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Short Report

Virtual-Try-On Solutions

The so called virtual-try-on solutions have gained importance in the last few years in different areas of the fashion industry. Virtual-try-on solutions simulate digitally the behavior of textiles onto the human body. In this way, they allow a virtual probe of cloth items onto digital human body models. This technology was developed for and from two different fields of applications: professional CAD/CAM textile solutions and computer animation. Different are the characteristics and required functionalities of the two different fields, however the final goal is the same: to virtually dress a person and to represent it in the best real-like way. Various tasks have to be solved in order to achieve this goal; these can be divided into two lists: data acquisition and data representation:

- Data acquisition:
 - Modeling of the person (e.g. from 3D scanning),
 - Definition of the different cloth items (e.g. from 2D CAD patterns),
 - Definition of the color/texture of the fabric (e.g. from pictures, graphic design or drawings),
 - Definition of the characteristics of the fabric (e.g. density, elasticity, etc.)
- Data reproduction:
 - Visualization of the person (e.g. with avatar),
 - Visualization of the cloth items,
 - Simulation of the cloth item on the person:
 - physical simulation of the fabric behavior,
 - simulation of the interaction between cloth item and person,
 - simulation of the interaction between different cloth items,
 - simulation and representation of texture and color of the fabric,
 - Visualization of all the elements: body model and cloth items:
 - static 3D visualization,
 - dynamic visualization with motion of the person,
 - real-time interaction with the cloth item and body model,
 - Analysis of the fit result (e.g. tension, distance to body surface).

Virtual-try-on solutions are becoming interesting to different areas of fashion industry. For example, fashion designers can employ such systems to obtain first visual results of their creations without the need of the production of real prototypes. Cloth buyer can see remotely new cloth items without the need to have the real pieces shipped from distant locations. Experts dealing with styling of persons can show their clients how they will look before they buy new dresses. Some web-shopping solutions are also exploiting this technology to present their cloth items in 3D on virtual mannequins.

Virtual-try-on solutions can be divided into four distinguished groups with different characteristics, functionalities and targeted users:

- Professional 3D virtual-try-on solution fully integrated in CAD/CAM textile packages,
- 3D virtual-try-on solution connected to CAD/CAM system but functioning as stand-alone solution,
- Simple 3D virtual-try-on solution not connected to CAD/CAM textile packages.
- Web 2D or pseudo-3D virtual-try-on solutions.

The two mostly employed groups are shortly described in the following.

Web solutions

The second group to be described regards simple virtual-try-on solutions developed specifically for web-shopping and on-line applications. The figure 3 shows two examples: the extensively diffused *MyVirtualModel* and a Japanese solution *Haoreba* of digital fashion.

Such systems have already since many years been commercially exploited. They represent the simplest way to dress virtually 3D avatars (humanoid computer models). Simple parametrized and customizable 3D body models are employed. The appearance can be changed and customized (skin, haircuts, face) in order to resemble the person who use it.

The big difference to the previously described solutions is that the process of virtual-try-on does not represent in this case a real 3D representation. The virtual garments are in fact described as simple pictures taken 360-degrees around it. These pictures are then scaled in order to fit the sizes of the displayed body model. However, the results give the impression of looking at a real 3D representation.

The strong limits of these solutions are the non reality-like representation of garments on the human model and the limited variation of the shape of the human model. This last can in fact be defined by a limited number of parameters.

The big advantages of these simple solutions compared to the real 3D virtual-try-on systems, are the easiness to generate web applications. In fact, not only the generation of the body model is simplified (even though limited), but also the generation of virtual collections of dresses is reduced to a number of pictures acquired 360-degrees around cloth items. Image acquisition systems for this purpose are also available (see figure 3 on the right).



Fig. 3. From left to right: on-line shopping with virtual models of *MyVirtualModel*, snapshots of some results, on-line shopping with *Haoreba* of *Digital Fashion*, clothes photo imaging system *Dressta* of *Digital Fashion*.

For more detail about virtual-try-on technology:

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