Role of 3D Printing in Fashion

Ambica Khurana,
Assistant Professor
PG Dept. Fashion Designing
Khalsa College for Women
Amritsar (Punjab)

Abstract

In recent years, one technology has been making waves and reshaping the fashion industry is 3D printing. This groundbreaking technology has unlocked new possibilities, pushing the boundaries of traditional fashion design and manufacturing. From avant-garde runway creations to personalized accessories, 3D printing has emerged as a powerful tool for designers, enabling them to bring their wildest imaginations to life. In this post we will show some cool applications of 3D Printing in Fashion.

Keywords- Innovative, Technology, Traditional, Revolution, Industry

Introduction

Textiles and fashion is a dilemma as it is one of the most consumed aspects of human lifestyle, but equally infamous for polluting and endangering the well-being of only habitable planet in our solar system. This makes the case for fashion innovation even more compelling and ethically pressing. Then it comes to textiles and fashion, the innovative ideas. 3D printing has revolutionized multiple industries in recent years, and now it may be changing the way we produce textiles. This technology is considered as one of the most emerging and a significant technology of the fourth industrial revolution in many of the industries, and the fashion industry is also included in it. Due to this advancement 3D printing providing a drastic change in the production and trade in the fashion and textile industry. Nowadays, the use of 3D printers in the textile and fashion industry is gaining attention since designers and clothing producers discovered the importance and benefits of this technology. This technology can be used to create or design fantastic 3D printed fashion with the help of different shapes and geometries but they can also prototype and it makes the sustainable clothing production process.

Objectives

- To study the importance of 3D printing in fashion
- To study the advantages of 3D printing

Research Methodology

The research is descriptive in nature and is based on secondary source gathered from articles in research journals and various online sourcs.

Review of literature

(Shi Jing, Zang Yingchun 2019) in their experimental research they found that after 3D printing the structural line on the fabric, three-dimensional apparel modeling can be produced without joining different pieces of a garment, which also offers the fashion industry an innovative alternative to the seamless eco-friendly creation.

(Chi-Wai Kan Ya-Qian Xiao 2022) in their research paper demonstrated that Three-dimensional printing (3DP) allows for the creation of highly complex products and offers customization for individual users. It has generated significant interest and shows great promise for textile and fashion design. They summarize that the three routes to use 3DP technology in textile manufacturing, including printing fibers, printing flexible structures and printing on textiles. In addition, the applications of 3DP technology in fashion design, functional garments and electronic textiles can be introduced.

(Tanja Nusa Kocevar 2023) explains that 3D Printing enables the production of new, potentially personalised products in areas such as technical textiles, protective clothing, medical products, fashion, textile and interior design. 3D printing can also contribute to waste-free production processes.

Importance of 3D printing in Fashion

3D printing has become an increasingly popular item in fashion and textile at recent years. While conventional textile manufacturing techniques involve cutting and sewing flat materials, 3D printing allows for the creation of complex and intricate designs that are not possible using traditional methods.3D printing, otherwise known as additive manufacturing, is a recent innovation that has fast become one of the most important manufacturing methods. In this process, products are constructed layer-by-layer according to a specific computer-aided design from

extruded materials. There have been several different types of 3D printing processes developed over the past few decades, including fused deposition modeling, stereolithography, selective laser sintering, selective laser melting, digital light processing, and fused filament fabrication.

As far as recent inventions go, the advantages of 3D printing make it one of the most promising technologies. The additive technology is one of the biggest advantages of 3D printing, it opens a whole new way in which product are created and it offers a lot of advantages compared to the traditional manufacturing methods. Fashion designers want to be at the forefront of innovation and 3D printing technology provides them with the tools to fabricate the most adventurous designs. Many brands and designers are using this advancing technology to facilitate creative freedom and design things that once may have only been an imaginative dream.

There are many different types of 3D printing technologies available, but the benefits of 3D printing discussed here are applicable to the whole industry. Through fast design, high levels of accuracy and the ability to make informed decisions, the following 3D printing advantages make this technology a real prospect for businesses but also highlight its importance in future production techniques.

Advantages:

1. **Flexible Design**

3D printing allows for the planning and print of more complex designs than traditional manufacturing processes. More traditional processes have design restrictions which do not apply with the utilization of 3D printing.

2. **Rapid Prototyping**

3D printing can manufacture parts within hours, which accelerates the prototyping process. This enables for every stage to finish faster. In comparison to machining prototypes, 3D printing is inexpensive and quicker at creating parts because the parts are often finished in hours, allowing each design modification to be completed at a way more efficient rate.

3. **Print on Demand**

Print on demand is another advantage because it doesn't need tons of space to stock inventory, unlike traditional manufacturing processes. This protects space and costs as there's no got to print in bulk unless required.

The 3D design files are all stored during a virtual library as they're printed employing a 3D model as either a CAD or STL file, this suggests they will be located and printed when needed. Edits to designs are often made at very low costs by editing individual files without wastage of out of date inventory and investing in tools.

4. **Strong lightweight parts**

The main 3D printing material used is plastic, although some metals also can be used for 3D printing. However, plastics offer advantages as they're lighter than their metal equivalents. This is often particularly important in industries like automotive and aerospace where light-weighting is a problem and may deliver greater fuel efficiency.

Also, parts are often created from tailored materials to supply specific properties like heat resistance, higher strength or water repellency.

5. **Fast Design and Production**

Depending on a part's design and complexity, 3D printing can print objects within hours, which is far faster than moulded or machined parts. It's not only the manufacture of the part which will offer time savings through 3D printing but also the planning process is often very quick by creating STL or CAD files able to be printed.

6. **Minimizing Waste**

The production of parts only requires the materials needed for the part itself, with little or no wastage as compared to alternative methods which are cut from large chunks of non-recyclable materials. Not only does the method save on resources but it also reduces the value of the materials getting used.

7. **Pocket Friendly**

As one - step manufacturing process, 3D printing saves time and thus costs related to using different machines for manufacture. 3D printers also can be found out and left to urge on with the work, meaning that there's no need for operators to be present the whole time.

8. **Simple Access**

3D printers are getting more and more accessible with more local service providers offering outsourcing services for manufacturing work. This protects time and doesn't require expensive transport costs compared to more traditional manufacturing processes produced abroad in countries like China.

9. **Environmentally Friendly**

As this technology reduces the quantity of fabric wastage used this process is inherently environmentally friendly. However, the environmental benefits are extended once you consider factors like improved fuel efficiency from using lightweight 3D printed parts.

10. **Healthcare**

3D printing is getting used within the medical sector to assist save lives by printing organs for the physical body like livers, kidneys and hearts. Further advances and uses are being developed within the healthcare sector providing a number of the most important advances from using the technology.

Conclusion

The field of 3D printing fabrics is in its infancy, but there are some key benefits that producing textiles with these methods could bring. The textiles industry is a major consumer of water and material resources, which gives it a massive environmental footprint. Currently, the global textiles industry is extremely unsustainable, and scientists are constantly exploring new avenues to improve methods utilized in the industry.3D textile printing has the potential to significantly reduce the number of resources needed to produce fabrics for uses such as clothing and furnishings. Processes can be streamlined, use less raw materials, chemicals, and water, and moreover, the amount of waste materials produced is significantly curtailed using 3D printing methods.

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