ISBN: 978-93-94570-37-5

17. Recent Software used in Apparel and Textile Designing

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17.1 Introduction:

The techniques of expert systems (ES) and artificial intelligence (AI) enable computers to be applied to less prescribed design tasks by using reasoning and symbolic manipulation instead of routine processing. ES provides very powerful tools to solve problems like designing, database manipulation and decision making. ES helps to plan, diagnose, repair, instruct, analyse, monitor, learn, consult, design, explain and conceptualise problems.

To know the preferences of the customers, it is necessary for the fashion designers to have proper knowledge about technology and effective usages of software. These softwares enhance creativity and make the designing interesting. It includes planning and producing the appearance and structure of a fabric. Textile designer imagines a design and applies it on the fabric with the help of knit, weave and print methods. A designer can suggest the use of the various types of threads, dye and its different methods, to get the desired effects on the fibre, look and enrich the surface of the fabric and create specific patterns. Through textile designing raw materials convert into finished product where fibre, yarn and finishes works as a key element.

These software works with computers and creates the design and document according to the demand of buyers. Buyers select their design from anywhere. These are very fast, perfect, easily develops textile designs and customizes (color scheme) with the choice of buyers whereas manually it takes more time, efforts and one needs to strive harder for perfection.

Since prehistoric times natural dyes have been used for colouring of food substrate, leather as well as fibres like wool, silk and cotton. The use of non-allergic, non-toxic and eco-friendly natural dyes on textiles have become a matter of significant importance due to the increased environmental awareness in order to avoid some hazardous synthetic dyes **(Verma & Gupta, n.d.).**

17.2 Some Essential Textile Design Software:

We are living in an advanced technology era. It has various types of textile design software which makes the work easier, faster and attractive. Every textile designer or fashion designer should know textile design software. Which are able to solves all kinds of designing problems i.e. personal design or a fashion agency or a start-up.

Some of these softwares are discussed below:

- Software for yarn
- Software for fabric (weaving)
- Software for apparel design
- Software for scanning

Software for yarn:

Artificial neural network (ANN): The artificial neural networks (ANNs) is used to characterised the yarn structure, on the basis of geometric arrangement of fibre within yarn body, develop a model of the relation between mechanical properties and physical structure of constituent fibres. This software is an information processing model. Which is configured with special applications such as data classification or pattern recognition. It assembles a close interconnection between the mechanical properties and physical structure of constituent fibres, It is integrated with elements such a:s information, production, quality,cost, statistical process control, just-in-time (JIT) manufacturing computer integrated manufacturing etc. also characteristics of yarn structure in case of the geometric arrangement of fibers in yarn.

17.3 Electronic Inspection Board for Spun Yarns and Hairiness:

Electronic Inspection Board Hairiness Tester: (EIB-S) it is Windows based, easy to handle Yarn Analysis or quality testing Software. which provides yarn diameter measurements based quick, precise yarn analysis. It has a CCD camera to measure the yarn diameter at 3.25 micron precision with 300 m/min test speed. This camera is able to test natural, synthetic and high-performance yarns (glass, carbon or hybrid yarns). Yarn Analysis Software (YAS) is also used to classify the yarn defects such as thick places, neps, thin places, yarn appearance, slubs and hairiness on the basis of yarn length and diameter. These characteristics affects the yarn uniformity and define the commercial value of the end product. This software is able to remove the defects of yarn without retesting, automatically grade the yarn and send the diameter report to the fabric simulation software.

Features include:

Maintains constant Input Tension up to 60g on the running yarn

- It maintains the input tension (up to 60) in the running yarn
- Yarn Analysis Software (YAS) is Windows based and easy to use.
- Diameter evenness measurement with standard deviation and coefficient of variation percentage (CV%)
- Thick & thin places, slub and neps analysis by length and diameter
- Able to change the yarn defect matrix (YDM) without rechecking of the yarn
- Realistic Yarn Appearance Board simulation
- Able to change the width and board type and without rechecking of the yarn to examine the arrangement of the slubs ovwr different loom widths
- Able to automatically grade the yarns for appearance

- Able to Provide diameter information to fabric simulation software

Computer-aided design (CAD) is frequently used for drafting and design, three-dimensional modelling, finite element analysis, generating reports, and as an input source for computer-aided manufacturing (CAM). The CAD is used as an essential tool for manufacturing and designing with computers.

It based on three phases: designing the geometric model, analysis of designed model against various physical quantities, visualization and optimization of computer graphics based on analysis and results.

CAD is a very amazing and powerful tool for the textile industry, offering several benefits such as improved product design, higher utilization, increased productivity and better-quality control. CAD system simplifies the process of designing textile elements like printed surface patterns and garments

COSMOS software - to study the yarn structure on the basis of fibre properties and mechanical action

Yarn Cad - It is specially used for yarn designing and visualization. It shows accurate yarn structure and texture on the basis of the raw material's properties and manufacturing parameters.

A CAD software package was used for algorithm(3D) modelling of yarn structure which assembled various filament on the basis of idealized helical model through many twisting angles. CAD is also able to visualize the fibre's 3D modelling behavior during high speed airflow application (air-vortex yarn and air-jet textured yarn assembly). (Sriprateep and Bohez (2006, 2009)

Knit CAD - CAD provides a specialist software for knitwear designers. This software helps to develop designs and send instructions to the knitting machine for production. It also enables to 3D painting

Point care software- This is used to knit a fabric very easily and modify it. it has some features.

- Design can be repeated easily on the cloth. It may be mirror, half drop, straight with or without overlap.
- Draw designs on the screen or on virtual graph paper using square or rectangular grids at the right scale. You can change the size of the design according to the gauge by modifying the number of rows and columns.
- This software has many graphics design filters, to enhance and retouch your knitting.it applies mix special effects to get exact simulation like blur and comic.
- It has jacquard stitches library, to create an effective variety with customised stitches.
- With drag and drop from the complete Pantone option it easily changes the colour.
- Easily the colour of your knit can be changed with the use of drag and drop options of Pantone ® textile library.

17.4 Software for Fabric (Weaving):

Weave CAD- CAD provides a ˜Scotweave" software. It helps to develop a complex weave structure.This software is helpful to the designer for simplifying the weaving process and attaining guaranteed desired effects with the help of lifting plans and peg plan along with simulation of the structure.

17.4.1 Computer Aided Dobby Design:

Creativity is the demand of the present textile market so today textile designers are becoming more dynamic, creative and productive. Computer-based sample weaving system and interactive textile designing are highly effective for designers. This software enables the designers to visualize better and more patterns as per the requirement and choice of the clients. With Computer-aided designs it provides efficient and comprehensive user interface which allows to specify, visualize, construct and execute designs in original time and can create more attractive and suitable patterns with automatically insert weave, warp, weft structures and integrate colours as per the demand and choices of the customer. There is no need of machine specific criteria such as codes, color values and other technicalities. At present time Design dobby provides the best woven fabric simulation in the market today. The simulation module brings to life the very complex process of dobby weaving on a computer screen or print out. Control functions such as draw-in, read, warp and weft sequences are taken into account in simulation in the same way as yarn properties, material, and colour. The editing process in the Dobby main module automatically analyses all these parameters included in the design file to determine the dynamic behaviour and paths of all thread systems and then corrects them according to their actual appearance.

The dobby design provides:

- Story and mood boards for creating an array of unique pattern
- Bold designs, barcode stripes, pattern-in-pattern, fil-a-fil designs
- Fancy yarns – linen, flannel effect, chenille and slub yarn,
- Development of any colour and produce an almost unlimited palette

17.4.2 Computer-Aided Jacquard Designs:

Jacquard fabrics are complex patterned fabrics having floats and lustre. They are more stretchy and stable as compared to fabrics which are made through basic weaves. Satin fabrics, Atlases fabric, damask fabric, and brocade fabric are some of the examples of jacquard fabric. Computer-aided textile designing software helps the designer to design in the graph either directly or through digitiser or scanner. CAD software is useful for designing I.e. jacquard, treadle and dobby. The pixel graph designs can be transferred either to floppy or taken as graph print out using a printer. The data punched floppy directly operates the needle of the fine pitch electronic jacquard The different CAD software are Texnronics, wonder weaves, CADantage, Autotex, Texgraphics and Ned graphics.

Electronic jacquards are powered by formatted data directly from the computer. Therefore, the graph for electronic jacquard resides in the computer and there is no virtual graph paper.

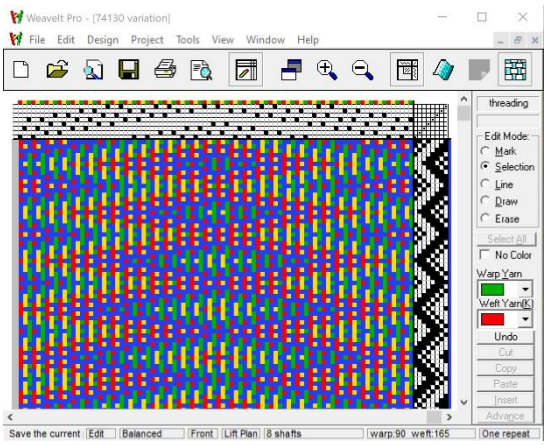
Similarly, no punch cards are required to use punching machines. After designing the graph in the computer, the design is transferred to the floppy. Floppy feeds to fully automatic punching machine. Card automatically filled. According to the design marks and blanks in the floppy, the electronic head with the machine punches the stock cards automatically. The speed is 240 hooks (80 to 120 cards) per hour. Punched cards are locked and used in mechanical jacquard of power looms or handlooms. The card has the advantage of error free punching designs over data formatted floppies.

Advantages of CAD:

Clothing designs are the original work of designers. It helps to visualize and get their imaginative design in finished form without any out-of-sampling design. Some time designer customizes the product as per the client's demand in the aspect of fabric samples or painted artwork and sometimes film negatives. The textile designer creates a workable design by using CAD, scanner, digital camera and finally edit it to obtain a final design.

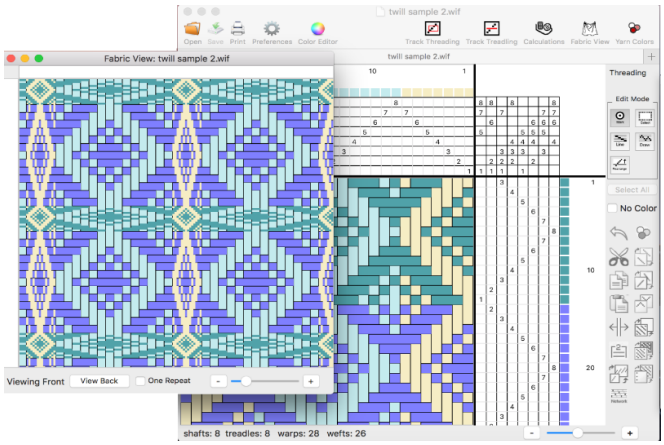
- The cost and time is significantly reduced as compared to the painstaking manual work of designing.
- Designing and controlling of the process can be done from anywhere even from remote locations also.
- The data can be easily prepared, stored, transported and transmitted by computer files
- Digital swatches can be saved on floppy and zip disks, hard drive or CD-ROM thus saving space. It can be easily managed/organized for easy and fast retrieval.
- Designs can be customized and personalized easily as for editing and corrections at any time without any delay or cost escalation.\

WeaveIt: It is a weaving software which offers displaying, designing and creating, Weaving drafts and patterns. Weavers develop treadling, threading and tie-up and applications able to display the draft in drawdown form, calculate the number of heddles and yarn yardage.



WeaveIt supports Windows 7, 8,10 and 11.
Sources http://www.weaveit.com/

WeaveIt Pro is useful for creating drawdowns or more design capability.it has various designing tools Double Weave, Block substitution, Fabric Analysis, Polychrome and Taquete Design, blending and turning drafts, many editing and designing of drafts.



WeaveIt Pro for Mac

Sources http://www.weaveit.com/

WeaveIt Pro for Mac includes many advanced features for Windows. These include block substitutions, parallel threading tools for echo weave, finding floats, network drafting, color n' weave, double weave etc. It requires MacOS 10.11 or greater and is able to quickly convert/exchange files with iWeaveIt for iPhone and iPad.
Photo of iPad and iPhone.

Sources http://www.weaveit.com/

["WeaveIt"] iWeaveIt is also available on IOS systems for phones and tablets. It has a basic drawdown program and is able to read and write WIF files. emailed files and Internet files can easily be imported with one click.

Grid n Weaveit: This software offers basic drawing tools based on warps and yarns and links between weaving. graphics for rugs and tapestry weavers. This software works like windows paint and Images are drawn along the grid and the print is obtained in the reasonable size and weavers can get an idea about the knitting pattern by going through the prints.

17.5 Software for Apparel Design:

Print CAD: Adobe Photoshop and Adobe Illustrator software are mostly used by designers to develop images. If required, these images can be directly fed to the digital printer. Mostly designers used "studio master" to screen print the images or its parts and for preparing and separating their screens

Adobe Illustrator: Adobe Illustrator Adobe enables designers, photographers, and small to medium businesses to create beautiful clothing designs with easy access to all your favourite assets, including images, colours, brushes, and type styles.

Adobe Illustrator and Adobe Photoshop both are pattern making and designing CAD software programs which are versatile and affordable and commonly used in the fashion industry. Illustrator is an advanced and very powerful fashion specific application for any trim design, graphic design, fashion sketches, illustration and print etc. It's used to create stunning textile designs with the help of easily available various tools, colors, textures, image, filters and more. Filters and layers create a unique effect and patterns on textiles designs without graphics and rotations. This software provides all necessary tools for apparel designing such as technical flat sketches, create and modify textile designs, design embroidery, fashion design sketches, repeats and colorways, graphic artwork, CAD presentations (rendered flat sketches). It is a vector based program and able to print and scale any art work at any size and resolution with accurate clarity and full detail.

These features make the software ideal for creating fashion flat sketches, CAD sketch presentations able to commonly resize and rearrange the fashion illustrations and images for presentation purposes.

Live trace is introduced in illustrator CS2 that enables the users to convert bitmap images, photos and scans into editable vector files.

Live paint helps to fill the apparel sketches with colour and pattern with some clicks.

The main features of adobe illustrator are:

- Fashion design and Illustration (Presentation and professional tools and helps one's to get desired effect)

- Creative Cloud Library (easily excess valuable artwork)
- Colour matching (with enhanced functionality)
- Pattern print or layout or cut (develop unique patterns seamlessly)

Pattern Design Software: it's EFI Optitex's open-source software. It assists the textile designer to design to development and production related end-to-end solutions.

At a glance some important features of Pattern Design software are:

- 2-D Pattern Samples
- 3D Design Illustrator
- Virtual Image Accessibility
- Collaboration with Cutting Layout Tool Maker
- Customizable Fabrics and Textile Accessibility

Fashion CAD It is suitable for fashion designing, lay planning, fashion production and pattern making. Kaledo Style illustration software, Adobe CS5 suite, Modaris pattern drafting, Lectra, Diamino marker planning and fabric utilisation software, modification and grading software, one large format pattern plotter and two large format digitisers are it's contains.

C-Design Fashion: It is the most advanced textile design software which is useful for the clothes contraction. It is included both creation of the fashion and also involved in the all steps of the design to end finished product. It has a full and intuitive user interface, enhancements, professional features and latest generation of design tools.

C-Design Fashion has various Features to complete the development process. They are CAD Tools, charts, labelling, Colour Matching, Fabric Matching, Templates, Fashion Illustrations, clean data, measurement and many more.

C-design fashion permit to access technical files efficiently and quickly, prepare or construct ready-to-wear collections

Vetigraph: It provides CAD/CAM solutions for latest fashion and apparel grade patterns, automatic cutting machines, plotters for markers and fashion.

Zedonk Software: it is an reasonable, online apparel and production inventory management software system. It is useful for designers and manufacturers of clothing, footwear, jewellery and accessories. An iPad has also been launched.

- C-DESIGN Fashion Features
- CAD Tools
- Colour and fabric Matching
- Fashion Illustrations
- Templates

CorelDraw: It is a professional graphic design software to help you quickly and easily create modern fashion designs. Includes thousands of high-quality images, fonts, and templates.

17.6 Software for Scanning

Virtual Product Development (VPD) this software allows fully digital 2D/3D environment and used for developing and prototyping products.

There are four main components of a VPD:

- Virtual design (2D graphics/copy and 3D shape)
- Virtual product simulation (crush test, drop test etc.)
- Virtual product staging (retail space planning, consumer research and behavior analysis)
- Digital manufacturing (assembly virtualisation, process planning and plant design)

VPD basically works with collaborative, web interface that brings together consumers, designers and value chain partners Real time around the same source of product the virtual process planning (VPD) concept was recently introduced by manufacturing companies. It enables practitioners to accurately predict and provide the right idea more quickly. its manufacturing performance and retail settings, market failure potential, ultimately minimising time to value, and product development costs.

Virtual Product Development (VPD): It takes usage scenarios and design specifications and provides the information to instruct the development process. Across all industries, it enables companies to leverage resources through optimizing product design for improving quality and performance, reducing the need for real-world prototyping, and reducing operational failures and problems.

Virtual garment simulation: The simulation is a reality imitation. Clothing manufacturers require advanced systems which work directly for garment design processing, within a 3D graphic environment. It stimulates the fabric properties and manufacturing processes. In such a context, the aim of the authorâ€™s research work has been the development of a graphic and interactive environment to design men garments and simulate their behaviour according to fabric properties and manufacturing processes. The system should allow prediction of actual garment behaviour that acts on the parameters characteristics. its physical model in order to reduce the number and the role of the physical prototype.

Virtual try-on: Under this project Virtual Try-On, new VR technologies have been innovative, which works on three- dimensional, realistic, visualization and simulation of individual clients and garments. By using these VR techniques, an integrated virtual shop infrastructure is created, which facilitates the presentation and trading of customized and personalized clothing at the purpose of-sales and soon over the Internet. Rather than replace the current shopping experience (e.g., really touching garments and materials), Virtual Try-On, are, in effect, intended to enhance customer decision- making and support through the expansion of related customer services.

Geometric modeling of clothing: As mentioned, the standard way of 2D fabric patterns designing with realistic virtual simulations starts with all the necessary knowledge about tailoring and sewing that most computer artists do not have.

17.7 CAD/CAM Software:

Various softwares are available in market and only useful, accurate and advanced software are selected by the textile and apparel industry manufacturing industry. Important CAD/CAM software which are described here.

A. Gerber:

Gerber accumark: It is garment manufacture CAD software. It's reliable and leading supplier in high solutions as well as technology, it also provides excellent quality assurance. It has advanced features such as easy as well as quick functioning, easily operated, and user friendly. This software helps the pattern makers and designers to work efficiently in an automated environment for quick reversal of final designed fabric and products. Gerber technology is applicable in the different fields such as technical textiles, industrial fabrics, construction, digital printing, fashion & apparel, furniture, transportation, packaging, automotive industry, graphics and composites industries, aerospace. Pattern Generation Software (PGS) and Pattern Designing Software (PDS) are new system software widespread in Germany and Italy. Currently Conex and PGS have been used.

Designed by AccuMark Pattern Design Software

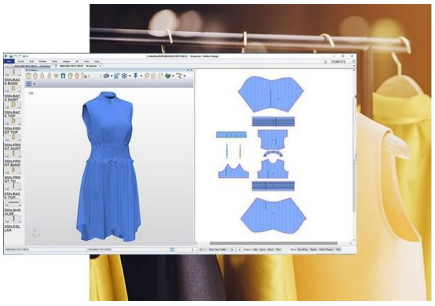


Figure 17.1: Designed by AccuMark Pattern Design Software

B. Lectra:

Lectra works in the sports field and enables fashion companies to increase creativity and speed by bringing designing solutions and best practices. Solutions which can help textile designers, merge traders, supply chains and product designers. Using this innovative design develop good business opportunities. It is one of the worldwide high end CAD solutions for garment entrepreneurs and fashion industry. It has simple, powerful features and cutting solutions for smooth operations. They help to practice innovative design and styles. It is also admired in textile, leather, fashion and apparel as well as furniture, automotive and other industries.

C. Optitex:

It well managed the maximum aspects of 2D textile design and launch 3D simulation with improvement and innovation. More decisions can be made in the digital environment, it promotes creativity as well as save time and cost as every change in made in 2D or 3D is automatically reflected. The 3D rendering of the design once created can be used in several business processes from product development and sales, through sales and marketing all the way.

D. Tukatech:

Tukatech provides 2D and 3D designs, patterns making and construction software which is specifically designed for apparel planners, automated cutters and broadcasters for production, as well as apparel manufacturers of every sizes and skill level.

Tukatech Technology has unique capabilities in the fashion industry, and all products are available and offered at reasonable prices. Tukatech has grown a loyal and large international customer base, which is using user-friendly products to develop and improve their apparel and garment lines.

E. Ned Systems:

This is a leading developer of CAD and used NedGraphics for solutions specifically designed for home furnishings, flooring designs, apparel, retail, and other various garments. NedGraphics allows textile designers to exercise complete creative freedom while improving productivity, efficiency, and accuracy to create product-ready artwork. It provides adequate tools for print, carpet and tufts, woven and knitted fabric design, sales, colour management and calibration, etc. It enables users to reduce sample costs, increase product development flow and improve their sales by reducing time to market.

F. CorelDraw:

This software is vector graphic. It enables us to create amazing illustrations with the help of a wide range of (16.7 million) colours. Designers feel comfortable with this software and it's features such as toolbar, menu and command bar, command aliases and smart tools such as object snaps, align, grips and polar guides, to quickly copy, resize and reposition objects. It provides shortcut menus for instantly editing geometry and 3D editing of objects at the desired places.

Comma separated value (CSV) format table can be inserted by using Export Table command, these are imported from database applications or Microsoft Excel. In tables, formulas can be used to add into cells and insert, merge, delete, or resize cells, rows and columns within existing tables.

As per the design requirements its Entity Grips and Properties palette provides editing and intuitive manipulation in 3D and to unite, subtract as well as intersect the 3D solid primitives by the Boolean operations.

Features:

- It is a excellent tools for virtual design from advertisement, technical illustrations, publishing and Internet publishing
- Precision-drawing and extensive text handling features of vector based drawing programs can be applied to enhance a design.
- Create photos from scratch, export and enhance the designs, use and adorn scanned pictures of designs in many ways.

Application of CAD in Dyeing and Printing:

Advanced techniques are used to improve the estimated quality and reduce the cost of production in the context of colour matching, dye selection and the dyeing process. DyStar introduces a new customized dyeing procedure through the auxiliary data, replacing the old standard dyeing process. CAD is also useful for colour management and colour matching system. Fabric designing (weaving and print design) can be done with the help of Computerized methods. Print design is close industrially related to the fine arts, but fine and small designs are obtained through the process. Corel draw and Photoshop are used for digital printing and graphics. Nowadays Which are used widely. CAD software reduce the production cost and processing time and enhance the quality level of colours (tones and shade) as compare to computer print.

17.8 Conclusion:

These software enhances the production of textile products as well as fashion design such as pattern making and grading, design sketches, apparel designing and specification sheets, storyboards, dropping, virtual imaging, print and technical drawings for clothing etc. As a result, the dress becomes fashionable. One of the major benefits of using textile design software is that it does not require much drawing skills. Any fashion enthusiast or illustrator can create professional and digital fashion sketches using this design software.

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