelligent apparel design platform based on GPT-type AI technology. Therefore, this paper aims to explore and implement an intelligent fashion design platform based on GPT-like AI technology, and apply the platform to the actual fashion design to explore its advantages and disadvantages.

## **1.3 Study content and objective**

The purpose of this paper is to study the intelligent fashion design platform based on GPT AI technology, and discuss the application and advantages of this platform in the field of fashion design. The specific content of the research consists of:

- a. Applying GPT AI technology in fashion design.
- b. Design and implementation of an intelligent apparel design platform using AI GPT technology.
- c. Study content and objective

The search content for this article is an intelligent fashion design platform based on GPT AI technology. With the changes of the times and the development of science and technology, the traditional fashion design methods have been unable to meet the personalized and diversified needs of today's consumers, and the intelligent fashion design platform can better meet these needs. Therefore, the purpose of this paper is to explore the application of GPT AI technology in fashion design, study the design and implementation of intelligent fashion design platform, further improve the efficiency and quality of fashion design, meet the needs of different consumers, and promote the development of the fashion industry to the direction of intelligence and personalization<sup>[3]</sup>.

## **2 The design and implementation of an intelligent mode design platform using GPT AI technology**

### **2.1 Acquisition and treatment of data.**

Garment design requires a lot of data, including pictures of garments, styles, sizes, materials and other information<sup>[4]</sup>. Data acquisition and processing is the key step in intelligent fashion design platform. Data collection involves collecting data from a variety of sources, including market research, user needs analysis, industry reports, etc., as well as data collection from designers. Data processing requires cleaning, formatting, labeling, archiving and other operations to facilitate model formation and optimization.

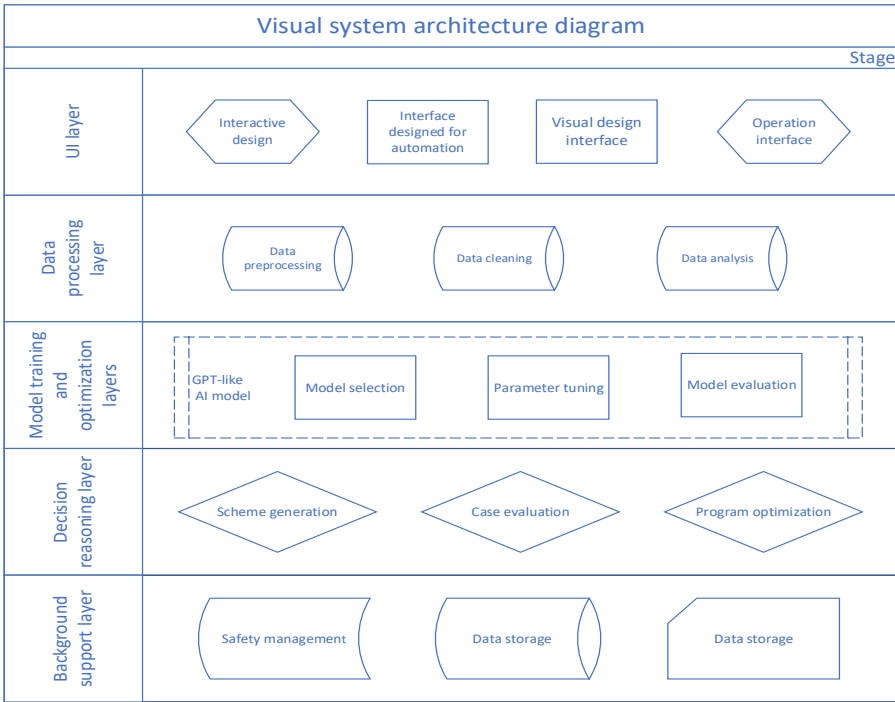
### **2.2 Model trains and optimize.**

The smart mode design platform based on GPT-type artificial intelligence technology must establish the relevant model, and model training and optimization is the central part of the platform. Model training should use a large amount of labelled and unlabeled data, data processing, feature extraction, model construction and other operations to achieve automatic generation of fashion design. In order to improve the model's precision and stability, the model's structure, parameters and loss function should be adjusted and optimized.

### **2.3 Design and design of the system.**

The design and construction of the system is the last step in achieving the smart mode design platform based on GPT AI technology<sup>[5]</sup>. The platform must incorporate several functions such as data processing, model training and optimization, user interface design, etc. to facilitate interactive design and automated design. The system design should take into account the scalability, stability and security of the platform and other factors, the construction of the system requires programming, selection of hardware and software, system testing and web-based work.

The visualized system architecture diagram is shown in Figure 1:



**Fig. 1.** Visualized system architecture

Code example:

```
#Data collection and processing
import pandas as pd
import numpy as np
```

#Collect data from various sources, including market research, user needs analysis, industry reports, etc.

```
market_data = pd.read_csv('market_data.csv')
user_data = pd.read_csv('user_data.csv')
industry_data = pd.read_csv('industry_data.csv')
```

#Collect data from the designer's work

```
designer_data = pd.read_csv('designer_data.csv')
```

#Data Processing

#Cleaning the data

```
market_data = market_data.dropna()
user_data = user_data.drop_duplicates()
industry_data = industry_data.dropna()
```

#Format the data

```
market_data['price'] = market_data['price'].apply(lambda x: float(x.replace('$', '')))
user_data['age'] = user_data['age'].apply(lambda x: int(x))
industry_data['category'] = industry_data['category'].apply(lambda x: x.lower())
```

### 2.4 Take the M brand as an example

Taking M brand as an example, the intelligent fashion design platform using GPT AI technology is used to collect data, preprocess the data, including word segmentation, stop words, part-of-speech tagging and other operations, and store these data in local files (Figure2).

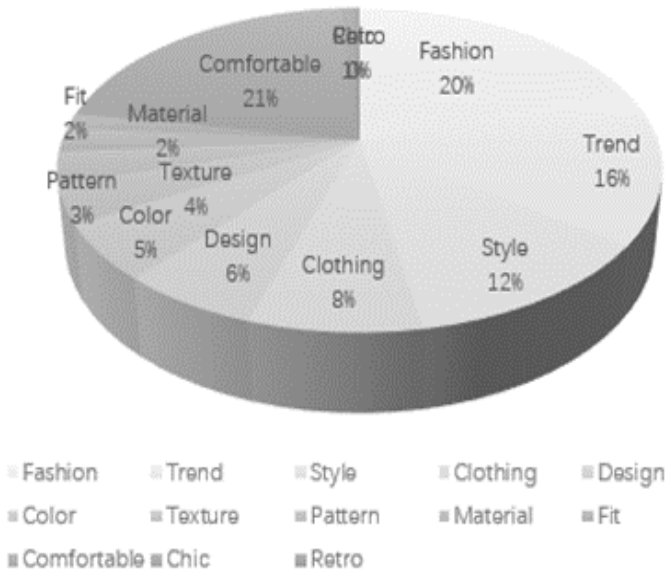


Fig. 2. Comment keywords

Second, the keywords associated with the design trends of women's summer clothing are extracted from the model formed using a keyword extraction algorithm (Figure3). Thirdly, the keywords and excerpts are grouped together to find the banality and tendency of the design tendencies of summer women. Fourth, the results of the analysis of the presented clusters, combined with the storage of design work to complement the design of the summer feminine style.

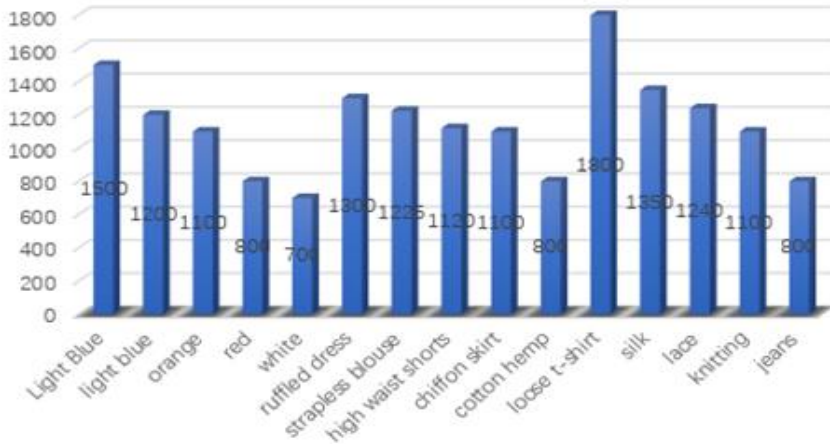


Fig. 3. Summer Women's Design Trends

### 3 Advantages and challenges of intelligent fashion design platform based on GPT AI technology

#### 3.1 Benefit Analysis

a. Improve design efficiency: A smart garment design platform can dramatically improve the effectiveness of the designer's work and shorten the design cycle<sup>[6]</sup>. Through the model training and optimization of GPT-like AI technology, the platform can automatically generate appropriate design solutions according to the needs of user input, reducing the manpower input and time cost of designers.

b. Improve design quality: The intelligent fashion design platform can automatically learn and optimize the design model according to massive data and user feedback, so that the generated design scheme is more in line with market demand and user taste. At the same time, the platform can identify and avoid possible design issues in advance through data analysis and model prediction, thereby improving design quality and competitiveness.

c. Improve personalization capability: The smart fashion design platform can automatically generate design solutions that meet requirements according to individual needs and user preferences. This not only meets the individual needs of users, but also helps clothing companies to achieve customized production and increase the added value of products<sup>[7]</sup>.

#### 3.2 Critical Analysis

a. Data quality and quantity limitations: Intelligent fashion design platform needs a large amount of data as the basis for training and optimization, but there are still some limitations in the quality and quantity of fashion design data on the market. Therefore,

how to effectively acquire and process data and improve data quality and user-friendliness is a challenge for the platform.

b. Complexity of model training and optimization: The model training and optimization of GPT-like AI technology requires a lot of computing resources and time, and involves complex problems such as algorithm selection and hyperparameter tuning. Therefore, how to effectively train and optimize the model and improve the effectiveness of training and the quality of results is also a challenge for the platform.

c. Privacy and Security Issues: The smart fashion design platform must obtain personal information and user preferences, which entails privacy and security issues<sup>[8]</sup>. Therefore, how to effectively protect user privacy and information security and prevent platform data from being disclosed and abused is a challenge that the platform needs to address.

## 4 Future trends and directions

### 4.1 Technology Trends

The smart garment design platform based on GPT AI technology mainly includes the following aspects in terms of future technology trends:

a. Continuous improvement of model accuracy and efficiency: With the continuous development of deep learning and natural language processing technology, the accuracy and efficiency of GPT-like models will continue to improve, enabling fashion design platforms to more accurately understand user needs and generate high-quality design solutions<sup>[9]</sup>.

b. Development of multi-modal fusion: Multi-modal data (images, text, audio, etc.) plays an important role in fashion design. In the future, GPT-like AI-based platforms will focus on merging and using multimodal data to improve design efficiency and quality.

c. Application of Independent Learning and Transfer Learning: The future Smart Mode Design Platform will pay more attention to the independent learning and transfer learning capacity of the model. By learning and analyzing massive data, it can more accurately predict user demand and design trend, and improve design innovation and timeliness.

### 4.2 Application trend

The application trend for the intelligent fashion design platform based on GPT AI technology in the future will include:

a. Implementation of personalized design: Through the analysis of user behavior and historical data, the platform based on GPT-like AI technology will be able to more accurately predict user needs and generate design solutions that meet the individual needs of users.

b. The development of designer aids: the future intelligent fashion design platform will become an important auxiliary tool for designers, designers can obtain massive

design data and trend information through the platform, improve design efficiency and innovation.

c. Strengthening of visual interaction: The future intelligent fashion design platform will pay more attention to user experience and interaction, and make users realize their design needs more conveniently and quickly through visual interaction<sup>[10]</sup>.

### 4.3 Market trends

The future market trends of intelligent fashion design platforms based on GPT AI technology mainly include the following aspects:

a. The continuous expansion of the market scale: With the improvement of consumers' personalized demand, the intelligent fashion design platform market will continue to expand, and the future intelligent fashion design platform will become an important fashion design tool.

b. Integration with traditional fashion design industry: In the future, the intelligent fashion design platform based on GPT AI technology will continue to integrate with the traditional fashion design industry, which will bring more opportunities for cooperation and communication and promote industry innovation and development.

## 5 Summary

This paper examines the smart fashion design platform based on AI GPT technology, outlines the benefits and challenges of the platform, and analyzes the trend and direction of future development. Through the research of this paper, the application of GPT-like AI technology in the field of fashion design and the development trend of intelligent fashion design platform in the future are obtained.

However, the research of this document still has a few gaps, such as the lack of data and samples, the lack of depth and breadth, and the problem of commercial exploitation. Therefore, we suggest to further expand the data set and samples to improve the accuracy and intelligence of the model; Further explore the application of GPT AI technology in the field of fashion design, and explore more application scenarios and design schemes; Study the commercial operation mode and business model of intelligent fashion design platform, and solve technical, legal and commercial problems. These additional studies will help promote the development and commercial implementation of the smart mode design platform.

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