

## CREATING A COLLECTION OF CLOTHES USING ARTIFICIAL INTELLIGENCE

Anastasiia MOVCHANIUK<sup>1</sup>, Viktoriia MYTSA<sup>2\*</sup>

<sup>1</sup>Department of Garment Technology and Design, gr. SHV-22-1, Faculty of Technology and Design,  
Khmelnyskyi National University, Khmelnytskyi, Ukraine

<sup>2</sup> Department of Garment Technology and Design, Faculty of Technology and Design,  
Khmelnyskyi National University, Khmelnytskyi, Ukraine

\*Corresponding author: Mytsa Viktoriia, [mitsa\\_vv@ukr.net](mailto:mitsa_vv@ukr.net)

Tutor/coordinator: **Ivanishena Tetiana**, assistant professor,  
dean of the Faculty of Technology and Design

**Abstract.** *Artificial intelligence in the fashion industry has great potential to improve production efficiency, create personalized offers, introduce more sustainable production, and reduce negative environmental impact. Thanks to the introduction of modern AI generators, industrialization, sales and customer experience are moving to a new level of efficiency. Nevertheless, the use of AI tools in the creative stages is very limited. This research explores how different neural networks can be used to conceptualize a clothing collection. An algorithm for creating a collection of clothing models in the Leonardo AI generative neural network environment has been developed. A collection of women's jackets has been generated, edited, and adjusted. The collection is based on classic and romantic styles. For one of the collection models, the generation was performed based on a referent and a hint detailing the design elements. The key to unlocking the potential of artificial intelligence for the needs of the fashion industry lies in the designer's ability to effectively interact with it and transform the results into creative solutions that meet market demands.*

**Keywords:** *Artificial intelligence, clothing collection, generation, neural network*

### Introduction

Fashion is not just clothes; it is a dynamic and competitive industry that is constantly evolving. Consumer expectations are rising, driving the need for innovation and new approaches. Traditional methods are no longer delivering the desired results, so businesses are looking for new ways to meet the needs of customers.

Generative artificial intelligence (GAI) is becoming a revolutionary force in the fashion industry, offering an innovative approach to creating clothing collections. Its capabilities go far beyond simply predicting trends, offering new approaches to improving the efficiency of various stages of production, optimized inventory and logistics management, personalization clothing for individual consumers, implementing sustainable production and reducing negative environmental impact. Artificial intelligence technology continues to improve, and research into how it can be used in product design and development is relevant.

In work [1], ways of integrating artificial intelligence into the fashion industry are considered for the further widespread implementation of the principles of sustainable development with the help of automation, personalization, ecological materials and transparency. However, the main focus of the work is on the marketing policy of enterprises specializing in the manufacture of clothing. The key issues in the paper [2] are property rights, confidentiality, intellectual property, inclusiveness, skill development and responsibility in the interaction of fashion and artificial intelligence. The authors devote considerable attention to exploring the potential of artificial intelligence to support diversity, inclusive functioning, and protection of individuality, emphasizing its critical role in the context of contemporary fashion.

In fashion, companies deal with complex data, including complex correlations, dependencies, and unpredictability of human behavior. In this context, generative artificial intelligence methods have become a powerful tool that offers effective interpretations and use of these huge data sets. However, there are ethical issues, discussed by the authors in [3], which require the development of reliable recommendations to ensure the responsible use of artificial intelligence. Recommendations on possible ways to ensure the level of responsibility are not provided.

The paper [4] presents an overview of three main areas of fashion research related to artificial intelligence - fashion analysis, fashion recommendations and issues of fashion synthesis. Prospective directions of development in this area have been determined.

Analysis of the state of the issue regarding the use of artificial intelligence systems in the fashion industry demonstrates the relevance of their active implementation in objects of creative activity. However, there are no real recommendations and developments proving the effectiveness of using generative artificial intelligence for specific tasks in the fashion industry.

### **Using text-based generative artificial intelligence for design purposes**

The fashion industry is constantly evolving, and forecasting fashion trends is an important task for designers, marketers and other professionals. Programs that generate text can help identify patterns and trends in fashion trends; predicting fashion trends by analyzing large volumes of data, such as textual descriptions of clothing and accessories; making more informed decisions regarding the development of new products, marketing campaigns and entry into new markets.

ChatGPT is one of the most well-known text generation models with a wide range of features. However, there are a number of analogues on the market that can offer similar or even better results, as well as additional features, making them valuable tools for different tasks. The most well-known are Chatsonic, Microsoft Bing Chat, Google Gemini, YouChat, Perplexity, and others. The diverse array of models, equipped with distinct features and capabilities, empowers users to make informed choices, selecting the model that best aligns with their specific requirements. In addition, all these models are constantly being improved and developed.

Because such chatbots use artificial intelligence, they understand language, not just commands. By giving clear tasks to the chatbot, we can get ideas for further work. Let's choose two chatbots based on artificial intelligence to form the concept of a collection of women's jackets and compare the results.

Task: Generate a description of a creative women's jacket inspired by a classic style with romantic elements. A fragment of the result obtained using ChatGPT 3.5 is shown in Figure 1., and with Google Gemini in Figure 2.



ChatGPT

Creative Women's Jacket Inspired by Classic Style with Romantic Elements:

Picture a women's jacket that seamlessly blends the timeless elegance of classic tailoring with whimsical romantic details, creating a captivating piece that exudes grace and sophistication. Crafted from sumptuous fabric, the jacket boasts a structured silhouette that flatters the feminine form while offering a nod to traditional menswear suiting.

The silhouette of the jacket is refined and tailored, with clean lines that accentuate the waist and shoulders. However, it's the unexpected details that truly set this piece apart. Delicate lace insets adorn the cuffs and collar, adding a touch of ethereal beauty to the otherwise structured design. The collar itself may feature a soft ruffle or scalloped edge, reminiscent of vintage romance.

Embellishments such as tiny floral embroidery or hand-stitched beadwork adorn the lapels, infusing the jacket with a sense of whimsy and charm. Perhaps there are subtle pleats at the back, creating gentle movement and fluidity with every step.

**Figure 1. Fragment of the result generated by the ChatGPT 3.5**

### ◆ The Ethereal Tailor: A Classic Reimagined

This women's jacket transcends the boundaries of traditional tailoring, offering a fusion of classic structure with whimsical romance. Designed for the woman who embraces timeless elegance with a touch of unexpected charm, it's a conversation starter waiting to happen.

#### Details:

- **Tailored Silhouette:** The jacket boasts a clean and structured silhouette, reminiscent of a classic blazer. The nipped waist emphasizes a feminine figure.
- **Asymmetrical Peplum:** A playful twist emerges with a dramatic peplum that cascades down on one side, adding movement and a touch of whimsy. The peplum can be crafted from a contrasting fabric or a sheer, ethereal material like organza for a romantic touch.
- **Delicate Collar:** A delicate lace or ruffle collar replaces the traditional blazer collar, adding a touch of softness and femininity.
- **Statement Cuffs:** The sleeves end in statement cuffs embellished with delicate lace or pearl buttons, further emphasizing the romantic theme.

**Figure 2. Fragment of the result generated by the Google Gemini**

As can be seen from the obtained results, each of the options has its own creative suggestions that can be used in further work to write a prompt.

### Creation of a range of apparel designs utilizing neural networks

Neural networks are bringing fresh possibilities to clothing design. While the core stages of collection development remain similar to traditional methods [5], utilizing neural networks adds a unique layer to its characteristics:

- Identifying the collection's theme and setting creative goals;
- Conceptualizing and visualizing the collection: this emphasizes the translation of the theme into a cohesive design concept and its visual representation (creating a mood board and a text prompt).
- Registration in the appropriate neural network, creating an account → Work in the neural network;
- Generate a collection of clothes → Edit if necessary → Save the result as intended.

For optimal results, it's the best way to start your network with a well-defined idea, specifics, and supporting visual references.

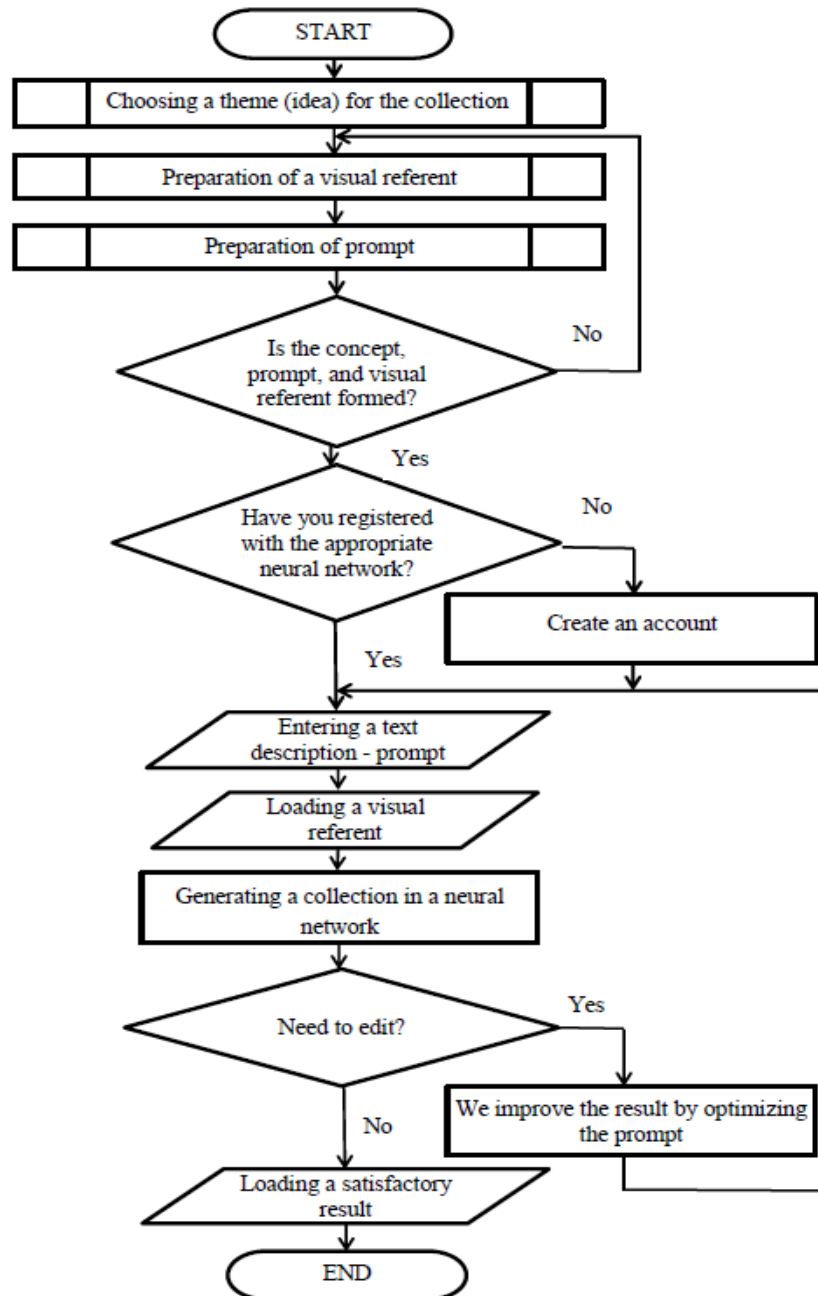
The neural network produces a sequence of generations, each of which is a step closer to the author's idea. We carefully evaluate each generation and choose the one that best embodies the desired vision, keeping it as the final result.

Figure 3 showcases the outcome that closely aligns with the author's original concept.



**Figure 3. A collection of women's jackets, designed and refined using Leonardo.Ai**

To generalize the above actions, an algorithm for creating a collection of clothes using artificial intelligence using the method of step-by-step detailing has been developed, which is shown in Figure 4.



**Figure 4. Algorithm for creating a clothing collection using artificial intelligence**

To optimize the workflow, the algorithm suggests employing specific neural network types at each stage of development:

- text-oriented neural networks such as ChatGPT, Google Gemini, TalktoBooks, BLOOM, Namelix, and smodin.io, among others, are recommended for the collection concept stage;
- during the rapid translation phase, it is advisable to use AI-based translators such as DeepL, Google Translate, iTranslate, Microsoft Translator, Reverso Context and Dictionary, SeamlessM4T and others;



- at the stage of creating a collection, it is advisable to use neural networks based on images, such as Midjourney, Leonardo.Ai, Stable Diffusion, Dall-E 2, NightCafe, etc.

Thus, for each type of activity there are a number of neural networks, each of which has its own advantages and disadvantages.

Figure 5 illustrates how to generate variations of a model from a past collection. This is achieved by creating a reference image (visual representation) and a detailed prompt specifying modifications to individual elements.



**Figure 5. Variations of a women's jacket model, created using a reference image and a quick description of the desired structural changes**

As illustrated in Figure 5, certain elements of the designs require refinement to meet various technical and aesthetic requirements. This may involve optimizing the structure, enhancing material treatment, or incorporating functional considerations. Additionally, the interaction of each component within the overall product composition is crucial.

The key factor in shaping the final outcome is the designer's professionalism, experience, and creativity. A harmonious blend of these elements ensures the creation of a unique and promising fashion collection that will captivate with its originality and elegance.

### Conclusions

The use of AI generators has significant potential for the development of light industry in various directions. However, artificial intelligence cannot replace human creativity, but is only a valuable tool for designers, expanding the possibilities for creating new, innovative products.

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