

Study on Pattern Design Method of Women Tight Skirts Based on 3D Point-cloud Data

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Abstract

In this research, 100 female students aged from 18 to 24 years old were selected to take part in the body measurement. Data acquisition software named Imageware with a 3D scanner was employed to gain the body point-cloud diagram. Then, the characteristics of the young female lower body torso have been analyzed according to the data obtained. The regression of the key parts of women skirts and the characteristics of young female lower body torso has been found. Finally, the generating rules of the basic pattern of women skirts were established, which provides the foundation for auto-generation of skirt pattern.

Keywords: 3D Body Measurement; Women Skirts; Pattern Auto-generation; Imageware

1 Introduction

With the development of the times, people tend to require the individuation and fit of the clothing. Dress style, material, color, accessories and so on now needs to reflect the individual characteristics. Automatic generation of garment pattern development system can make the apparel industry more automatic and efficient to meet consumers' demands for more personalized and diverse clothing [1]. At present, the garment industry has achieved the automatic nesting and automatic cutting, but the automatic garment pattern generation system has not been born yet, as it is still at the exploratory stage. Some of these systems only have databases of various clothing styles for the standard model, which can neither automatically handle new clothing styles, nor be linked with the human body. And those linked with the body's systems still rely on the pattern makers' experience to modify and adjust the computer-generated model when dealing with the special body pattern [2].

Three-dimensional body measurements are accurate, at a high-speed and consistent, which can accurately reproduce the human body shape and its curve features [3]. Besides, it is simple

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in operation and can measure a number of projects. These measurement results can also be directly sent to the pattern design and automatic cutting system through the computer, to achieve continuous automatic discharge of body measurements, pattern design and cutting. And the development of non-contact 3D body measurement provides strong support for rapid access to three-dimensional shape parameter and human body model [4, 5, 6, 7].

This study uses three-dimensional measuring instrument to research the female characteristics of the lower body torso, then explores the generating rules of the basic pattern model of women skirts and provides the basis for the auto-generation of skirt pattern.

2 Anthropometry

2.1 Subjects, Time and Apparatus

80 female students aged from 18-24 years old of Soochow University were selected as research subjects for this study. The experiment was carried out during the period of 2010.9 ~ 2010.12, by using the non-contact 3D body scanner Symcad of Telmat.

2.2 Measuring Items

The study uses the software of imageware as a tool to read and optimize the point-cloud data generated by the 3D body scanner, and separately obtains the heights, widths and thicknesses of the waist, abdomen, buttock and other data (Fig. 1) and whilst also manually measures the girths of waist, abdomen and buttock.

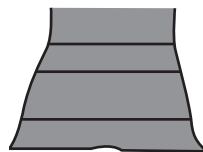


Fig. 1: 3D point-cloud schematic diagram

3 Data Analyzing

In the structural design of skirt, the main height sizes are the waist height, abdominal height and hip height. The main girth sizes are waist girth, abdomen girth and hip girth.

3.1 Data Obtainment of Height

3.1.1 Correlation of Height and Altitude

The altitudes of main body parts and height are closely related, and in order to determine how the altitudes of main body parts vary with the height and the selected proper model, it is necessary