Integrated Platform for Networked and User-Oriented Virtual Clothing

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INTRODUCTION

Fashionizer is an integrated framework that fits the needs of the garment industry of virtual garment design and prototyping, concentrating on simulation and visualization features.

Virtual Try On has been developed in close relationship to be compliant with Fashionizer's clothes and to allow trying them virtually on a body's *avatar* in real time on the Web; in a few words, it is a virtual clothing boutique.

The framework integrates innovative tools aimed for efficiency and quality in the process of garment design and prototyping, taking advantage of state-of-the-art algorithms from the field of mechanical simulation, computer animation, and rendering that are directly provided by the research team of MIRALab.

APPROACH AND RESEARCH

To take a 2-D (two-dimensional) pattern as a base is the simplest way to obtain a precise, exact, and measurable description of a 2-D surface, which is the representative of the virtual fabric. In the traditional clothing industry, one garment is composed of several 2-D surfaces (pattern pieces) that need to be seamed together in a particular way to describe the complete garment. Fashionizer enables clothes designers to create 3-D (three-dimensional) clothes based on pat-

Figure 1. An example of 2-D patterns applied on a body with Fashionizer

Figure 2. Different points of view for viewing the worn garment

terns. Users will be able to alter the patterns in the 2-D view and visualize automatically the simulated garment in the 3-D view.

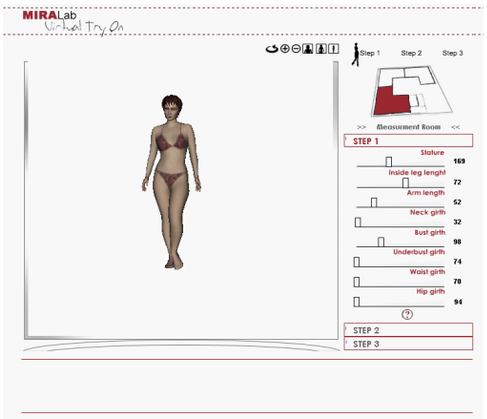
It also allows the user to dress virtual humans with realistic simulated clothes, based on the designed patterns, and therefore to simulate and display the final aspect of the garment, in dynamic situations as well, before manufacturing it. Through built-in plug-ins, patterns can be imported from traditional CAD systems, or can be created manually. Furthermore, 3-D generic models of bodies, female or male, are manipulated and crafted based on anthropomorphic measurements.

Fashionizer provides functionality from the most recent research, namely, physical and realistic simulation of fabrics; that is, each kind of woven fabric can be simulated with respect to its texture, thinness, and properties of textile. The simulation of clothes is based on the *finite elements method* that provides the most accurate and precise results (Volino & Magnenat-Thalmann, 2001). Fashionizer also provides less accurate methods based on *mass-spring systems* from research done for more interactive simulations (Volino & Magnenat-Thalmann, 1997). Moreover, Fashionizer can animate a whole sequence of simulated clothes, which involves a robust simulation of clothes and efficient collision detections between clothes and the underlying body (Volino & Magnenat-Thalmann, 2000a, 2000b). This accuracy provides an estimation of pressure and stretching areas on the body that is wearing the simulated cloth in order to measure and visualize the comfort and fitting of a garment on a specific body.

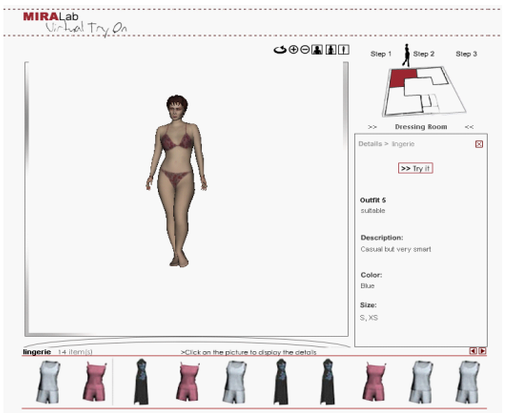
The Real Time Virtual Try On is an altogether new approach to online visualization and immersion that lets any standard Web browser display interactive 3-D dressed virtual bodies. Our approach provides a minimal response time to the user since a major part of the content to be manipulated is generated on the client side rather than on the server. The MIRALab Virtual Try On client application is not only involved in the visualization of garments, but also used for the calculation of the cloth and body deformation. The question is "What is needed for virtually trying on clothes in real time?" First, a virtual copy of the user's body measurements and a database of virtual clothes to be tried are required, and finally, a real-time display of the whole is mandatory to illustrate how the cloth fits and reacts in real time.

Figure 3. From top right to bottom left are the three steps of our Virtual Try On

- First the user loads the avatar according to his/her body measurements



- Then the user selects a desired cloth



- Finally the user can have a look at the moving cloth on his/her avatar