

Innovation in computer aided garment designing.

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Abstract: Fashion apparel and accessory industry is a constantly developing and exciting market place. In today's globalized era, consumer preferences are motivated by many planetary directed factors. To gain competitive advantages in particular seasonable and dynamic fashion industry, innovative product design and development modification need to be implemented by garment designing and manufacturing company. Present paper explains new software's which are used in successful fashion industry. It includes knowledge about fashion product design through 3d body scanning for wide population data for quick response, fashion computing for drawing techniques including fashion template and specs for men-wear ,women-wear, kid-wear using different graphic software like Adobe Photoshop, Corel-draw etc. Image editing for different colour and fancy pattern effects, professional fashion design presentations (virtual fashion shows) by different graphic software's like Opti-tex , Tuka-tech etc. Fashion product development is also extremely alleviated by fashion CAD/CAM software's, fashion internet on the World Wide Web, and product life cycle management (PLM) software's by Gerber and Lectra etc.

Keywords: Fashion apparel and accessory industry, Fashion CAD/CAM, Fashion-drawing Softwares, PLM Softwares.

I. INTRODUCTION

Design is created by using elements of design & principles of design. Shapes, forms, colours and texture all combine to form a design. The unity, balance and harmony of designs plays important role in designing. Significance of design or aesthetic becomes even more important in case of apparels. The apparel/textile industry has shifted to computerization. The latest CAD/CAM systems and other technological developments have introduced new and innovative ways of product design and development in all fields like apparels,home furnishing etc. The trend has resulted in overall increase in competition among manufacturers to adapt for quicker market responses.

II. FASHION AND APPAREL INDUSTRY:

Product can be defined as "any offering that is capable of satisfying customer needs". Fashion industry offers products & services. Fashion industry is not only about the clothing, in fact it is basically a wide market of apparels , services and ideas as:

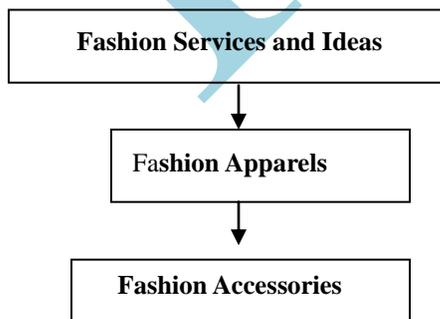


Fig 1. Fashion apparel industry and components

Fashion Apparels:

This segment deals with functional apparels used by consumers. Various types of apparels in this category can be classified as:

- Men-wear, Women's wear, Kids Wear i.e, shirt, ladies suits etc.
- Uniform Wear e.g. Defense, Doctors etc
- Sport Wear like T-Shirts
- Formal Wear like Shirts, Trouser etc
- Traditional /Ethnic Wear like Embroidery Sarees etc
- Night wear like Gowns
- Protective wear like Bullet Proof Jackets, Fire Proof etc.
- Miscellaneous like Fusion wear, Inner Wear etc

Fashion Accessories:

This segment deals with all accessories which are used along with apparels so as to enhance the overall look or appearance of the garments.

- Gems & Jewellery
- Leather products like handbags, belts, shoes etc
- Miscellaneous products like watches, head wears etc

Fashion Services and Ideas:

This segment deals with all services and ideas linked with working of garment manufacturing industries.

- Fashion Shows
- Dry cleaning
- Dyeing and Printing
- Fashion Promotion
- Miscellaneous

III. USE OF CAD/CAM ASSISTED SYSTEMS

Use of CAD/ CAM software for garment industry has increased the boundary line of designing as well as production. With these software, designing, merchandising and visual presentation to buyers can be easily done in less time. These Latest CAD/CAM systems and other technological developments have turned out as a substantial boost to the fabric manufacturers for vast application for area like towels & other home furnishing materials, dress materials, etc. By changing different parameters like yarn, woven and knitted fabric structures, different designs can be generated. Followings are some of the CAD/CAM systems generally used by apparel industries.

- a. Textronics Design Jacquard
- b. LECTRA (PrimaVision Weave)
- c. Tukatech (TukaStudio)
- d. Wonder Weaves

CAD (computer aided designing)

Computer aided designing in apparel industry has opened numerous horizons for designing and buying team for speedy and high quality work. CAD used at various stages in the apparel industry may be categorized as:

- I. Textile designing software
- II. Fashion /garment designing software

Textile designing software

Textile designing software greatly aids the work of the designers and improves their capability and creativity as well. These software packages helps the designers in the experimentation with the number of textures, colours and patterns for producing the perfect design along with the availability of sketch backgrounds in concept boards, tools for repeating patterns, texture mapping and product renderings. Design can be made faster and more precisely: available for designer's quick access. A few simple design software are adobe Photoshop, corel draw and poster etc. The choice of right fashion designing software helps the designers in the expansion of the creativity achieved in less time. Latest designing software are integrated with looms, dobbies, and jacquards.

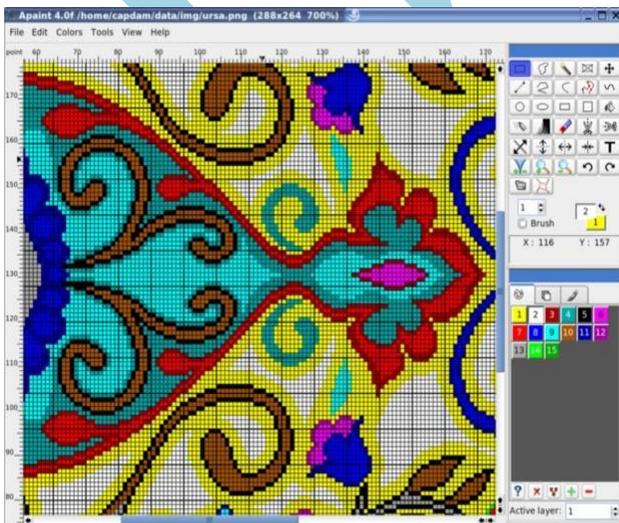


Fig 2: Woven Fabric Designing Software

Garment designing software

These are a boon to garment designing. 3-d scanning and pattern making software and virtual garment styling ranges are the major developments under this advancement.

3-d Scanning software: new methods and technique are continuously developed for the digitization of human body and new tools are introduced for a more efficient use of the resulting data. Now-a-days, 3-d scanning technologies are applied to different parts of the human body and systems are commercially available for the measurement of the practically any surface area of the human body. The results of the 3-d body scanning processes vary in the data collection mode as point clouds, surface models, textured models and unprocessed data according to the requirement of the targeted application. LASS, Modaris, Tuka Tech are a few suppliers dealing with this software.

Use of 3d body scanner in apparel industry

Anyone who has ever been frustrated by trying to determine which size, shirt, jeans or clothing items will fit best or has spent a lot of time going through the alteration process will benefit from a new technology developed. This technology is a 3d body measurement which include capturing of the image and proprietary measurement extraction. The scanner captures hundreds of thousands of individual's image and the software automatically extracts dozens of measurements. This measurement information can be electronically compared to garment specification.

Characteristics of 3D body scanner:

- Quick
- Accurate
- Precise
- Requires no prior knowledge of anthropometry

3-D scanning processes:

- The individual enters the scan room (in under garments) of the body scanner to be scanned. The individual must stand perfectly still with their legs and arms an appropriate distance apart. The individual grips the handles inside the scanner for proper arm placement and to activate the scanner. Light sensors surround the individual – in front and behind.
- Once the scanner is activated, the light sensors rhythmically flash against the individual and the all black scanner interior to capture a 3D body model. This process is totally harmless and takes less than 30 seconds.
- Outside the body scanner, the individual's 3D body model generates on the monitor. The model containing the individual's measurement is stored in the computer and can be printed. Body measurements can be immediately extracted from the generated image.

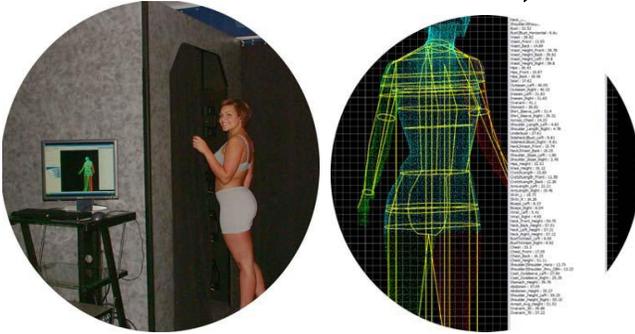


Fig 4: full body scanner [TC]2

Pattern making is the process of arranging all pattern pieces of garments along the fabric widths so as to achieve maximum marker efficiency. Initial practice of hit and trials by experienced tailors used to be very time consuming. Moreover prevention of fabric wastage is also very important in narrow profit competition. Latest CAD software have facilitated this work for example 3-D Modaris software by Lectra uses traditional pattern design tools to make pattern generation faster- creation from scratch or existing patterns, grading reproducing traditional or advanced methods, checking using state of the arts techniques, industrialization and pre-production tasks performed early in the development process for consequent time saving. In addition, Modaris can calculate fitting, grading and helps considerably reduce successive back and forth checking and adjustments. It makes internal and external communication simple and easy – thanks to its wide conversion possibilities.

Most widely used 3d body scanner in apparel industry:

1. TEXTILE/CLOTHING TECNOLOGY CORPORATION ,[TC]²
2. WICKS AND WILSON
3. TELMAT / SYMCAD
4. CYBER WARE

Pattern

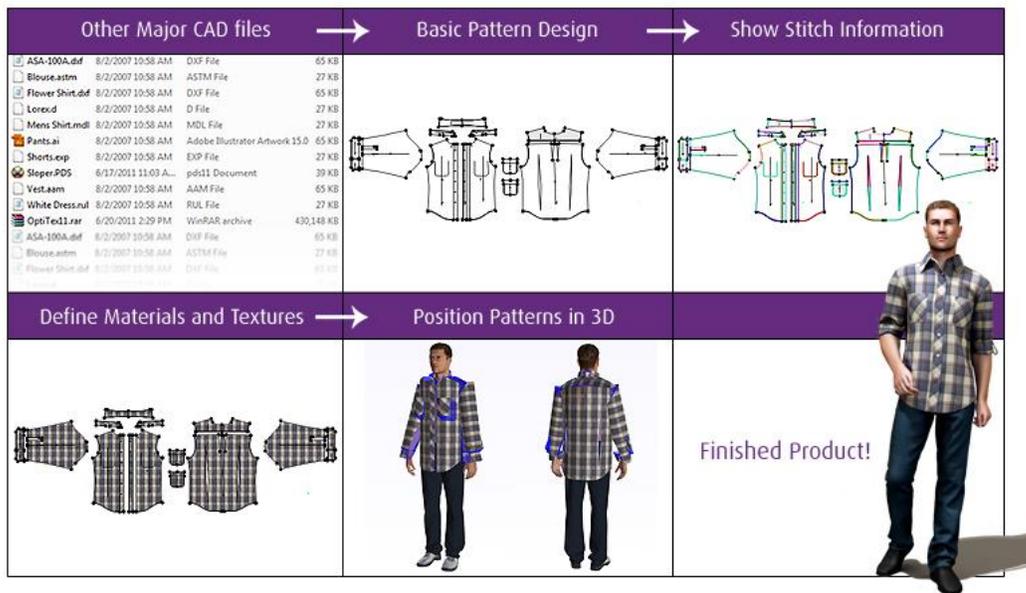


Fig6: 3D Pattern Making Software

Various softwares like Maya can be used elegantly for virtual fashion shows . A better visualisation of the designed garments is generally a eye catchy experience for the buyers. It in return leads to more orders and a big chunk of profit in the pockets of manufacturers.

IV. USE OF GRAPHIC DESIGNING SOFTWARES

Many cheaper designing softwares like adobe photoshpe, adobe illustrator help garment design visualisatuion an easy and simple job now a days. Some images can be easily exported from the files and fancy colour and texture combination effects can be produced. The produced designs may be stored and communicated to buyers for approval and further rectifications, if required . Various painting tools like burn, smudge, dodge, Layer effect, Brush and Fill effects etc can be done by these softwares. In a brief these softwares are generally used for following:

- a) Fashion templates and Specs
- b) Change in Colour Combinations
- c) Change in Fashion Details
- d) Change in fabric Textures
- e) Portfolio Presentation
- f) Fancy Brush Effect
- g) Pattern Stamping
- h) Overall various advantages linked with the softwares are:
 - a. Lesser time spent in sampling
 - b. Easier design visualisation
 - i) c)Lesser material wastage
 - j) d)easier retrieval of designs
 - k) e)Easy to store
 - l) f)Easier alterations in designs

V. CAM (COMPUTER AIDED MANUFACTURING)

Computer aided manufacturing in apparel industry deals with the practices and different stages of garment making with the help of computers. The computers have entered in many departments like plotting , spreading , cutting , surface ornamentation, i.e. printing and embroidery.

Plotting: Latest plotter system replace traditional paper –pen and other tracing and marking technique: the plotters are connected to PCs and can plot files received via internet. ALYS plotter of Lectra comes with communication features enabling remote maintenance, which can reduce down time.

Spreading: Traditional spreading methods were earlier generally performed with manual as well as automatic power leading to increased work time and labour fatigue. Latest spreading machines are integrated with pattern making softwares. Spreding instruction and layout are directly fed from pattern making softwares. Progress Brio55 of Lectra communicates directly with CAD work stations and cutting machines, creating significant time and material savings and eliminating the risk of error. The cradle feed system provides fast loading of rolls for high flexibility and ensures tension free lays and perfect fabric alignment. As a results material saving are achieved.

Cutting: Use of latest cutting machines integrated with the

computerised instructions and protocols for the multi –ply fabric cutting has become the main requirement for higher and quality garment production. A quick access to marker libraries, an interface to ERP systems for transfer of order information and planning results, marker making stations and other CAM equipments is also possible. Requests for new markers can be directly sent to the marker making stations and retrieve results for markers created directly from there. Lectra , Zuki, Gerber are a few companies manufacturing computer integrated cutting devices.



Fig7: Computerized Double Head Leather Nesting & Cutting Machine

Surface ornamentation:

Computerized embroidery machines can be used to produce fine , multi-coloured intricate motifs in very less time. Feeding of design is generally easy and quick. Textile digital printing techniques on to T-shirts and leather accessories in water based pigment colours with excellent wash fastness properties with 700 dpi is the latest venture for innovative manufactures.

VI. USE OF PRODUCT LIFE MANAGEMENT (PLM) SOFTWARES

PLM Softwares are a management tools that combine flexible workflow and flexible functions tailored to the need of garment manufacturing organisation. All stages which individual product develops with the passage of time , from introduction to decline , is generally known as Product life cycle. All management strategies adopted by a company to control its collection from the point of conception to the point of sale are decided accordingly. During this period significant cohesive marketing strategies are developed and adopted to increase the profit of company in terms of market and customer share. Companies either make strategic plans or follow the basic rules of the different life cycle phases that can be analyzed later. A clear cut analysis of PLC is very important for "Fashion Apparels and Accessories" which have continuous change and aesthetic as the inherent feature. Keeping in view many software companies have introduced programme packages for fashion products managements, which are implemented by many garment manufacturers.

Mainly there are four different stages of any product life cycle.

1. Introduction phase
2. Growth phase
3. Maturity phase
4. Decline phase

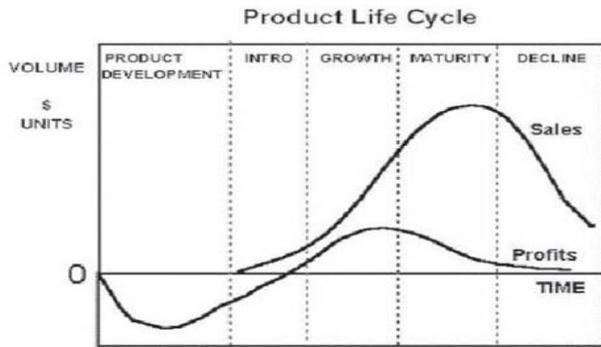


Fig 8: Product life cycle

Fashion product's uniqueness and need of PLM

Nature of product has a deep impact on selection of product management strategies. All price, promotion and distribution mix change as per the nature of product. Fashion products like clothing and accessories are unique as:

- The length of the selling period depends on the product design, and fashion shows cyclical changes.
- The end of the production period is determined by objective constraints on sales (e.g. alternating seasons in the case of clothing).
- The length of the production cycle is incommensurate with the selling period.

PLM Software for fashion & apparel industry

For each type of fashion product, within each industry Designing, Development, Production and Marketing are important sections. For rapid and smart working, PLM software are implemented in almost every well automated and growing fashion industry. General PLM software has different packages as per the process flow requirements of all these sections. Generally main modules in PLM software are:

- Design management with reference to creative as well as technical design, color management.
- Product data management module for efficient storage & retrieval of designs & details.
- Product manufacture management and work flow engine for efficient follow up of production process
- Marketing management module for marketing, distribution, licensing etc. of product.

Many renowned companies like Lectra Fashion PLM V2R1, Fashionware Solutions Inc, Gerber Web PDM, New generation computing e-PDM, Freeborders, unique Solutions Inc.'s, Lawson Fashion have already captured a huge chunk of fashion & apparel industry:



Figure 9: Design preparation via Lectra fashion PLM

VII. CONCLUSION

This paper includes an overview of the different applications of computers in textile and garment industry. It mainly emphasize on CAD/CAM software, PLM software, and 3-d body scanner packages. There is wide scope of computer application in apparel industry. Use of these technologies is not only time saving and simple but also it can lead further advancement in the garment sector.

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