A Study on Men's Wear Production Using Digital Clothing Program

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ABSTRACT

As contemporary men's clothing is becoming slimmer, people consider it important not only the existing simple design, but also intricate design and its fitness that can complement one's body. Therefore, in this study, we reproduced Men's wear fabrication process with 3D process. As a result, it was well received, as it can check the fitness, and allows modifying the design and mixing different texture easily.

Key words: Digital Clothing, Virtual fashion show, Men's wear

1. INTRODUCTION

As the exchange in the industrial activity be-

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tween countries and regions is preceded vigorously with the development of scientific technology and information industry, the global companies in the recent clothing industry are facing the age of limitless competition. For that reason, the companies are putting efforts into promoting the global competitiveness in their structurally vulnerable part including the lack of product differentiation and global sourcing etc. to establish global SCM(Social Chain Management) system and utilizing foundation of state-of-the-art functional materials and IT country, and present the vision of cutting-edge textile and fashion country by sophistication of the marketing ability through informatization [1].

When we look at the previous research on 3D digital clothing, there are comparative studies between 3D virtual clothing and real clothing [2-5], studies on 3D virtual clothing and pattern construction [6-12], studies on textile reproducibility in 3D digital [13-14], and studies on 3D clothing design development [15]. Apart from them, studies on digital stores, that are studies on u-shop, avatar, game clothing, silverware, wearable computer, customization by the made to measure, RFID, smart wear etc. are actively pushed forward in the clothing industry. The luxury brands are also showing a digital fashion show in the form of a

performance as a measure to express the brand identity. The brands include Alexander McQueen and Burberry who showed the holographic fashion show and Ralph Lauren who presented 4D style to feel the smell and wind unlike the previous 3D fashion show. In addition, Ecole de Paris, Fnc. Kolon, the new designer Harriette Kim, etc. put the same garment as the real one on a virtual model with slight image effect and realized 3D digital fashion show.

Likewise, While digital media is becoming the center of the global industry, demands for the digital clothing technology are rapidly increasing with the unification of the fashion industry and innovative IT technologies. The appearance of social media and smart phone made men today have interests in the fashion trend and a wide range of social sectors for men including men's magazine, online shopping mall, fashion show etc. is developing. As their interest in fashion increases with the development of media, men these days have more needs for various designs and fitness that can supplement their body shape. For this rea-

son, it is assumed that the development of the customized digital fashion process and solution that can satisfy new needs in the global fashion and IT industry is required. Complying with the trend, this study realized the production process of men's wear in the 3D process and produced a fashion show with the clothes. This study aims at verifying if the production process of men's wear is available in the production process and suggesting a new fashion paradigm at the men's wear market.

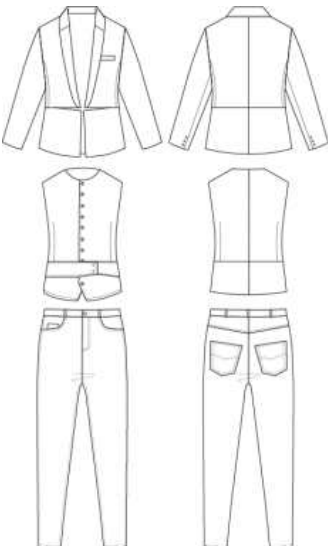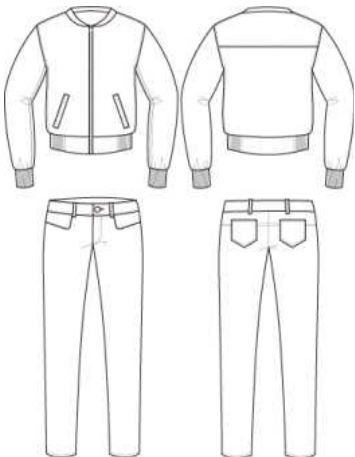## 2. METHODOLOGY AND CONTENTS

2.1. Subject of Study

For composition of clothing goods for virtual digital fashion show, jean was used as the popular material.

<Work 1> was made up of shawl collar jacket, vest and baggy style jeans. Material of a vest is applied to leather. Bodice, shawl collar and sleeves of a jacket and pants are used denim material.

<Work 2> was composed of a jumper and basic skinny style jeans. Material of bodice and sleeves

Table 1. Design for virtual fashion show

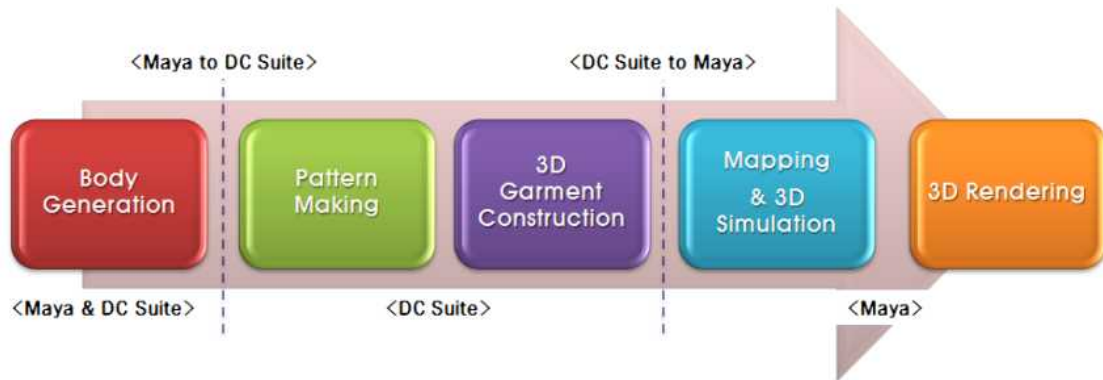| Work 1	Work 2
- Target: Men's wear - Item: Shawl collar jacket, Vest, Baggy jean pants - Material: leather, velvet, jean	- Target: Men's wear - Item: Jumper, Skinny jean pants - Material: leather, jean, knit

Fig. 1. Digital production process of men's wear

of the jumper is leather. Collar, hem of sleeves and bodice of a jumper are used rib knit fabric. Pants is applied to denim material and Table 1 illustrates the work.

2.2. Step for the works

The work process of digitizing the men's wear in this study is shown in Fig. 1. The software DC Suite was used to create men's wear. (1) Import the body data created in Maya to DC Suite. (2) Pattern making was done in pattern tab. (3) Construct a garment by virtual sewing and in garment tab. (4) Simulate the garment. (5) Import designed garment into MAYA and apply virtual fabric image. (6) Finally, simulation of men's wear was carried out.

## 3. DEVELOPMENT OF 3D DIGITAL FASHION SHOW PROCESS

3.1. Motion Capture & 3D Body Modeling

Model size is height 195cm, chest circumference 98.2 cm, waist 80.3 cm, and hip circumference 92.4cm. We made the final completion using motion capture of real gestures from a model who has many fitting experience. We then conducted virtual wearing for fitting and form suitability in 3D by importing the final body to DC Suite. Table 2 is the silhouette of the man's model.

3.2. Pattern Making, Sewing & Simulation

Pattern making of <work 1> and <work 2> was done in pattern tab of DC Suite, developed in digital clothing center at Seoul National University. For
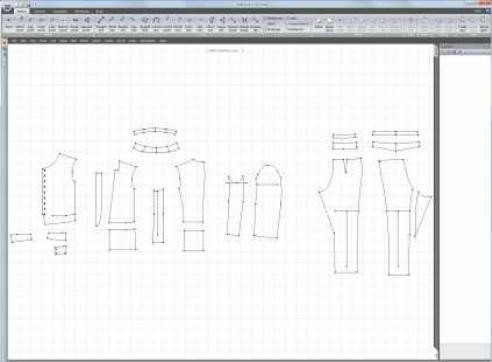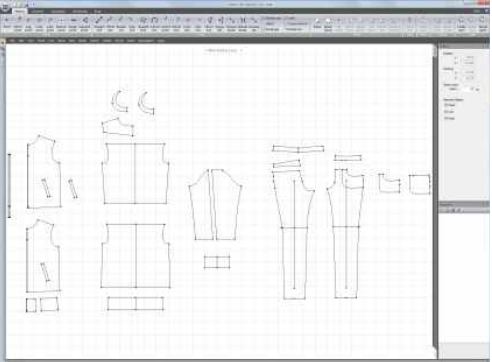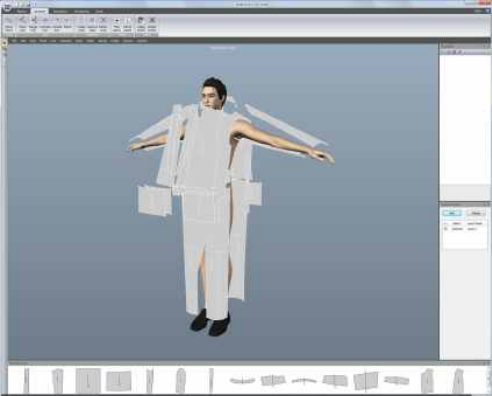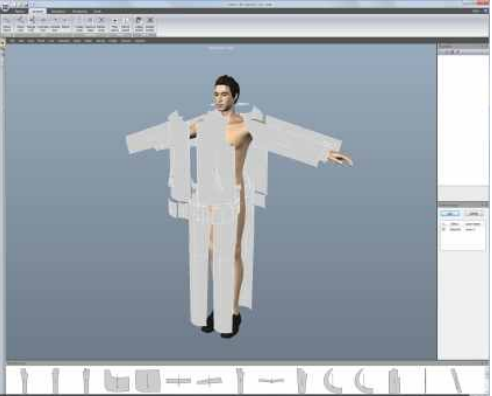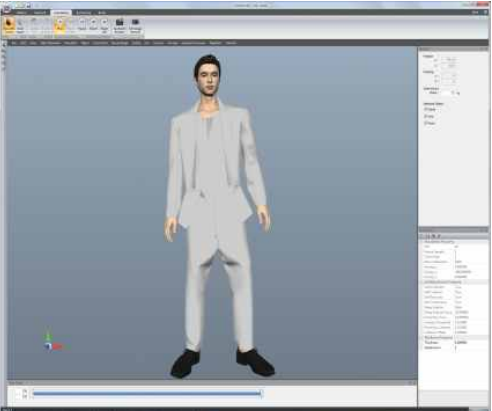
Table 2. 3D Virtual model

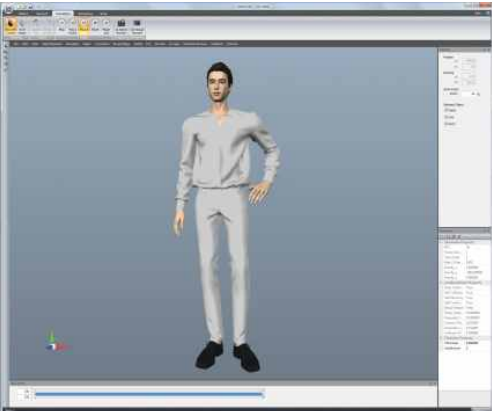| Surface | Front | Side | Back |
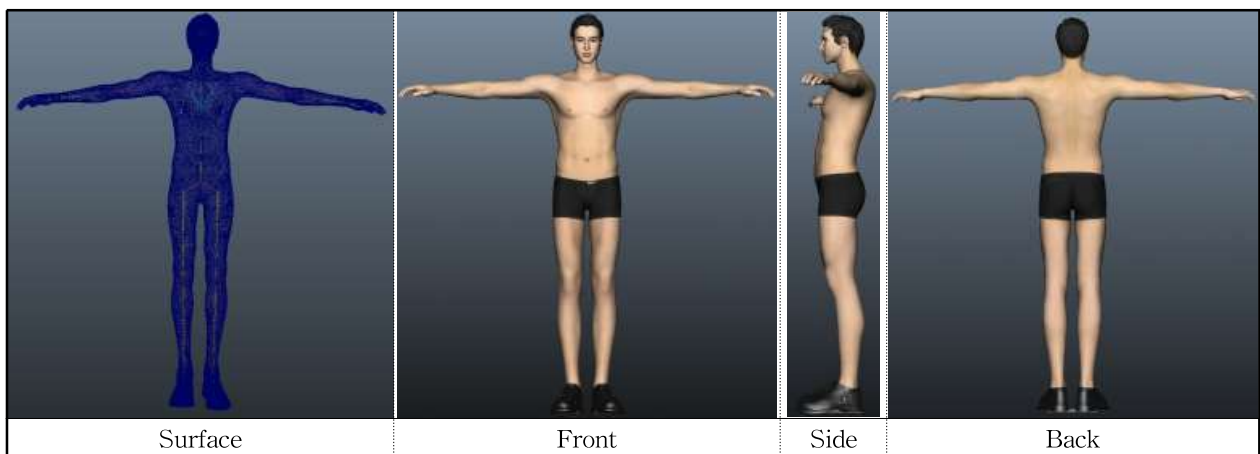
pattern layout, we placed the panel to the virtual model from garment tab of DC Suite. As the pants go over the top, first we placed the pants panel and then put the top over. Virtual sewing was done faster than the actual time, as each panel of sewing connected exactly like the actual sewing. To take a look at the works 1 and 2, we moved to simulation tab, wore it to the virtual model, and completed the experiment through various modifications. Table 3 is the process of pattern making-panel placement-sewing- simulation in DC Suite.

Table 3. The production process in DC Suite

Work 1	Work 2
Pattern Making	
3D Garment Construction-positioning & sewing	
3D Simulation	

3.3. Material Property & Mapping

For surface detail of <Work 1> in digital fashion show, we used leather for vest, velvet for the body of jacket, and jean for collar and pants. We used Photoshop CS5(Adobe, Inc.) to create design and fabric image. Also, we used shader and lighting in DC Suite and MAYA to naturally express velvet jacket, leather vest and jean pants that were cat sand washed and to make their surface detail as real as possible. We also used material property in simulation tab of DC Suite to make material of the clothes upward the value of bend resistance and bend damp to lessen the wrinkle, and for the fabric of jean pants, we adjusted downward the value of stretch resistance and bend resistance to express

Table 4. Material property & Mapping in Maya-Qualoth

Work 1	Work 2
Jacket+Vest	Jumper
Baggy Jean Pants	Skinny Jean Pants

Jacket+Vest (Work 1):
Density 0.010
Stretch Resistance 100.000
Shear Resistance 0.100
Stretch Damp 0.010
Bend Resistance 0.120
Bend Damp 0.001
Bend Yield 0.000
Bend Plasticity 0.000
Air Drag 0.010
Rubber 1.000
Viscous Damp 0.000
Friction 0.000

Jumper (Work 2):
Density 0.005
Stretch Resistance 120.000
Shear Resistance 0.100
Stretch Damp 0.010
Bend Resistance 0.100
Bend Damp 0.003
Bend Yield 0.000
Bend Plasticity 0.000
Air Drag 0.010
Rubber 1.000
Viscous Damp 0.000
Friction 0.000

Baggy Jean Pants:
Density 0.010
Stretch Resistance 98.000
Shear Resistance 0.100
Stretch Damp 0.010
Bend Resistance 0.080
Bend Damp 0.001
Bend Yield 0.000
Bend Plasticity 0.000
Air Drag 0.010
Rubber 1.000
Viscous Damp 0.000
Friction 0.000

Skinny Jean Pants:
Density 0.010
Stretch Resistance 97.000
Shear Resistance 0.100
Stretch Damp 0.010
Bend Resistance 0.095
Bend Damp 0.000
Bend Yield 0.000
Bend Plasticity 0.000
Air Drag 0.010
Rubber 1.000
Viscous Damp 0.000
Friction 0.000

the elasticity and a little bit of stretch. Regarding the property of matter of leather and velvet, bend resistance value was raised to 0.120 from the basic 0.100, and bend damp value was adjusted to 0.001 from basic 0.000 in order to have less wrinkles, while stretch resistance value was adjusted downward, regarding the property of matter of jean, from 100.00 to 98.00, and bend resistance value was adjusted from 0.100 to 0.080 to show the elasticity and some stretching of the material.

For surface detail of <Work 2> we used patent leather, collar and sleeves for jumper's body and rib band for hemline, and jean for pants. Concerning the property of matter of leather, stretch resistance value was leveled up from the basic 100.00 to 120.00, while bend damp value was raised from 0.000 to 0.003 respectively to have the stiffness of the material without stretching. In case of the property of the matter of Jean, stretch resistance value was reduced from the original 100.00 to 97.00, and bend resistance value was reduced from 0.100 to 0.095 to show the elasticity and slight stretching of the material. Table 4 shows the material property applied to <work 1 and 2>.

3.4. Rendering

To make an image that moves along the walking of the virtual model, DC-Suite and Maya had test-rendering and practiced high quality rendering in V-ray program. It is shown in Table 5.

For <Work 1>, we used leather, velvet and jean. To show the natural sentiment of the velvet jacket, leather vest, and jean pants that had cat sand washing, shader and lighting were controlled to present the textile most similar to the actual one to the maximum.

For jumper body of <Work 2>, we gave convex embossing effect on the front central part with gradation dyeing effect to make motive seen as three-dimensional. For the sleeves, we have texture effect to express stitch in leather and rib band for the hem. To show the difference between plain

leather and patent leather, we used shader such as Phong and Blinn. Also, for material property of leather, we adjusted upward the value of stretch resistance and bend damp to express the stiffness without any stretch. As for material property of jean, we adjusted downward the value of stretch resistance and bend resistance to express elasticity and a bit of stretch. It is shown in Table 6.

4. CONCLUSIONS

With the development of media outlets, men are becoming more interested in fashion, while demand on diverse design and fitness to effectively complement one's body is increasing. In this study, we took it beyond the field of digital clothing that focuses on women's wear and reproduced a virtual fabrication process of men's clothing using digital program. Moreover, we compared with real situation and studied its efficiency and how much further it can go. For evaluation, we asked world renowned professionals in the field of menswear for their objective assessment after experiencing firsthand this process.

The result is as follows:

First, the pattern that makes up men's wear has simple design compared women's garment, so it was easy for fitness and design modification. Second, fabric used in men's wear is relatively limited compared to women's, but designers can try mixing diverse materials before the production, so it is economical and time-efficient.

However, we discovered some critical points and we found the need to modify it and to complement it. First, compared to women's wear, men's wear has some overlap in clothes, so a tool that enables simulation in sequence must be developed. Second, companies have their own software which should be compatible with diverse software.

Also in this study, we did the research using body size of a male model. However, in future studies, we hope to find a research on various
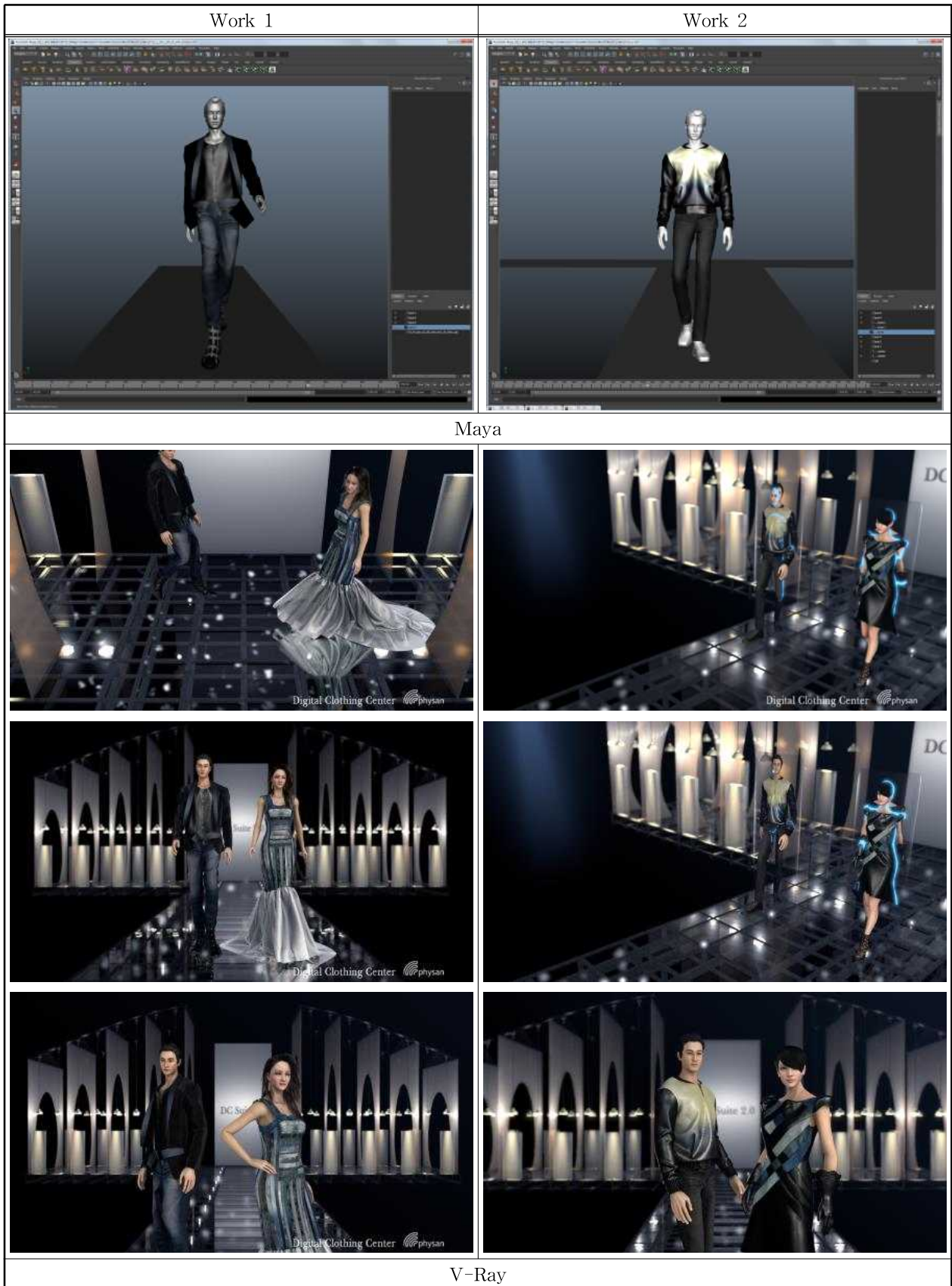
Table 5. Maya & V-ray Rendering

Work 1	Work 2
Maya	
V-Ray	

Table 6. Surface detail

Work 1	Work 2

physical forms of a male using size and pattern of a body that real companies are current using.

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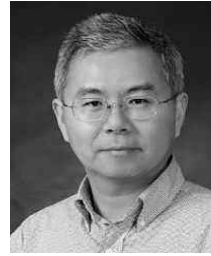
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