Body Scanning Avatar and Draping Simulation

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Introduction

Speedy developing CAD technology has changed the product development process in the apparel industry (Cho, Park, Boeing, & Hingston, 2010). For more than a decade, body scanning has provided accurate body measurements, garment-fitting simulations, and an improved sizing system. In less than four years, Kinect technology has been adopted in several laboratories to scan human bodies (Aitpayev & Gaber, 2012; Weiss, Hirshberg & Black, 2011).

A total of 188 female and male college students participated in a body scanning study. Kinect is an affordable home device that senses motion as input, however, much CAD software is developed to create an avatar. Kinect employs a revolutionary technique designed for games, entertainment, and fitness (Wii-Fit). It promotes body movement so people can exercise without using a controller or manual touch (Suh, Kim & Suh, 2011). Researchers suggest that Kinect has many potential uses in the market and in classrooms. Kinect is a popular item that is easy to access and low in cost. Affordability is the main reason that Kinect often will be used to find an accurate body size and to create an avatar for the simulation of fittings and trying clothing on.

Body scanning and avatar

This experimental teaching procedure uses a Kinect operating system to explore college students' attitudes toward body scanning. Students create their patterns using 3D computer draping on an avatar. Students enrolled in the Apparel CAD class participate in both body scanning and using a computer to conduct draping simulation on their avatars in the OptiTex PDS program. Using the Windows 7 operating system with Kinect provides a stable platform for the NUI audio and motor devices. Students' bodies were scanned in three dimensions to obtain 360 pictures and 360 depth frames (with about 10 degrees between each view). Outputs with PNG and PLY files were abstracted from the scan data and processed into a 3D model reconstruction by Wissenschaftlicher Mitarbeiter. A total of 7 female and male college students participated in the draping simulation on their avatars.

Satisfaction of avatar

The publicly shared program MeshLab was used to view, examine, and measure the avatar. Following the scanning process, subjects responded to a 20-item questionnaire about the process and the resulting avatar. Overall, participants expressed satisfaction with their avatars and body shapes. These subjects provided useful information about the use of avatars.

Procedure of draping simulation and preparation of an avatar for 3D fitting

A ply file was converted to an obj file using MeshLab software, because obj files are a supported format for importing 3D body scan data with the OptiTex PDS program. Students can use their own body scanned avatars to drape their patterns. First, obj file was checked in the "plugins list" of the 3D menu in the OptiTex PDS program in order to import the 3D geometry of the obj file format. Second, when users loaded the model, the obj file was selected, and then the body scan avatar was shown in the 3D model window. Users rotated the avatar by 90˚ to see the correct figure. Third, users opened any existing pattern file and placed cloth on the body scan avatar by clicking the "place cloth" button in the 3D toolbar. Using the "3D move or rotate piece tool" in the 3D toolbar, all 3D clothing pieces should be well positioned to create the 3D product. Last of all, by clicking the "simulate draping" button, a 3D draping simulation was shown on the body scan avatar in the 3D model window.

Satisfaction of the draping simulation

To explore users' satisfaction with the draping simulation and their potential adoption of an avatar, these factors were assessed. Participants responded to a questionnaire using five-point Likert scales (1= very dissatisfied; 5 = very satisfied). Overall, the participants were not likely to have a medium satisfaction level with the draping simulations using their avatars (m = 2.4).

Discussion

In terms of the positive aspects, users indicated that this process helps them imagine how they will look when they wear these clothes. They also reported that for real try-ons, this draping simulation resembled their bodies quite closely. Some of them reported that the procedure was easy. They were able to virtually see clothing on their bodies by using this new technology.

As to negative aspects of scanning, users indicated that the body scan avatar was not smooth. It showed a lot of lumps on the thighs and torso, and the arms were unclear. This occurred mostly because the arms and legs were too close to the other body parts, preventing the normal fall of fabric on the body scan avatar. As a result, some draping simulations on the body scan avatar were not accurate, and clothing did not drape properly. Some of users reported that the process of placing clothes on the body scan avatar was too complex, compared to placing clothes on the various regular parametric mannequins offered by the clean PDS program. Small businesses that adopt virtual fitting rooms for virtual try-on can develop new business strategies. Eventually, this will create a border-free business world (Sul & Kang, 2010).

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