THE INVOLVEMENT OF ARTIFICIAL INTELLIGENCE IN THE PATTERN-MAKING AND DESIGN PROCESS

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Abstract: In this paper, the authors propose a brief presentation of the effect of involving artificial intelligence in the process of collection development, design and fashion design. Artificial intelligence (AI) is a generic term that comprises a wider area of branches and systems, such as: machine learning, deep learning and generative artificial intelligence. Most of fashion software have included artificial intelligence, especially generative artificial intelligence, in the pattern-making and design process, making the design process shorter and easier. Artificial Intelligence (AI) plays an increasingly important role in the fashion industry, bringing significant changes in the way clothing is designed and produced. Whether it is used to generate a print or to generate a more complex model, as presented in this paper, the result is obtained based on a text description entered by the user. Platforms that use (AI) to generate designs are often equipped with user-friendly interfaces that allow users to enter textual descriptions effortlessly. This new feature in the design process, is making it accessible even to users without fashion experience. AI not only accelerates the design process, but also expands the horizons of creativity, offering new opportunities for innovation in the fashion industry.

Key words: ChatGPT, Illustrator, Adobe Firefly, design, AI in fashion

1. INTRODUCTION

Artificial intelligence is a generic term that comprises various computational algorithms capable of performing tasks that typically require human intelligence, such as understanding natural language, pattern recognition, decision making and learning from experience. Early *AI* systems, such as expert systems and knowledge bases, were rule-based and intended to assist users in making decisions [1].

Thereby, *artificial intelligence* represented by expert systems and knowledge bases, includes the following branches: *machine learning* e.g. SVM support vector machines, decision trees; *deep learning* e.g. neural networks, CNN convolutional neural networks; *generative artificial intelligence* e.g. LLM large language models, GAN generative adversarial networks, variational autoencoders, latent diffusion models [1].

The fashion industry is undergoing a transformation initiated and driven by technological innovations centered around *artificial intelligence*. Specifically, artificial intelligence-based clothing

development technology, including the design process of a human designer and fashion knowledge, can reduce the workload of designers and product designers, thereby increasing work efficiency [2].

Fashion brands like Tommy Hilfiger, Nike and The Fabricant are already using *artificial intelligence* in their creation and design process. Specifically, Tommy Hilfiger relies on an *AI*-assisted design, IBM Watson, which, based on predicted trends, suggests various designs [3].

In order to have a clearer picture of the extent of the use of artificial intelligence and its tools in the fashion industry, it is enough to use ChatGPT to receive an answer to the following question: *AI tools used in fashion*?

1. Fashion design and trend forecasting [4]
   - *Heuritech* – Uses computer vision and deep learning to analyze social media images and predict fashion trends.
   - *Stylumia* – AI-driven trend forecasting and demand prediction for fashion brands.
   - *Google's DeepDream & Runway ML* – AI-powered tools for creative design and generating fashion patterns.
   - *PatternMaker Pro* – AI-assisted tool for creating custom garment patterns.

2. Virtual try-on and personalization [4]
   - *Zalando's AI Stylist* – Provides personalized outfit recommendations based on customer preferences.
   - *Vue.ai* – AI-powered styling assistant offering virtual outfit recommendations.
   - *Fit Analytics & True Fit* – AI-based virtual fitting tools that suggest the best size and fit.
   - *Revery AI* – AI-driven virtual try-on and garment simulation.

3. AI in Manufacturing and Supply Chain [4]
   - *Sustainaibl.ai* – AI for optimizing sustainable fashion supply chains.
   - *Sewbo* – Uses AI-powered robots to automate sewing and garment manufacturing.
   - *Lectra* – AI-powered cutting and fabric optimization software.

4. AI in Fashion Retail and E-commerce [4]
   - *Shopify's AI* (Sidekick & Shopify Magic) – AI-driven product recommendations and content creation.
   - *Vue.ai* – AI for automated product tagging, description generation, and visual search.
   - *Syte.ai* – AI-powered image search and product discovery for fashion e-commerce.
   - *Lily AI* – AI-driven retail intelligence to improve product descriptions and customer engagement.

5. AI in Marketing and Consumer Insights [4]
   - *Phrasee* – AI-generated marketing copy for fashion brands.
   - *ChatGPT* și *Jasper AI* – AI-powered content generation for fashion marketing.
   - *Vidora* - AI-driven customer behavior prediction and targeted marketing.

2. GENERATIVE ARTIFICIAL INTELLIGENCE (*GenAI*) AND ITS USE IN SOME ADOBE CREATIVE CLOUD APPS

Since the emergence of *ChatGPT*, *GenAI* has become the center of attention and numerous such models are now available, which are capable of generating various types of content, from texts

to video sequences by way of images. The so-called generativity of these tools stands at the origin of many discussions, and the number of uses and users is increasing [5].

In fashion, the design development process has experienced considerable changes over time, influenced by the emergence of innovative technologies that have introduced new design tools. In recent years, we have witnessed an increase in the interest of using *AI* in design, which is changing the approach to textile design. The use of *AI* technology supports the designer's creative process by providing deep learning systems that mimic the commonly used manual design [6].

2.1. Adobe Firefly — the AI art generator

Adobe Firefly is a family of generative AI models for driving creativity and accelerating workflows in Adobe products, providing a creative copilot to accelerate ideation, exploration, and production. It is also designed for safe commercial use [7].

Generate images, edit existing photos, apply artistic styles, create social media content, flyers, and more using text descriptions [8].

The following image show the steps of generating images using *Adobe Firefly*, by means of text to image conversion, the image will be generated based on a text cue in English: Pencil skirt with black, white and yellow floral print, as shown in **Fig. 1**, the image generation will include 4 options the user is able to choose the model that best suits the text cue.
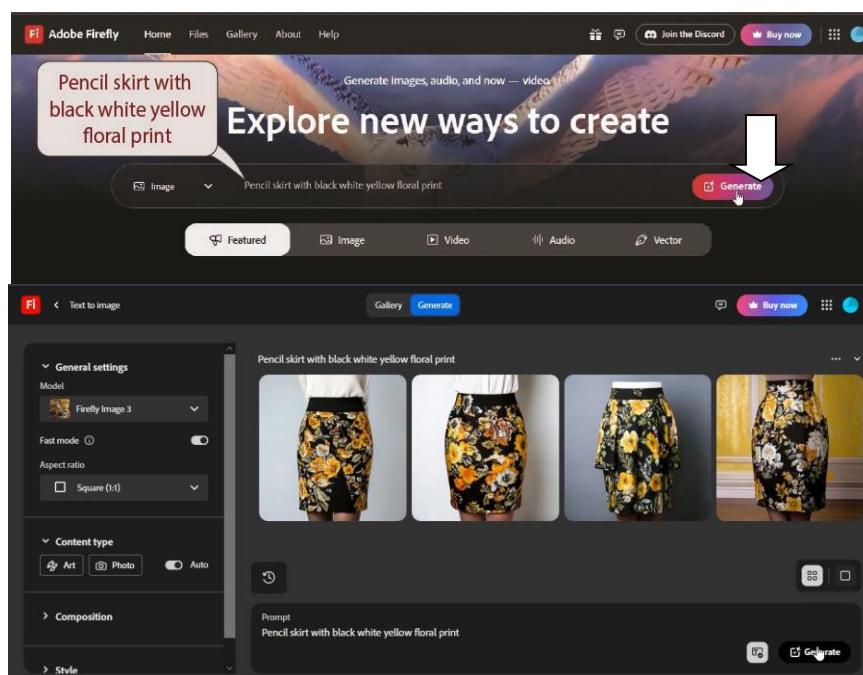
*Fig. 1: Generating model options using Adobe Firefly*

2.2. Adobe Illustrator – Generating vector graphics

Text-to-vector graphics conversion, powered by *Adobe Firefly*, allows you to create realistic vector graphics, such as scenes, objects, and icons, in a short amount of time and with minimal effort [9].

Based on a brief description of the desired graphic, *Illustrator* [10], [11], [12] quickly generates 3 variants as a result. Once the variant that best aligns with the artistic vision is chosen, it

can be saved and edited.

The following is an example of generating a vector graphic, [10], [11], [12] therefore the rectangle tool is selected from the toolbar ▣ and a rectangle is drawn in the work area, the size of the rectangle will represent the size of the graphics. Subsequently the shape is selected by using the selection tool. ▷, **Fig. 2.**
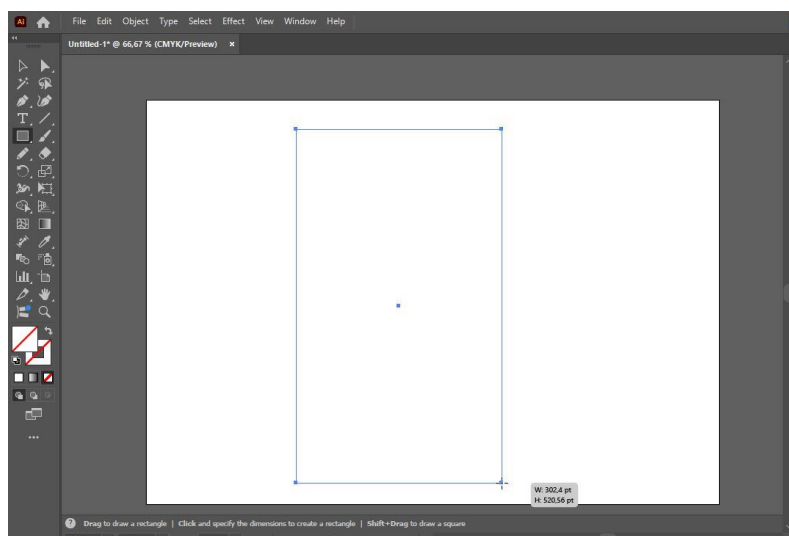

***Fig. 2**: Drawing the rectangle in the work area*

For the next step, select *Generate vectors* from the contextual bar that appears after drawing the rectangle, **Fig. 3.**
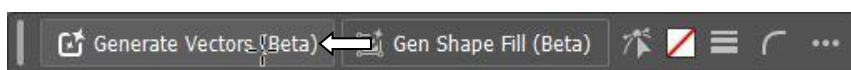

***Fig. 3**: Select Generate Vectors*

In the text input field, write the description of the graphic or scene which is to be generated, **Fig. 4a**, for more options about content type and detail please click on 🔄 to choose between generating a scene, subject or icon **Fig. 4b**, please click on ⚙ to adjust the style reference, **Fig. 4c**.
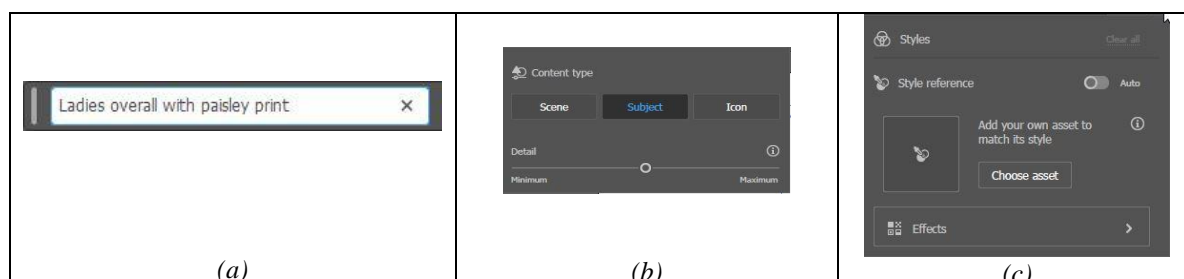
***Fig. 4** (a) Typing the text cue (b) Content and type detail (c) Style reference*

To view and access all desired settings before generating the vector graphics, access the view all ⚙ settings button, this window also includes the color or number of colors setting **Fig. 5**.

For the vector graphics to be generated, the settings remain standard, the text cue for generating the graphics being: Women's overall with paisley print. Illustrator first generates 3 options that can be evaluated, the generating process can be continued or if the result is satisfactory, the chosen option can be saved. The selected and saved option can still be modified, as it is a vector graphic, changes are unlimited, starting with changing of the fill color or background, changing the shape and changing the print, everything is possible, **Fig. 6**.
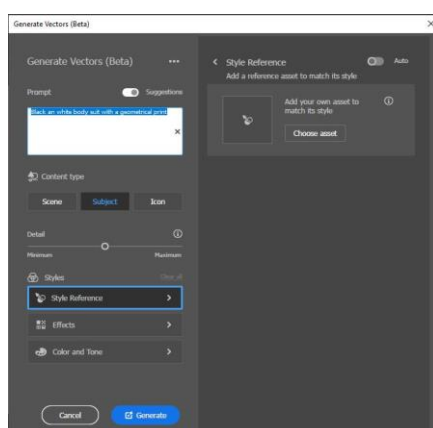
Fig. 5 *: All setting window*

Fig. 6 *: The three vector graohics generated by a text cue*

3. CONCLUSIONS

Artificial intelligence is already revolutionizing the fashion industry, with its involvement entire collections can be created based on the analysis of trends and user preferences. It also offers the possibility of completing the entire design process in a much shorter time and with reduced

effort. The complexity of its use is found in important stages within the entire production flow: trend forecasts, customization, design and creativity, sustainability, accuracy in tailoring, production and automation. To assure all previously mentioned stages, the textile industry has available apps that include *artificial intelligence* and are used for design, 3D conversion of the model, virtual fitting. All these stages, which are now easier to complete, increase efficiency and reduce the effort and time required for the entire process, starting with the design concept and ending with the production stage.

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