

RATIONAL WAY OF DESIGNING CLOTHES AND TRANSFER FROM 2D TO 3D IMAGE ON A VIRTUAL FIGURE

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Synopsis: The paper presents a rational way of clothes construction in 2D using AccuMark software and consequential transfer from two-dimensional to three-dimensional clothes designing using V-Stitcher software and Artworks Studio software for design (all above are GERBER TECHNOLOGY products). This is a new way of evaluating whether the clothes fit on a virtual figure and a new way of presenting fashion collections for sale.

1. Introduction

The origins of virtual reality can be traced back to late 1960s and early 1970s. It was around that time when first input facilities for interactive graphics were introduced. A high quality image of an object or a human figure is dependant on the quality of the software that is being used. Today, 2D and 3D image of a human figure is getting more and more attention in the clothing industry. It is helpful especially in the process of scaling, helping to verify the designer's basic ideas. The quality of the image depends on 2D and 3D software evolution and possibilities of their output – from the initial design to virtual image shown on a figure with the possibility of evaluating whether the clothes fit or not.

Virtual reality device composes of a display (such as virtual reality helmet) and controlling device which can be 3D mouse, joystick of gloves.

There are three basic levels of virtual reality:

- passive
- active
- interactive

Passive applications function similarly to film. Such medium can be seen, heard and felt as well; it cannot be affected in any way though.

Active devices enable us to examine the virtual world arbitrarily. It is possible to move within it, observe it from various angles and hear the appropriate sound. What is missing is a tactile feedback – so any modifications are impossible. Put in practice, this method can be used to present virtual artworks, in architecture, meteorology, air traffic control etc.

Interactive applications are the most advanced ones and also most technologically demanding. These allow us not only to explore the virtual world but also modify it. It is possible to touch and move the virtual objects, work with virtual tools etc.

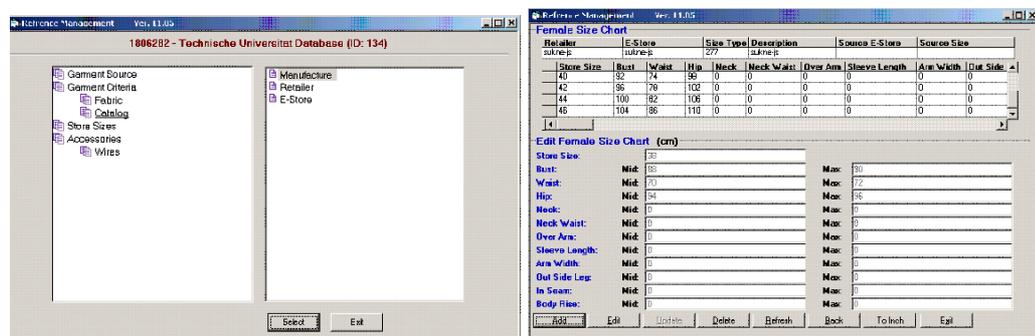
The latter Interactive virtual applications are suitable to be used by clothing industry to interconnect 2D and 3D images of a human figure. They help to design and verify the initial designer's ideas. Quality of the eventual image is determined by advances in 2D and 3D software and their possibilities on the output. 3D imaging is being used in Spain (Virtual clothes workshop – VF Works) and France (Virtual 3D Changing Room - Ma cabine d'essayage) but also V-Stitcher software combined with AccuMark CAD system (both Gerber Technology products) which are available at the Department of Technology and Management of Apparel Production and are used mainly for class work.

2. Experimental part

V-Stitcher is software which facilitates three-dimensional visualization of clothes and their fitting on a virtual human body of a man, a woman, a girl or a boy whose dimensions can be modified. Virtual clothes use 2D patterns prepared for AccuMark software. If the clothes' design does not fit, the patterns can be easily sent back to AccuMark and necessary adjustments can be made there. The software allows the designer to simulate drapery on clothes in 3D visualization, design their colours and patterns in combination with design software Artworks Studio and fashion collections presentation.

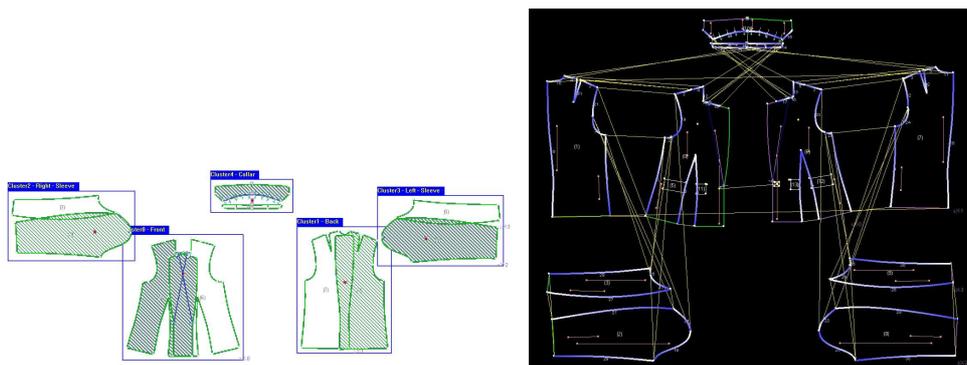
The technique for creating virtual image of the clothes in 2D and its transfer into 3D requires:

- Preparation of the clothes source database
- Creating the size assortment, i.e. marking of the size and defining its dimensions



Pic.1 Virtual figure selection and setting its size and bodily dimensions

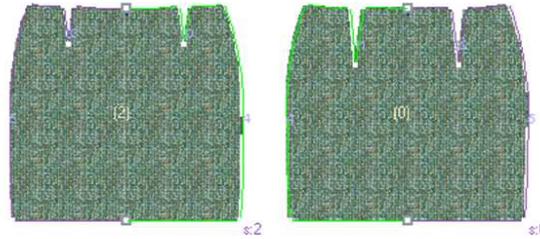
- Preparation of the design parts for tacking
- Stitching the individual parts up



Pic.2 Jacket's parts and markings of the stitches

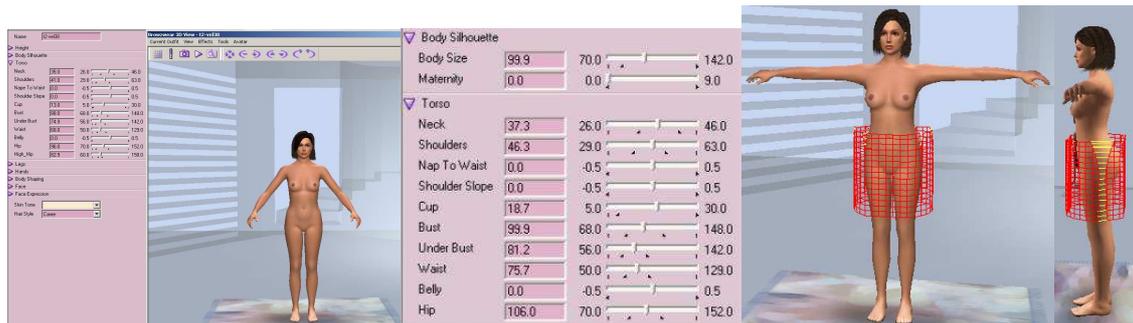
- Defining the textile material for individual clothes part

Specific textile material is allocated to all design parts. When selecting the material, the software offers a choice between woven and knitted fabric and a choice of the fabric's quality, such as fibre, basic weight, elasticity, creasing etc.



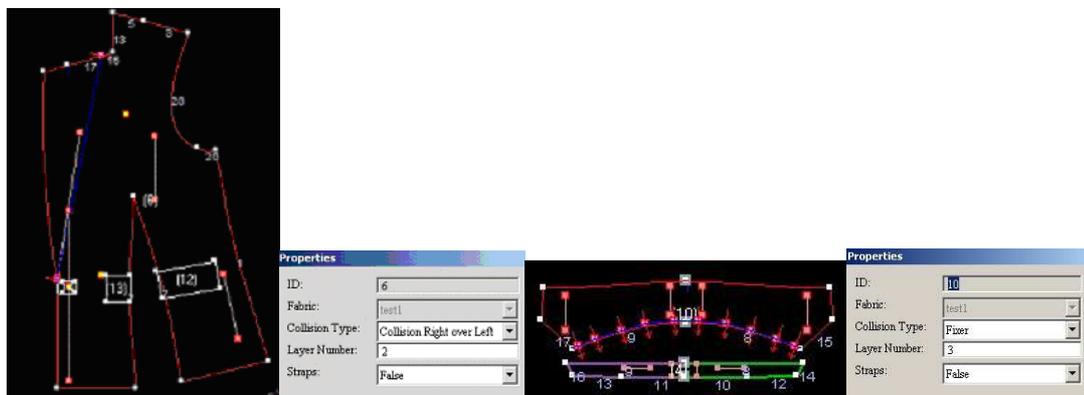
Pic.3 Selected material visualization on the front and back part of a skirt

- Defining the figure – setting the size or modifying the dimensions
- Visualisation of the individual design parts on a virtual figure



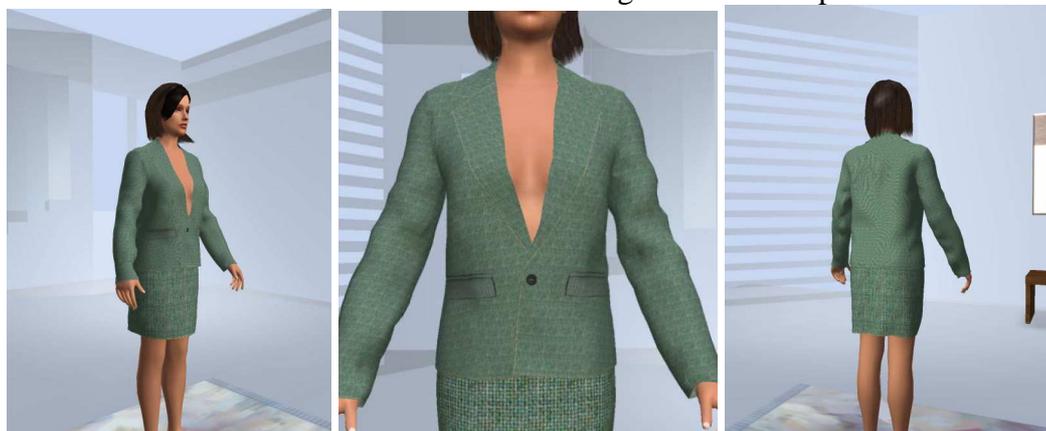
Pic.4 Female figure visualization, its dimensions and grouping of the skirt design parts

- Setting for the front part and jacket lapels



Pic.5 Front part and lapel visualization

- Visualization of women's dress on 3D virtual figure in various postures

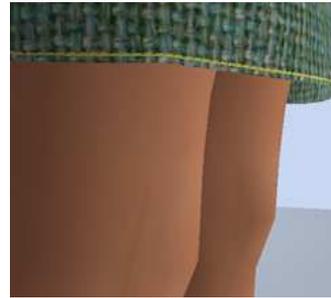


Pic.6 Visualization of 3D dress model with buttons

- Those places where the virtual clothes are tight or small the software marks red



Pic.7 Deformations in the grid (red)



Pic.8 Bottom part of skirt and lapels quilt

- Dress accessories application

V-Stitcher software allows not only creating arbitrary clothes, it is also able to create authentic dress accessories simulation for any part of clothes. Dress accessories can be buttons, zip fasteners, galloons, buckles, various types of stitches, decorative stitching, and also various logos, iron-ons and pockets, belts etc.

Individual dress accessories can be scanned or created in Artworks Studio design software or Photoshop.

- Stitch application

Stitching has not only the connective function but it should also carry some aesthetical function. This case is dealt with in V-Stitcher as well, as it allows simulation of various stitch types. This can be achieved by scanning the actual stitches or made in Photoshop, saved into database and consequently applied to any part or rim of the clothes.

3. Results and discussion

V-Stitcher software enables us to examine the clothes models on mannequins exported from 2D AccuMark in a very simple and intuitive way. This simulator brings into life varieties of hyper realistic materials. It is possible not only to see what the clothes look like on the virtual figure, but we can also see how it reacts in different poses.

The method of three-dimensional clothes visualisation and clothes fitting on a virtual figure is ready to be accustomed into teaching plan of subjects Clothes Construction, Construction and Modelling, and mainly CAD/CAM systems in Clothes Industry and Computer Design. It is designed for students at the Faculty of Textile Engineering of Technical University of Liberec.