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Role of computers in garment and textile industries

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Abstract

Computers and fashion have evolved progressively over the years in tandem with changes in taste and fashion trends. However, no one could have predicted when these two fields would mesh so brilliantly. Thanks to computer-aided design techniques, fashion design has advanced to new heights nowadays. Consequently, the computer sector has gained a new clientele. The field of fashion design is seeing a shift in the use of computers. A key element of the fashion business, computers are used for everything from sizing designs to figuring out textile weaves. The need for hand sketching is diminished by computer-aided design (CAD) software. Old manual skills continue to be replaced by new software systems. Utilizing computers extensively and sensibly across the company at the office, in import and export departments, in manufacturing and technical departments, in the warehouse, etc. is one way to boost productivity. This will immediately improve factory productivity and product quality as well as all other operations and corporate activities.

Keywords: Computer, designs, garment, industry, applications

Introduction

The production of fibers, spinning yarns, fabricating cloth, dying, finishing, printing, and garment manufacturing is all part of the intricate web of interconnected industries that make up the textile and apparel business. One of the key instruments enabling this industry's tremendous progress is computer technology. The trend towards computerization and digital solutions is unstoppable at this point and will only pick up speed in the future. These days, computers are a major component of any garment and textile industry. Computer technology improves productivity, reduces waiting times, and creates value goods that buyers, sellers, or manufacturers may want. A computer is an electrical device that has the ability to receive, process, and retrieve data as needed.

Learning outcome

- Gain understanding about the computer applications in the apparel and textile Industry
- Learn the functions of CAD

Definition

Computer Aided Design (CAD) in fashion industry helps to create sketches, prototypes and designs of garments. CAD is essentially an automated system for the design, drafting, display of graphically oriented information and also used in the manufacturing process for layouts. It makes the work easier through efficient use of softwares. (Palak Gaur, 2010) ^[3].

CAD history in the apparel industry

Pencil and paper were the tools used by designers to construct their ideas during the start of the contemporary fashion business in the 19th century, when Charles Frederick Worth made the first label to be sewed into a garment he manufactured in 1858. However, as society and culture changed, the primary obstacles to this process included the growing need for variety in design, the rapid shift in fashion, and consumer preferences in the marketplace. This led to the development of alternative alternatives that acted as a kind of manufacturing and design assistance.

When computer design advanced to the point where it could be used in the clothing business, CAD became useful. A week's worth of work might now be completed in a single day thanks to the design industry revolution brought about by CAD.

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With features like virtual test fitting, pattern grading, marker manufacturing, and pattern creation, CAD systems are becoming a necessary tool for fashion designers, clothing manufacturers, export houses, and other related businesses. By employing CAD systems, garment manufacturers have been able to drastically cut down on manufacturing time.

Applications of computers in apparel industry

There are several instances where computers are used in the clothing business. Here is a list of them.

- **Textile design systems:** This includes planning and executing various knits, weaves, and prints. The process of creating designs for woven, knitted, printed, or surface-adorned materials is known as textile design. These designs are created in collaboration with textile designers. After that, the created designs are applied to textiles and apparel materials.
- **Computerized color matching systems:** These systems compare the dyed cloth with the original sample and quantify the color's depth. It can also provide chemical and color recipes.
- **Fabric defect checking systems:** A scanning device is used to check the fabric for flaws.

Sketch pad systems and illustrations

Sketchpad is a creative software application. With its graphic programs, the designer may utilize a pen or stylus on an iPad or tablet. It is possible to make and save freehand pictures on a computer. Numerous distinct knit and weave simulations may also be made using this sketchpad and saved in a library. To display texture and proportions later, the saved designs can be chosen and pasted over the sketches.



Clothing designing: The clothes designer draws designs and applies different textures to them. Both two- and three-dimensional digital outfits may be produced. Drawing a sketch on paper is comparable to constructing a two-dimensional outfit. The technique of creating in three dimensions is comparable to drapery on a mannequin. The mannequin or the human model in the 3d form can be animated to perform a ramp walk. The garment can thus be viewed in all the angles.

3D body scanning: 3D body scanners measure an individual's measurements by scanning their body. The person's body measurements can be taken with the highest degree of precision. This is a crucial phase that gives the designer the ability to produce clothing that fits well.

PDS systems: PDS systems can be used for marker planning, grading, and pattern creation. Flat pattern procedures make it easy and accurate to draft patterns. Block designs and simple patterns may be scaled to various proportions. A plotter can be used to print the marker planning or lay planning, which can be completed quickly on a computer.

Digitizing systems: The digitizer can assist in converting the manual patterns into digital patterns. The digitized patterns can be utilized for marker planning and grading. The process of digitizing involves incorporating features into an initial pattern or sloper using a computer. By specifying the set of chosen spots surrounding the pattern and identifying the notches, the pattern may be constructed. Certain computer techniques can be used to modify these fundamental patterns. For instance, darts and pleats may be made and changed in the case of pants. Additionally, pre-existing patterns can be used to generate new designs on screen.

Computerized cutting: The cutting / marker plan made using the PDS system is loaded in automated cutting machine. The cutting takes place without a human hand. The computerized cutting machine cuts the fabric into pattern blocks as prescribed by the marker plan.

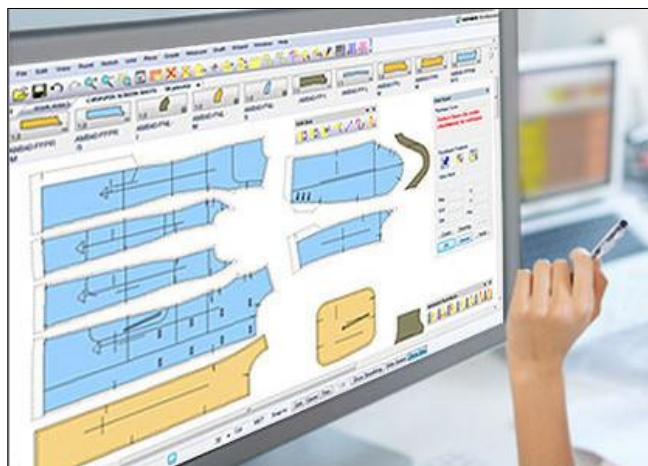


Computerized sewing machines: Sewing machines have programmed operations that help in increasing the production. It also aids in improving / maintaining the quality of the product.

Made-to-measure systems: This is ideal for tailored garments. The measurements are entered into the PDS software which prepares patterns and marker plan for the desired style. This aids in mass production of tailored garments. The full size patterns can be printed using plotters. The customer's measurement can be saved and used for manufacturing of other styles in future.



Embroidery systems: The method allows for the creation of new embroidery designs. It is possible to try several color combinations for the design before deciding on a final color scheme. A computer-controlled embroidery machine can quickly enlarge and stitch the CAD drawings onto the cloth. For the bulk production of embroidered fabrics for the home and business, embroidery design software is utilized. It is possible to put embroidered designs onto fabric while creating clothing. Designers can use a computer to produce embroidered motifs or designs. The design's color and the embroidered stitches are distinct. With this method, several color and stitch combinations are conceivable.



Marker making systems: Usually, a marker is used on broad, thin paper. It contains all of the pattern parts' sizes for a particular kind of clothing. The most effective and widely used technique for producing efficient markers is the computerized method. This process guarantees the least amount of fabric waste. Making markers on plain fabric is rather easy, but matching striped cloth needs careful attention. Preparing markers is said to be simpler using the Computer Aided Marker Making System.

Grading systems

Pattern grading is the process of employing a size specification sheet or grading to convert base size or sample size patterns into extra sizes. It's only a matter of making designs bigger or smaller. The production sample intended for approval is typically medium in size; however, designs are graded to Small (S), Large (L), Extra Large (XL), and Double Extra Large (XXL) if the buyer requests a different size.

Texture mapping (3D draping software): A graphic design technique called texture mapping illustrates how cloth appears on the body. With this method, a realistic draping of the cloth over a shape is possible. The designer begins with a picture of a model donning an item of clothing. The garment is delineated from seam to seam in every region. Using the textile design system, a new fabric swatch is made and placed over the region. The region is immediately filled in with fresh color by the computer.

Administration: The system allows for the creation and maintenance of both the work flow and the whole production plan. This facilitates the efficient coordination between several departments.

Virtual marketing: Before the items are produced, consumers may view them exhibited virtually in virtual storefronts. One type of virtual store is the internet. It is actually not necessary to manufacture a product in order to market it; instead, an electronic version of the product suffices.

Quick response system: By connecting with shops, the designer is able to learn about the interests of consumers. The reaction will determine whether to keep the product, replace it, or give it more priority. The lag time between the manufacturer and the store is shortened by prompt action.

Internet and information explosion: The explosion of information and the internet allow fashion designers, students, leaders, and lovers of fashion to stay up to date with the newest trends in the industry.

Functions of CAD

A computer is used to develop designs in a process known as computer-aided design (CAD). Computer-aided design (CAD) software is used for computerized designing. General-purpose of CAD programs are Paintbrush, CorelDraw, Adobe Photoshop, Autocad, 3D studio max, and others for which the computer is frequently used for clothing designing. Additionally, garment designs may be created using specialized software like as Vidhya, Tukacad, Gerber, Lectra, etc.

The following are the reasons for using a computer-aided design

1. The designer is able to create, recreate or modify designs faster and easier with CAD. In apparel industry CAD refers to garment designs, fabric designs, pattern making, grading marker planning etc.,
2. The designer can create a design and at the same time is able to provide variety of alternatives like variation in colour, texture and styles with ease. Thus, quality and quantity of the design is enhanced with CAD
3. CAD designs can be stored for a longer period of time without damage. It can be retrieved whenever required. It is stored in a virtual space and hence does not occupy floor space.
4. The CAD designs also serve as data base for the manufacture the product though CAM.

Types of CAD systems

In order to create and market ready-to-wear garments, the apparel industry has begun utilizing size classification systems, garment style, design, and color combination. The following are some of the several CAD system types that are available on the market for usage in the clothing industry: One or more design workstations, a CPU, secondary storage, a plotter, and/or additional output devices make up a typical CAD system. Creating designs, creating patterns, grading patterns, and designing markers are all done with computer-aided design, or CAD.

Creation designs: Textile designs for weaving, knitting printing, embroidery and garment designing (2D and 3D) can easily done with CAD.

Pattern making: Pattern Design Systems (PDS) may be used to draft clothing patterns. Making patterns requires mathematical knowledge and is by its very nature a difficult

task. This is a complex procedure that involves the x, y, and z axes, much like pattern creating. With CAD, patterns may be increased or decreased more easily. Clothing is produced for three or more sizes in the apparel sector.

Marker planning: An effective marker plan lowers the cost of fabric by reducing the amount of fabric used. Simply place the pattern pieces in the specified width and rearrange them to create an economical marker. In marker / lay planning, the sizes to be cut and the quantity of layers of fabric to be distributed are decided.

Application of CAD in textile and garment designing

Textile and apparel businesses have both tremendous potential and problems as a result of the fashion industry's fast growth. The apparel industry keeps up with emerging technology and global market trends to enhance its manufacturing capabilities. CAD systems are often used by fashion and textile designers to create clothing designs. A few preliminary drawings done by hand might be the designer's first step. After that, the preliminary photos are scanned into a computer, and CAD is used to complete the final design.

A designer makes edits to design drafts using computer-aided design (CAD). A textile designer uses a variety of CAD software depending on the sort of cloth they are making. Systems exist for planning and producing knitted garments, printed textiles, illustrations, and sketch pad programs that let users create freely on the computer. There are CAD systems that show a designer how to drape a fabric for a particular style of garment.

What are the main advantages of using computers?

- More Efficient
- **Faster:** Reduces the time taken to complete tasks
- **Cheaper:** Decreases costs within industry Provide a simple means on presenting designs/work
- **Clearer:** Improves and clarifies Communication
- **Duplicating:** Reduces repetition (<https://penyrheol-comp.net/technology/wp-content/uploads/sites/2/2014/06/computers-in-textile-industry.pdf>)
- Designs can be created more quickly and easily.
- It is reusable and may be kept for an extended period of time. It is possible to remove the requirement for physical storage space.
- It is easy to embroider on both thin and thick textiles. Both stitch capacity and speed may be raised.
- Additional features include special applications such as appliqué, quilting, and sequence work. The stitching is of excellent quality and suitable for professional use.

Advantages of CAD

Increasingly, CAD and CAM are considered as standard system used in the textile industry. These systems provide many advantages to textile designers and textile manufacturers. They are as follows;

- Using CAD software, designers can be more creative.
- By using CAD software, designers can create new sketches more quickly and precisely.
- Designers can create more accurate patterns with fewer mistakes.
- Designs can be digitally transfer into CAM systems.

- They can graphically test ideas in real time without creating physical prototypes. They can quickly redraw and resize garments.
- They can operate CAD and CAM software efficiently with expansion of the graphic memory allocation.
- CAD has become increasingly important that it has helped to secure a job in fashion design
- It is easy for designers to modify and expand upon preexisting designs to produce new pieces, as well as to adapt a single design to different materials and patterns.
- By enabling designers to inspect virtual representations of final items without having to buy materials, CAD reduces costs.
- Fashion designers may work more efficiently and reduce the time it takes from early conceptions to the final product by utilizing computer-aided design (CAD) software to see and modify designs in both two and three dimensions, as well as view the complete design history of their product. (https://www.brainkart.com/article/Gathered-Frock-with-Puff-Sleeve_37559/)

Future of CAD in the apparel industry

Given the current pace of technological development, we may expect a day when virtually all aspects of fashion design and garment production will be handled entirely by software and machines controlled by a potent algorithm. With its 3D visual portrayal of clothing on human figures, 3D visualization, and other features, computer-aided design (CAD) has already had an impact on the industry as on-demand manufacturing emerges as the new method of production. It will also be extremely important in 3D printed clothes, which the fashion industry hopes will become the new trend. Today's CAD-era electronic drawings and illustrations have the enormous potential to transform this varied sector and push the frontiers of fashion. Fashion and textiles are seeing new trends and developments as a result of the increased usage of CAD software. In the future, CAD can be combined with AI technology to improve 3D modeling and predict certain activities, enabling users to foresee or correct design flaws (Kiron, 2021) ^[5].

Conclusion

The apparel business and technology are expanding quickly, and new trends in clothing include seamless clothing, which is made entirely inside a knitting machine. It is often accepted that computers will always have a role in the industry. The computer-controlled machinery contributes to higher output and caliber. The production of fibers and yarns, fabric fabrication, finishing, dyeing, printing, and garment manufacture are all part of the intricate web of interconnected industries that make up the textile and apparel business. One of the key instruments enabling this industry's tremendous progress is computer technology. The advancement of computer-aided design (CAD) has had a profound impact on and changed every facet of fashion design. As a result, nearly all of the antiquated conventional procedures become outdated and are replaced by more modern, efficient technologies. Computerized talents have supplanted manual skills. The process of fashion design requires less hand drawings thanks to computer-aided design. Thus, we can say that the use of CAD has improved the overall efficiency of the design process and reduced

waste of time and materials, all of which lower production costs.

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