ISASE 2019

Patternmaking of individualized A-line dress using computerized 3D draping method

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Abstract: This study aims to make an individualized A-line dress from three dimensional (3D) body data. Shapes of a body and an A-line dress which was fit on the body were obtained by 3D scanning. From the scanned 3D data, cross-sectional dimensions of regular intervals were obtained. Then, ratios of the maximum distance of front, back and width on transverse planes from the origin between the body and the dress were obtained as multiplication factors. A target body was deformed using the multiplication factors to construct a new dress model. Employing the proposed method, a 3D dress model was made. Using the computerized 3D draping method, the pattern was obtained and the dress was made. It was fitted on the target body while preserving the original shape dress. This method will help to make an individualized dress using 3D scan body data.
Keywords: *3D draping method, individualized dress, pattern making, dress modeling*

1. INTRODUCTION

For better wearing comfort and appearance, the demand of individualized garments is increasing. To make an individualized garment, three dimensional (3D) scanning technology is used to obtain more precise body measurements and characteristics [1]. The 3D scanning method is also used for pattern development [2]. Many researchers studied to make a clothing pattern using 3D garment surface flattening method (3D draping method) [2-4]. In those researches, garment models were generated by modeling the human body which is for tight fitting garment.

For a garment model with complex ease allowance for styling and silhouette, Zhang et al. [5, 6] proposed a method to create 3D jacket model using garment scanning data. They constructed jacket bodices for various sizes from a scanned 3D body model using the multiplication factors obtained from 3D scanned garment model and body model. Then, they successfully made the jacket bodice patterns.

This study aims to make an individualized A-line dress from 3D body scan data. A dress needs ease for a bodice and space for a skirt. Those were connected at the waist as showing curved waist line. Therefore, it is necessary to investigate the modeling method for making an individualized A-line dress.

2. EXPERIMENTAL

An A-line dress (bust 90cm, waist 74cm, hip 95cm, back length 39cm) were selected and a dress form (original body, bust 87.5cm, waist 63.5cm, hip 91.5cm and back length 42cm), which the dress fits on, was selected. Those pictures are shown in Figure 1. Those 3D shapes were obtained using a 3D scanner (Body Line Scanner, Hamamatsu Photonics KK). The button and collar of the scanned dress data were deleted.

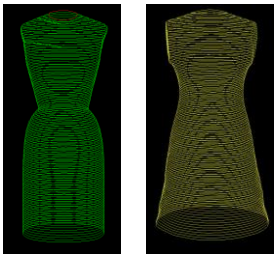
(a) (b) (c)

Figure 1: (a) Standard dress, (b) a standard body and (c) a target body

From the scanned 3D data, cross-sectional dimensions of regular intervals (polyline model) were obtained as shown in Figure 2. The ratios of the maximum distance of front, back and width on transverse planes from the origin between the original body and the dress were obtained as multiplication factors [5, 6].

Another dress form (Figure 1(c), bust 94cm, waist 70cm, hips 98cm, and back length 44cm) was selected as a target body. The target body was deformed in vertical direction to fit positions of bust, waist, and hips lines to the positions of the original body. The target body was deformed using the multiplication factors to construct a new dress model. After applying the multiplication factors, the target body was deformed in vertical direction into the initial state. Then, the polyline model was converted into polygon model.

Using the new dress model, the dress pattern was developed using a 3D pattern making system [2]. The weft and warp grainlines were set at the similar position as the dress. Similar cutting lines were also set. Using the finished pattern and a cotton 100% fabric, a dress was made.



(a) (b)

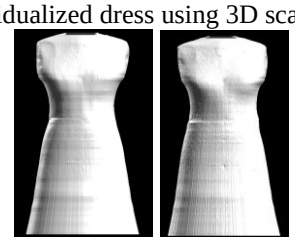
Figure 2: (a) polyline model of the body and (b) polyline model of the A-line dress

3. RESULTS AND DISCUSSION

Figure 3 shows the created dress models for the original body and the target body. Dress models were successfully made. Those dresses patterns were also made using a 3D pattern making system [2]. Figure 4 shows the manufactured dresses with the created patterns on the original body and the target body. Those dresses were able to keep the shape and silhouette of the A-line dress. Therefore, individualized A-line dress was successfully made using the modeling and 3D pattern making method.

4. CONCLUSION

By adapting the magnification factors to different bodies, it was possible to create a new dress model as keeping the shape and silhouette of the A-line dress. Using 3D patternmaking method, the patterns were also developed. The made dresses keep the shape and silhouette of the A-line dress. This method will help to make an individualized dress using 3D scan body data.



(a) (b)

Figure 3: (a) dress model of the original body and (b) dress model of the target body

(a) (b)

Figure 4: (a) Manufactured dress for a standard body and (b) manufactured dress for a target body

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