

Artificial intelligence in textile design: a mini review

Abstract

This paper explores the evolving relationship between humans and technology, particularly focusing on the integration of artificial intelligence (AI) into daily life and its implications for human creativity. It discusses the challenges posed by sedentary lifestyles resulting from the automation of physical tasks and emphasizes the importance of maintaining reasoning abilities amidst technological advancements. Categorizing AI into machines that mimic human thought processes and those that operate rationally, the study examines the potential impact of AI on creativity and decision-making. The text highlights the increasing use of AI in wearable technology and textile design, pointing out the shift towards garments capable of autonomous decision-making. However, it raises concerns about the potential consequences of overreliance on AI, including loss of human reasoning abilities and ethical implications such as social manipulation and invasion of privacy. Drawing from various scholarly perspectives, the paper discusses the potential risks and benefits of AI, including its role in augmenting human creativity. While some researchers argue that AI can enhance creativity by providing innovative tools and workflows, others caution against the homogenization of designs and the need for regulatory frameworks to ensure responsible AI use. Ultimately, the paper concludes that AI should be viewed as a tool to augment human creativity rather than replace it entirely. It advocates for collaborative approaches where AI assists human designers in exploring new creative possibilities while upholding ethical standards and individual expression.

Keywords: artificial intelligence, smart machine, design, creativity

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Züleyha Değirmenci

Textile Engineering Department, Gaziantep University, Turkey

Correspondence: Prof. Dr. Züleyha Değirmenci, Textile Engineering Department, Gaziantep University, Turkey, Email degirmenci@gantep.edu.tr

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Introduction

Artificial Intelligence (AI) constitutes a domain within computer science devoted to elucidating the underlying principles of human intelligence. Its primary objective is to decipher cognitive processes and subsequently emulate them in computational systems. Owing to its broad scope, AI permeates various facets of human endeavor, rendering it germane across diverse industries. Within the realm of robotics, particularly within the domain of apparel manufacturing, a distinctive field of inquiry emerges necessitating adeptness in fashion design, mechanical engineering, and machine learning. Although robotics find widespread application across numerous sectors, their integration within the fashion industry remains an incipient pursuit, primarily due to the intricate challenges inherent in fabric manipulation.¹

With the evolving technology, people's worldviews and expectations have begun to change. The rapid advancement of technology and people's attempts to keep up with this pace bring along many mental and physical challenges. With the integration of machines into our lives, many tasks requiring physical effort have begun to be performed by machines. This has led to sedentary lifestyles and consequently the emergence of obesity and similar health issues. Individuals have been compelled to incorporate exercise programs into their daily activities to maintain their health.

The ability of a user to reason at a certain level is essential for the use of technology, which leads to errors due to operator-dependent errors or user-related variations during the use of devices. In order to eliminate these problems and to produce machines independent of operators, artificial intelligence has begun to be used in engineering. Accordingly, artificial intelligence is divided into two categories: machines like humans and rational machines. Machines like humans are classified as machines that think according to the cognitive modeling approach and behave according to the Turing test approach. Rational machines, on the other hand, can be classified as machines

that think and behave guided by the laws of thought and the rational agent approach. When both classes are examined, it can be seen that the studies are divided into thinking and behaving. In this case, it can be said that machines capable of thinking and deciding instead of just reacting have become widespread.

Creativity and Artificial Intelligence

In addition to machines called intelligent, it is also possible to mention smart textile materials. The use of clothes that can change color and pattern according to environmental conditions and adapt to your body rhythm is increasing day by day. Users now prefer clothes that can make decisions rather than clothes that only give any alert (sound, light, vibration) with the help of sensors. This situation raises the problem of not using the mind and losing the ability to reason over time. It is a known fact that all unused nerves slow down and even lose their function after a certain period. For example, the weight that a weightlifter who has been working out for a long time can lift may not be the same as that of an ordinary person, or the leg muscles that have not been used for a long time due to illness may weaken. If a person performs even the simplest tasks without reasoning with the help of a machine, it is thought that they will do it without error but will lose their questioning ability. Since the human mind cannot produce new solutions without encountering problems, this situation will lead to the dulling of the human mind.

Bernard Marr² reported that artificial intelligence can be dangerous. Autonomous weapons is the first risk. If they are programmed to kill, there is nobody to resist this problem. Another risk can be social manipulation which can be used as a tool to find and analyze people especially for target marketing. Third risk is invasion of privacy and social grading. By using cameras all the movements can be recorded and by using algorithms, social credit system can be applied by this way. Another problem is misalignment between our goals and the machine. Although people are more creative than machines, learning process is going on and in near future nobody knows the level of

competition. Discrimination is the last risk reported by Marr. Even though artificial intelligence is used for good purposes now, who knows the problems human will meet.² Machine learning and deep learning are the approaches of AI. Researchers argued that who knows the place of this collected data from any machines and who uses these data for which aim. Also security is the another risk of AI.³

The human body is also a machine. This machine has basic needs such as food and security to function. In addition to these needs, human beings need emotional interactions for the development of the brain. That is, concepts such as love, being loved, belonging, being appreciated, and achieving are emotions that fuel one's creativity. When we encounter any problem, the choice of moral and immoral solutions to solve this problem is related to our character. Therefore, for a machine to learn, the problem it will face and the solution paths may be better than humans, but it can only be possible with machines interacting with each other or with humans. From this perspective, it is possible that machines are more error-free than humans in terms of fulfilling given tasks, but it cannot be expected that artificial intelligence is superior to a working mind in terms of creativity.

On the other hand considering the speed of development of artificial intelligence and its predicted potential based on what it can do, claiming that the human mind is better than artificial intelligence and opposing artificial intelligence is like swimming against the current. If we examine the concepts of fashion and artificial intelligence together; textile design is the process where designers create products with innovative ideas by following trends and forming their own styles. In this process, the use of artificial intelligence can facilitate the work of designers in fabric selection, pattern creation, sewing techniques, color combinations, and detailing.

Mazzone and Elgammal⁴ discussed AI decreases the creativity of human body. Art and style analysis of AI processes are seemed similar to each other. If a person want to use AI to design a special product, at first she has to design the AI tool. If the designer blends the force of AI and creativity of own the originality level of the product increases.⁴ Cheng,⁵ argues the articulation and originality of the products obtained by AI tools. Opposite to many researchers Cheng thinks that AI technologies can be used to discover the potential of human's creativity.⁵ Zhou et al.⁶ support the idea of Cheng and concluded that to reach the maximum originality human should blend AI tools and own creativity. By this way discovering new creative workflows will be possible.⁶

However, a process where authority is entirely delegated to artificial intelligence can also lead to the formation of a repetitive order. This situation can lead to brands producing similar designs. Vinchon et al.,⁷ investigated the possible laws for the AI, if there is a collaboration between human and smart machines. Laws are important to avoid using of these machines for harmful purposes. And the responsibilities of this machine's creator should be written in detail to minimize the risks of these machines. And they reported that these tools can increase the potential of human body.⁷

Artificial intelligence is a technology designed by humans to solve human problems, holding immense potential as a tool to enhance human life experiences rather than replace or surpass human intelligence. The value of art lies in its fulfillment of tasks such as creative activity, performance, and appreciation. While digital art enables new forms of creativity, ethical concerns arise regarding the replication of other artists' works without individual expression. To achieve optimal results, designers must adopt new roles that enable collaboration with machines using rapid, engaging, and continually

evolving technological methods to create products. While AI-based programs cannot produce original and creative works without the human factor, they can serve as supportive tools in the design process, facilitating designers in creating unique designs, saving time, and reducing effort.⁸ Consequently, the visual design profession is not under threat, and designers have more time than ever to be creative. Artists and designers can explore and discover new creative possibilities they otherwise couldn't imagine by using AI-assisted software.

Conclusion

The rapid integration of artificial intelligence (AI) into various aspects of daily life presents both opportunities and challenges for humanity. While AI offers tremendous potential to enhance efficiency and productivity, it also raises concerns about its impact on human creativity and autonomy. This paper has explored the implications of AI for creativity, particularly in fields such as wearable technology and textile design. Through an examination of scholarly perspectives, it has become evident that while AI can assist in generating novel ideas and facilitating design processes, it cannot replicate the depth of human creativity and moral reasoning. Therefore, it is essential to adopt a collaborative approach where AI serves as a tool to augment human creativity rather than replace it. Furthermore, the ethical implications of AI deployment must be carefully considered, with regulations in place to ensure responsible and ethical use. This includes safeguarding privacy, preventing social manipulation, and addressing concerns about the homogenization of designs.

In conclusion, while AI holds promise as a tool to enhance human creativity and productivity, it is imperative to maintain a human-centered approach. By leveraging AI to complement human ingenuity, we can unlock new creative possibilities while upholding ethical standards and preserving the uniqueness of human expression. The relationship between artificial intelligence and fashion is deeply penetrating various aspects of human life with the rapid advancement of technology. Artificial intelligence offers various opportunities in the fashion industry, from design processes to production stages. However, it is important to note that artificial intelligence is not yet at a level where it can compete with human creativity and emotional intelligence. While it enhances efficiency and streamlines processes, the human touch and ingenuity remain irreplaceable in the realm of fashion design and innovation. Therefore, the synergy between human creativity and artificial intelligence technology holds the key to unlocking new possibilities and driving progress in the fashion industry.

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Conflicts of interest

Authors declare that there is no conflict of interest.

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