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Opportunities and Threats of Artificial Intelligence in the Fashion Industry

Mahboubeh Shahidi[a]*

[a]*Design and Clothing Department, Apadana University, Shiraz, Iran*

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Research Article

Abstract

Artificial intelligence is a set of technologies and algorithms that give computers and different systems the ability to learn, think and perform complex tasks. Artificial intelligence as a new technology has many applications in the fashion industry. Using artificial intelligence algorithms, it is possible to predict fashion trends, design clothes, optimize production time and cost, etc. But also, with the introduction of artificial intelligence into the fashion industry, threats will also emerge for this industry. In order to investigate the opportunities and threats of artificial intelligence in the fashion and fashion industry, in this research, artificial intelligence technologies in the fashion industry have been explained. Various sources have been used to collect the information needed for this research. These sources include scientific articles, books, reports and sites related to the fashion industry and artificial intelligence. In the following, with the help of these sources, the opportunities and threats of artificial intelligence for the fashion industry have been examined in detail. In general, despite the many opportunities that artificial intelligence provides for the fashion industry, there are also threats to this industry that must be taken into account.

Keywords: Artificial Intelligence; Fashion Industry; Fashion Technology

1. Introduction

Intelligence is a very general mental ability that includes the ability to reason, plan, solve problems, think abstractly, understand complex ideas, learn quickly and learn from experience. It's not just book learning, a limited academic skill, or test-taking smarts. Rather, it has a broader

* Corresponding author. Tel: +989177214427.
E-mail address: yasna.nika.sh81@gmail.com

reflection and a deeper ability to understand our surroundings, to "make sense" of things, or to "understand" what to do. Human Reason Dreyfus explains that human intelligence relies on unconscious processes that cannot be achieved by conscious symbolic information. processes and finds it interesting and useful for researching that technology, reveals their limits. However, there are large investments in projects that try to mimic the brain, such as the Human Brain Project that investigates (Vollard, 2021).

Artificial intelligence is a field of computer science that studies and examines the logic of human intelligence (Lucy, 2021). The term artificial intelligence in its modern meaning was coined for the first time in 1956 by John McCarthy, Marvin Minsky and their colleagues at the Dartmouth Conference. The initial developments gave this courage to the scientists of this field to predict a very bright future for artificial intelligence. Herbert Simon predicted in 1958 that in the next ten years, computers will be able to be chess champions, this prediction of course came true to a large extent. Many definitions have been mentioned for artificial intelligence, all of which can be put in the form of two main approaches: "weak artificial intelligence" and "strong artificial intelligence". A strong approach to the problem of artificial intelligence seeks to build a machine that will reveal all the abilities that are associated with intelligence in humans. Therefore, it provides definitions corresponding to such a function of artificial intelligence (Matlabi Karabkendi et al., 2013).

With the rapid development of big data analytics technologies, artificial intelligence is being revived by the availability and power of big data. So, after years of hope and promise, AI is gaining traction among top companies. It has been reported that the use of systems equipped with artificial intelligence in organizations is rapidly expanding and artificial intelligence is changing business. The new wave of artificial intelligence systems has improved the organization's ability to use data for forecasting and significantly reduced forecasting costs. According to Gartner's 2018 Technology Trends Survey, artificial intelligence is listed as the first strategic technology. The ability to use artificial intelligence to improve decision-making, reinvent business models and ecosystems, and rebuild the customer experience will bring benefits to digital initiatives by 2025 (Yanqing Duan et al., 2019).

Artificial intelligence in robots to develop human-like characteristics significantly increases human dependence on technology. In addition, the ability of artificial intelligence (AI) to effectively perform any task is more limited and significantly increases people's dependence on technology. Recently, artificial intelligence has been reflected as an artificial representation of the human brain, which tries to simulate their learning process with the aim of imitating the power of the human brain. Everyone should be assured that artificial intelligence is equal to the human brain, which is not capable of creating it. Moreover, artificial intelligence (AI) is a combination of different technologies that give robotics the opportunity to understand, learn, understand, or complete human activities on their own. In this case, artificial intelligence programs (robots) are built for a specific purpose such as learning, acting and understanding correctly, while human intelligence is basically related to various multitasking abilities. In general, an AI tool mainly focuses on robotics that mimics human behavior. But still, artificial intelligence may fail at some points due to differences in human and computer brains. Artificial intelligence may be able to support us in performing tasks and functions that usually do not involve feelings and emotions. Until now, AI machines are not able to control their own process, for which they need the intelligence and minds of humans. The purpose of creating artificial intelligence is to make human life easier. However, there is still a huge debate about the pros and cons of AI in general. With the introduction and successful implementation of artificial intelligence (AI) solutions, many industries in the world have benefited from increased profitability and will continue to enjoy a good economic

growth rate. In addition, AI opportunities will be aimed at innovative, human-centered approaches and measuring the application of robotic technology in various industries and companies around the world. Artificial intelligence will also revolutionize the way companies grow and compete in the world by providing new production ideas that bring profitability to businesses (Jahanzaib Shabbir and Tarique Anwer, 2015).

Artificial intelligence algorithms play an increasing role in modern society, although they are not usually labeled "AI". Although current artificial intelligence presents us with few ethical issues that do not already exist in the design of cars or power plants, the approach of artificial intelligence algorithms towards more human thinking shows predictable complications. Social roles may be filled by artificial intelligence algorithms, which require new design requirements such as transparency and predictability. Sufficiently general AI algorithms may no longer be implemented in predictable contexts and require new types of safety assurance and artificial ethical considerations engineering. Artificial intelligences with sufficiently advanced mental states, or appropriate states, will have moral status, and some may count as persons, although they may be very different persons from the current kind, perhaps governed by different laws. And finally, the prospect of artificial intelligence with superhuman intelligence and superhuman abilities confronts us with an extraordinary challenge, which is to express an algorithm that is the output of supermoral behavior. These challenges may seem like a dream, but it seems predictable that we will face them. And they are not without suggestions for today's research directions (Bostrom, and Yudkovski, 2011).

Artificial intelligence has become an integral part of every industry. With the emergence of big data, industries, especially the textile and clothing industry, are on the threshold of relationships with consumers, suppliers and competitors. They have to manage different scenarios with a lot of complex correlations and dependencies between them and uncertainties caused by human interaction. It has become necessary to manage a huge amount of data to optimize their decision-making processes. In such a situation, artificial intelligence techniques are promising in every part of the value chain, from product discovery to robotics. The wide potential applications of artificial intelligence in industry have found their way in design support systems, recommendation systems, intelligent tracking systems, quality control, forecasting, predictive analysis in supply chain management or social networks and electronic commerce (Mahi Al-Din Babu et al., 2022).

Identifying the opportunity to deploy artificial intelligence depends on a wide range of factors that are specific to individual sectors and in those sectors, for different types of business. Given the wide range of applications of AI techniques, in general, if you want to know where AI can create the most value, you should follow the money. For industries where the main drivers of value are related to marketing and sales, including many consumer-facing industries, this is where the greatest value can be found from the application of artificial intelligence. The biggest value opportunities for artificial intelligence are in marketing and sales. In supply chain management and manufacturing, the greatest impact of potential value from the use of artificial intelligence is in both top-line functions (such as marketing and sales), and in bottom-line operational functions (including supply chain management and production at the company level). Each company should examine the mix of its functions to find the most attractive opportunities for using artificial intelligence and determine where it makes more sense to invest in the deployment of artificial intelligence (Michael Choi et al., 2018).

According to the awareness of artificial intelligence, consumers are divided into three categories: laggards, enthusiasts and realists. Most consumers are realistic, aware of both the benefits and risks of AI technology. Laggards believe that AI technology has a high level of risks and a low level of

benefits, while enthusiasts perceive a high level of benefits and a low level of risks with AI. Rapid advances in artificial intelligence technology enable new consumer experiences and therefore affect consumption values. Artificial intelligence technology is used in the retail fashion industry to improve consumer experiences (Csanák, 2020).

Artificial intelligence is currently used in many fields of fashion, and experts currently see the best possible opportunities to exploit it more. Machines and robots compatible with artificial intelligence easily sew fabrics well. While they can detect fabric defects and provide quality assurance to ensure that the actual design shades match the new colors. Some retail giants, such as Amazon and Walmart, already have their own clothing brands and use machine learning systems to create fashion trends that customers prefer to buy in the not-too-distant future. . Artificial intelligence can identify new trends by reducing (human) prediction error. Artificial intelligence can design to create endless combinations of variables. Changing something will change everything. Many possible connections between design variables and performance lead to different performance (Csanak, 2020).

2. Results and Discussion

2.1. Technology in the Fashion Industry

At present, artificial intelligence has become one of the most important and influential technologies in the world, and many industries are using it. One of these industries is the clothing industry, where artificial intelligence is continuously used in the design and production of new clothes. This has caused clothing designers to create new initiatives in designing and manufacturing clothes using artificial intelligence. These technologies are used in the design, production and use of clothes and provide facilities and capabilities that are beyond ordinary and analog clothes. One of the common examples of smart fashion is the use of electronics and sensors in clothes. These sensors can measure various information such as heart rate, blood pressure, body temperature and movements and transmit them wirelessly to external devices. This information can be used for health monitoring or more creatively in clothing design to create effects and lighting.

New technologies such as augmented reality and virtual reality are also used in smart fashion design. These technologies allow fashion designers to create virtual clothes on 3D models and allow customers to experience them in a virtual environment before buying. Also, artificial intelligence and machine learning algorithms are also used in fashion and smart fashion design. These technologies can create suggested patterns for clothing design based on the customer's taste and style, and also work more efficiently and effectively in the production and distribution process. Smart fashion and fashion design, using advanced technologies, gives us innovative clothes design and unique capabilities and leads to new and different developments in the field of fashion and clothing.

2.2. Virtual Reality (VR) Augmented Reality (AR)

AR and VR technologies have already been influential in fashion and the potential for their growth and adoption is high. They can provide immersive virtual shopping experiences, virtual fashion shows and virtual dressing rooms, and increase the way consumers interact with fashion. AR technology allows customers to try on clothes and accessories virtually using their mobile devices or proprietary AR applications. They can see how clothes fit, test different styles and colors, and make more informed purchasing decisions. For example, programs such as Dressing

Room and Z-Kit can be mentioned. VR technology allows fashion brands to create virtual exhibitions and fashion presentations. These immersive environments provide a digital platform for displaying collections, the possibility of remote presence and providing an attractive brand experience. Brands such as Tommy Hilfiger, Dior and Balenciaga have explored VR exhibitions. VR technology allows fashion designers to create virtual prototypes and visualize their designs in a 3D space. They can check the details of the garment, evaluate the fabric, and make changes to the design before moving on to physical production. Tools such as Clotridi and Optitex offer VR capabilities for design visualization. Fashion magazines and advertisements with augmented reality capability: Augmented reality can bring fashion static images to life by placing digital content on print media. Users can scan magazine pages or ads with their mobile devices to unlock interactive experiences such as 3D models, videos or behind-the-scenes content.

Virtual reality can be used in fashion education and educational programs. Students can participate in virtual design studios, participate in virtual workshops, and experience fashion events from remote locations, providing a more inclusive and accessible learning environment. Augmented reality-based styling applications can provide personalized fashion recommendations based on user preferences and body measurements. Users can virtually style clothes, receive design recommendations, and discover new brands and products that match their style preferences.

2.3. Artificial Intelligence (AI)

AI has the potential to help fashion designers in many ways, such as trend forecasting, personalized style recommendations, and even creating design concepts. Virtual fashion assistants based on artificial intelligence and fashion recommendation systems can become more common in this industry. Artificial intelligence is changing various aspects of the fashion industry, from design and production to customer experience and supply chain management.

Algorithms based on artificial intelligence analyze vast amounts of data, including social media trends, online shopping behavior, and fashion publications to predict future fashion trends. Companies such as Trendelitex and Editet provide trend forecasting services that help fashion brands make informed decisions about their collections.

AI algorithms analyze customer preferences, past purchases, and browsing behavior to provide personalized style recommendations. Virtual style platforms such as Stitch Fix and Amazon Echo Look use artificial intelligence to suggest clothes and help customers discover new fashion items.

Visual search tools based on artificial intelligence allow users to search for fashion items by uploading images or using descriptive phrases. Companies like Pinterest and Google Lens use artificial intelligence algorithms to recognize patterns, colors and styles and allow users to find similar fashion products.

Artificial intelligence algorithms analyze customer body measurements, product specifications, and historical fit data to provide accurate size and fit recommendations. This helps customers make more informed choices when shopping online and reduces the return rate. Brands such as True Fit and Fit Analytics specialize in artificial intelligence-based sizing solutions.

During the Corona period, brands often couldn't bring models to shoot safely. For many e-commerce stores, this was a serious problem, because model photos can sell items up to 60% more. Not surprisingly, some of the most popular fashion brands came up with creative solutions. British online fashion and cosmetics retailer Asus, for example, uses artificial intelligence technology to hold virtual photo shoots in which six real-life models wear virtual replicas of the brand's clothing real pictures of clothes are provided to buyers. Perhaps it is no coincidence that the company tripled its profits from the end of 2020 to the beginning of 2021. Some famous models are now completely

artificial intelligence, such as Brazilian-American model Mikola Souza, who has 3.1 million followers on Instagram and has collaborated with Givenchy and Prada. While the advent of artificial intelligence models may seem a bit surreal, the benefit of virtual shoots is that they can increasingly help reduce the environmental waste that physical shoots produce. As a result, for brands that need to quickly change advertising images, virtual photography provides an opportunity to not only improve efficiency, but also reduce costs. As more people shop online, this year we'll see an increasing number of brands experiment with artificial intelligence to build their catalogs on real or AI-generated models and even show the buyers themselves.

2.4. Opportunities and Threats of Technology and Artificial Intelligence in the Fashion and Clothing Industry

The fashion and clothing industry is one of the most competitive industries with many opportunities and threats. Considering that customers' tastes change rapidly in this industry, companies must keep up with market changes and be up-to-date in order to be successful in the competitive market. On the other hand, the use of social networks, the development of the global market and new technologies provide many opportunities for companies in this industry. But due to fierce competition in this industry and changing customer tastes, companies are also facing many threats.

Opportunities:

According to these points, companies should focus on improving the quality of products and services, improving processes and reducing costs in their planning in order to be successful in the competitive market. Also, the use of new technologies and the development of online business are also opportunities that companies should pay attention to.

• Improving the design and production process: by using artificial intelligence and digital technology, the design and production process of fashion products is improved. For example, by using artificial intelligence, you can quickly check different design patterns and choose the best option. Also, by using digital technology, it is possible to produce three-dimensional samples of products and check them before starting production and fix the problems.

• Improving the shopping experience: by using artificial intelligence, customers can easily find the products they want, and by using digital technology, they can buy more quickly and confidently. For example, by using artificial intelligence, it is possible to provide purchase suggestions that suit the tastes and needs of each customer, and by using digital technology, the process of payment and sending products can be improved.

• Improving the distribution process: by using artificial intelligence, it is possible to more accurately predict the needs of customers and deliver products more quickly and accurately. For example, by using artificial intelligence, it is possible to quickly respond to ongoing orders and determine the best shipping methods.

• Cost reduction: By using artificial intelligence and digital technology, production and distribution costs can be reduced and product quality can be improved. For example, by using artificial intelligence, it is possible to quickly identify the needs of customers and adjust the production of products based on these needs. Also, by using digital technology, it is possible to optimize the production and distribution process and reduce additional costs.

• Increasing the speed of the process: by using artificial intelligence and digital technology, the design, production and distribution process can be done faster and provide better services to

customers. For example, by using artificial intelligence, the design process can be done faster, and by using digital technology, the production and distribution process can be optimized.

• Improvement of decision-making: by using artificial intelligence, better decisions can be made in the field of design, production and distribution of fashion products. For example, by using artificial intelligence, it is possible to quickly identify the needs of customers and make decisions on the design and production of products based on these needs.

• Increasing the speed of production: by using artificial intelligence and digital technology, the speed of production and supply of products in the fashion and clothing industry increases. This makes it possible for companies to easily respond to market requirements and deliver to the market at a high speed.

• Improving the quality of products: the use of artificial intelligence and digital technology improves the quality of products in the fashion and clothing industry. This allows companies to achieve quality and acceptable products for their customers.

• Increasing sales: by using artificial intelligence and digital technology, companies can easily respond to customer needs and offer quality products at reasonable prices. This makes the company's sales increase and, as a result, their profitability also increases.

• Using social networks: Using social networks allows companies to be in contact with their customers and benefit from their opinions and suggestions.

• Global market development: Using digital technology, companies can easily target the global market and export their products to all over the world.

• Using new technologies: Using new technologies allows companies to produce their products with higher quality and faster.

• Online business development: Using digital technology, companies can easily develop online business and access their online store.

• Increasing competition: With the use of artificial intelligence and digital technology, competition in the fashion and clothing industry will increase. For example, companies that use these technologies can quickly respond to customer needs and provide quality products at reasonable prices. This causes other companies to use these technologies to attract customers.

Threats

• Reduction of employment: with the use of artificial intelligence and digital technology, many processes in the fashion and clothing industry are automated and the need for human labor is reduced. This causes many workers in this industry to lose their jobs.

• Violation of privacy: using artificial intelligence, personal information of customers is collected and analyzed automatically. This causes the privacy of customers to be violated and their personal information to be used for commercial purposes.

• Increasing dependence on technology: With the use of artificial intelligence and digital technology, the fashion and clothing industry becomes dependent on technology. This makes the fashion and clothing industry affected in case of problems in technology.

• Reduction of human communication: by using artificial intelligence and digital technology, many processes in the fashion and clothing industry are done automatically and the need for human communication is reduced. This causes the communication between people to decrease and as a result, the spirit of work and cooperation in the fashion and clothing industry decreases.

• Increased imitation: Using artificial intelligence and digital technology, the ability to imitate is very high and competing companies can easily be inspired and imitate your designs and products.

• Increased risk: the use of artificial intelligence and digital technology in the fashion and clothing industry brings with it risks such as system failure, information theft, etc.

• Fierce Competition: With the increasing competition in the fashion and apparel industry, companies have to compete with their competitors to attract more customers. This makes companies have to be more willing to innovate and think creatively.

• Change in customers' tastes: Customers' tastes in the field of fashion and clothing change rapidly, and companies must keep up with these changes in order to maintain their customers' satisfaction.

• Changes in different seasons: Different seasons of the year have different requirements in the field of fashion and clothing, and companies should be ready to produce products that match the seasonal requirements.

3. Conclusion

This article examined the importance of artificial intelligence and its role in the fashion industry. Artificial intelligence, as an advanced technology, has the ability to perform complex tasks and provide quick and accurate solutions. However, there are some concerns about the negative effects of artificial intelligence on society and the economy. As a result, it is better to use artificial intelligence while trying to preserve human values and sustainable development. In general, artificial intelligence as a powerful technology can help improve people's quality of life and economic growth. According to the analysis of the opportunities and threats of the fashion and clothing industry, it can be said that the competitive and dynamic market of this industry requires innovation and creative thinking. The use of social networks, the development of the global market, the use of new technologies and the development of online business provide many opportunities for companies in this industry. At the same time, intense competition, changing customer tastes and changes in different seasons are threats that companies must keep up with and be up to date with. As a result, successful companies in this industry should be more inclined to innovation and creative thinking, and by using the opportunities that exist in this industry, they can maintain the satisfaction of their customers and be successful in the competitive market.

In the fashion industry, artificial intelligence is used to improve the design, production and sale of products. For example, by using artificial intelligence algorithms, it is possible to more accurately predict new fashion trends. Also, artificial intelligence is used to improve the production process and reduce costs in the fashion industry. By using artificial intelligence, it is possible to more accurately identify the needs of the market and customers and design products that are more to the taste of buyers and, as a result, more profitable. Although artificial intelligence can lead to significant improvements in the fashion industry, there are also some disadvantages and threats. These disadvantages and threats include reducing the need for human labor and increasing unemployment, distorting and reducing taste and creativity in designers, creating a security hole for users' information, etc.; Also, the use of artificial intelligence in the fashion industry may make some large and technological companies more powerful and make smaller and start-up companies face more problems.

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