



Using 3D Scans for Fit Analysis

Susan P. Ashdown, Suzanne Loker, Katherine Schoenfelder, and Lindsay Lyman-Clarke

Cornell University
Ithaca NY 14853
spa4@cornell.edu

ABSTRACT

This research tested the effectiveness of using 3D scans of clothed participants in the fit analysis process. A panel of three expert judges viewed scans of 155 Misses size participants in the best fitting size of a test pant style. They rated 13 fit locations as Acceptable, Marginal or Unacceptable and then gave overall ratings for both front and back views. The ratings for all judges were added together to develop Acceptable, Marginal, and Unacceptable categories for each area and then compared using frequencies, means, and percentages to identify problem fit areas. Ease, line, balance, and set elements of fit were clearly seen on the visualizations of the scans and grain could be evaluated by its effect on silhouette. We concluded that substituting 3D scans for the live fit analysis process in research and industry has potential for 1) recording one single instance of fit that can be rotated and enlarged to view specific areas of analysis, 2) creating databases of scans of a variety of body shapes and sizes wearing a single size (in essence, testing multiple fit models), 3) scanning garments on fit models in multiple poses to evaluate garment/body relationships during natural movements, and 4) holding virtual expert panels where panelists can access the fit session at any location.

Keywords: body scan, 3D data, visualization, fit analysis

Introduction

3D surface scanning technology has evolved as an industrial tool to measure and compare three-dimensional objects at varying stages of assembly for the process of product development. Most industrial product development applications use the scanner with geometric rather than organic shapes. Use of 3D surface scanning technology for the human form is much more difficult. The human body morphology is a complex organic form that can undergo both subtle changes over time, such as posture, weight gain/loss, and large deformations in geometry through

movement and changes in body positions. When designing products for the human body, in addition to considering these variations for an individual body, we must also accommodate the variation of shapes across a population.

Work is underway to make mathematical comparisons of measurements from 3D body scans, transferring existing industrial techniques to improve apparel fit (Ashdown, Petrova, Loker, & Cowie, in press; Tahan, Buxton, Ruiz, & Bougourd, 2003). Due to the complexity of the body's geometry, this is a challenging task. However, body scanners offer another