

## Makeup Design and the Application of 3D Facial Avatar Makeup Simulation

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### Abstract

The purpose of this study is to design appropriate digital tools for the production of makeup designs. In this study, we used a three-dimensional facial avatar simulation program developed by the Electronics and Telecommunications Research. This study is based on the creation of three-dimensional CG digital art of facial avatar makeup, produced by using simulation technology. First, the actual application and the tools for digital-optimization and media features were created, leading to the research and cleanup. Second, the theoretical background was applied to the formative elements of oriental colors in the designing process. Makeup design elements include point, line, surface, color, and texture. In this study, effective makeup design was interpreted to be based on the representation of particular elements, notably the design principles of balance, proportion, rhythm, repetition, emphasis, contrast, harmony, and unity. In Asia, design is based on the visibility of red, blue, black, yellow, and white—the colors of the five elements—and the use of points, lines, and shapes. This study was recently under scrutiny in relations to digital simulation and various three-dimensional designs, in terms of how to take advantage of a wide range of applications, and how to apply the findings through media and the dissemination of basic research. This study applies the characteristics of the limited existing stereoscopic three-dimensional and digital simulation programs in order to take advantage of the empirical research, providing a basis to implement this research in a meaningful way. A follow-up study is needed to extend these findings and theoretical foundation through continuous observation and in-depth technical development and research.

**Key words** : avatar face makeup, makeup simulation training program, makeup training program, 3D facial avatar avatar, 3D facial makeup design

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## I . Introduction

Fusion is an important principle to explain the development of culture. Many methods have been developed to take advantage of technology, discovering its potential value.

These days usually talk like this. The Art and science meet takes place and the miracle convergence. However, an engineer and an artist are meeting and then take a fight or argument. Twenty-first century knowledge societies are characterized by the introduction of many new information technologies in each field. New technologies have been steadily evolving, along with the development of technologies that enable more effective communication. Cultural content that reflects the era's social and cultural development and importance has received particular attention. Expressed as to what the 'technical' original meaning of the word art is a very important key technology. That may be required as a condition for making a great art that you understand the Culture Technology.

The application of makeup is not simply a means to express beauty; it is a way of representing various aesthetic values. (Makeup is used to express identity, or the conscious ego that includes self-image, represented as a single personality. Moreover, makeup reflects the social expectations and cultural values of the times, especially for women. Throughout the history of humanity, changes can be seen in the makeup used by different cultures to reflect and express their different identities. In developed societies that are characterized by a video-and image-oriented culture, digital media has come to play a significant role in the arts sector, responding to the desire for simple, ideal beauty (Moon & Kim, 2011). We would like to increase the added value for the beauty industry that

derives from an understanding of social values, as well as contribute to the growing academic research on this topic.

The Future of Beauty Industry internet new media platforms IT Technical Features personality. Now there are more demands create a new model. Visual media have evolved to increasingly integrate computer graphics (CG), incorporating a variety of fields (Lee, Kim, & Choi, 2013).

Research related to the field of technology for disguise has been dominated by a theoretical approach based on a front, side-to-side, and side-oriented synthesis process that softens the edges of the seams. However, practical applications and uses for this approach are inadequate. Prior studies have mostly employed retouching techniques that utilize the basic tools of photoshop, including tools to adjust image contrast and size. In addition, Computer graphics was the application utilizes existing design research that uses photoshop and illustrator to create two-dimensional artwork based on images produced with a Barlow lens (Shin & Shin, 2011). In this way, the research program described here is unique in relation to three-dimensional CG software development and analysis, as the technical work for this study on the creation and simulation the creation and simulation of makeup application techniques are based on Choi (2013) of 3Ds Max and Moon (2009) Z-Brush.

A person's face is not a flat, indented with many three-dimensional forms. Hence, the practical uses of research and development based on two-dimensional CG software makeup patterns are really limited. Therefore, makeup patterns should blend two-and three-dimensional models (Moon, 2012). There is this need for suitable for two- and three-dimensional makeup

dress-related programs that take advantage of the development of applied research. Both training and a foundational knowledge base are required to cultivate skilled workers with on-site practical experience in a variety of rapidly changing fields (Lee, Kim, & Choi, 2013). Such professionals can easily become familiar with tools, especially with the support of media. To see a mirror of a realistic human face represented on a computer screen or through hands-on and easy-to-learn tools would be ideal.

We are 3D makeup simulation tool utilizing the evolution media works using the design needs to be applied. Makeup applied for the ultimate professional training program for cultivating the media needs to evolve.

The purpose of this study, beauty experts, special makeup artist, art professional training to take advantage of the media research and education work is to produce. The Design is appropriate digital tools for the production of makeup designs (Choi, Cho, & Choi, 2014).

The aim is to deliver more effective visual representations of the contents of the elements such as balance, proportion, rhythm, repetition, emphasis, contrast, harmony, and unity, using

art makeup design.

In this study, I was study use program the Electronics and Telecommunications Research Institute developed this is a three-dimensional facial avatar simulation program, which is available should you wish to use this tool.

## II. Research Methods

This study is based on the creation of three-dimensional CG digital facial avatar makeup art, produced using simulation technology. Art makeup, such as face painting, body painting, and fantasy makeup, is a combination of the practical and artistic aspects of fine art makeup. Digital: step through the production process on the study; use the 3D CG Software deliverable.

The Electronics and Telecommunications Research Institute (ETRI) developed a three-dimensional facial avatar makeup simulation program Software that generates a high-definition three-dimensional model using DSLR restoration technology (Yoon et al., 2012). The camera identifies three lighting aspects: UV rays, polarization, and general lighting.



Figure 1. 3D Facial Scanning System



Figure 2. Makeup Simulation System Avatar Face

Figure 1 This is an external light source block structure and photo shoot shown in three-dimensional model generation software with the facial avatar model.

Figure 2 Here is a person who looks like they have an avatar face of a fictional character. Such an avatar dressed over the attempt to reproduce the effect of realistic interaction-based workplace experience.

Figure 3, 4 This is three-dimensional avatar facial makeup simulations were applied in this research according to the following method. An Internet-based literature search of research

methods was conducted in order to establish a work plan.

Why do models and materials using a program I ETRI using makeup can quickly and easily do so (Figure 5, 6).

First, the actual application and the tools for digital-optimization and media features were created, leading the research and cleanup. Second, the theoretical background was applied to the formative elements of Oriental colors in the design process.



Figure 3.  
3D Makeup Simulation System



Figure 4.  
3D Facial Scanning System,  
Source: ETRI



Figure 5.  
Makeup Simulation System  
Make-up Tool



Figure 6.  
Makeup Simulation System  
Make-up Tool

### III. Theoretical background

Makeup is used to create attractive and beautifully dressed expressions of one's self-image, pursuing creative and artistic activity in the desired direction. Makeup of lexical meaning 'order', 'production', 'it is finished', is means. Make and Up with this synthetic means to give a synergistic effect by making.

Makeup design can be understood as aesthetic design with a focus on the human body. Makeup design elements include point, line, surface, color, and texture. In this study, effective makeup design was interpreted as being based on the representation of particular elements, notably the design principles of balance, proportion, rhythm, repetition, emphasis, contrast, harmony, and unity (Kim, Sin, & Lim, 2012).

In recent years, k-beauty has become a growing interest in Asia with. So the makeup design, centered on Asia and Oriental colors and details should you wish to proceed.

In Asia, design is based on the visibility of

red, blue, black, yellow, and white—the colors of the five elements—and the use of points, lines, and shapes. Design distinctions draw on rhythm and repetition, contrast, balance and proportion, and harmony or the emphasis on unity, based on the four seasons.

In the Orient is one of the most visible red, blue, black, yellow, and white colors of the five elements, such as points, lines, and shapes form the design work. Design distinction is rhythm and repetition, contrast, balance and proportion, harmony and emphasizing unity, based on the four seasons.

### IV. Results and Discussion

The title of Figure 7 was "The Spring". It expressed the image of a cherry blossom, which symbolizes the spring season. Point, line, and direction were the design modeling elements. Accentuation and contrast were the design principles. The principle of accentuation refers to



Figure 7. The Spring

a theme or method through which the work emphasizes a particular segment, including form, size, color, etc. ; when the eye focuses on that segment, it creates change and enhances interest in the visual impression. When it let's use it opposed or that it becomes the opposition of the characteristic the characteristic experiences the mutually different thing, the phenomenon that the difference of the characteristic feels increasingly emphasized is referred to. This method was used because it is clear and animated, and creates rich changes.

Work is the cherry blossom trees and blooming flower, buds form and soft pastels, downy texture. And the color is light pink, black, winter trees.

The title of Figure 8 was "The Summer". It expressed the image of a wave, symbolizing the summer season and the splendid landscape. Line and form were the design modeling elements. Rhythm and repetition were the design principles. In makeup design, rhythm is a principle that creates change and interest in the work. The fundamental expression of rhythm is a

visual dance routine in which the line, form, color, and design elements of a pattern repeat and have a visually successive movement effect. Repetition is a method in which design components such as points, lines, texture, etc. are repeated at regular intervals, enhancing rhythm.

Work is a wavy shape, in the shape of the curve using a lot of the orient and was composed of a soft cool texture. And the colors are dynamic and intense color.

The title of Figure 9 was "The Fall". It expressed the image of a tiger, symbolizing the fall season with a distinctly Korean image in autumnal colors. Point, line, and form were the design modeling elements. Balance and proportion were the design principles. Balance is a principle that indicates whether form, color, material, etc. are distributed equally, without bias, and conveys a sense of equilibrium, calm, and stability.

Because of being similar to the difference of the generated in the correlation relatively of the relationship in which the part mutual or whole



Figure 8. The Summer



and between the part are fixed in quantity when more than two expressed objects exist road or size, the proportion relates, it is the concept.

Work is in the form of a tiger face, animal masks, configuration, and Use a mat with smooth texture. The five representatives of the Orient color and the color is red, black, yellow,

green, and blue (Figure 10).

The title of Figure 11 was "The Winter". It expressed the Lunar New Year custom, symbolizing the winter season in Korea using images of ice. Point and direction were the design modeling elements. Harmonization and unification were the design principles. Harmonization refers to the condition in which



Figure 9. The Fall



Figure 10. The Fall is the Three-dimensional Simulations

the work inspires pleasure in the viewer by uniting more than two complementary elements. This phenomenon occurs when each element is comprehensively in harmony with the others, and when the work exhibits a strong aesthetic and sensory effect. Unification is the overall principle of equilibrium and consistency, when creating artwork, beautiful and harmonious is the basic principle. When structural, functional, and decorative elements are integrated, the work achieves unification.

Works perfectly round circle triangle feels soft, cosy and old configuration used the texture of it. And the color is winter white, pale pink, and red.

This study is to design appropriate digital tools for the production of makeup designs. The theoretical background was applied to the formative elements of oriental colors in the design process. Table 1. The results were as follows.

## V. Conclusion and Suggestions

This is a virtual avatar facial model that researchers have created using special applications of makeup artwork by taking advantage of production tools (Shin & Shin, 2011). This study establishes an academic perspective on the concept of digital cultural technology for understanding and academic interest, could be the cornerstone of widen.

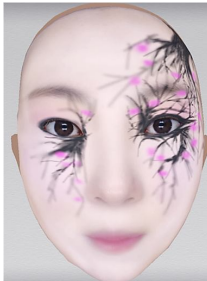



The actual applications of new technology development, as well as the uses of CG software, are emphasized in this area of research, to ensure that the needs of the public are being met. In addition, fulfilling the academic interests and development of a digital minute is one of the cultural content in order to be able to do 1 trillion of arrivals. Therefore, this application of traditional techniques, incorporated into new expressive forms of technological development and CG, can lead to



Figure 11. The Winter



Table 1. Work Planning and Production

	Expressed & Using images	Design modeling elements	Shape, texture, color	Design principles	Work
Work 1 The spring	This expresses the image of a cherry blossom, which symbolizes the spring season.	Point Line Direction	<ul style="list-style-type: none"> <li>- Cherry trees and blooming flowers, buds form</li> <li>- Soft pastels, downy texture</li> <li>- Pale pink, winter, wood, black</li> </ul>	Accentuate  Contrast	
Work 2 The summer	This expresses the image of a wave, symbolizing the summer and the splendid landscape	Line Form	<ul style="list-style-type: none"> <li>- Wavy shape, in the shape of the curve using a lot of the Orient</li> <li>- Soft cool texture</li> <li>- Dynamic and passionate colors</li> </ul>	Rhythm  Repetition	
Work 3 The fall	This expresses the image of a tiger, symbolizing the fall with a distinctive Korean image in autumnal colors.	Point Line Form	<ul style="list-style-type: none"> <li>- Tiger face, animal mask mode</li> <li>- Smoothness, mat texture</li> <li>- The five representatives of the Orient color.</li> <li>- The red, black, yellow, green, and blue</li> </ul>	Balance  Proportion	
Work 4 The winter	This involves Lunar New Year custom, symbolizing the winter in Korea using the images of ice.	Point Direction	<ul style="list-style-type: none"> <li>- A perfectly round circle triangle</li> <li>- Soft feeling texture is used to comfort the comfortable</li> <li>- The color is winter white, pale pink and red.</li> </ul>	Harmonization  Unification	

improved abilities of professionals in the field. CG three-dimensional simulations that use avatar character facial makeup to take advantage of media-based art makeup design is very new. I believe that evaluations and demonstrations the appropriateness of such a novelty approach for the medium is well worth researching, in order to increase the appeal of the medium.

This study is a 3D Facial Avatar Makeup Simulation Training Program Development and Utilization (Ver. 1) as a follow-up of research training programs take advantage of the design process was applied to the works produced. This research is applicable to any person through the third dimension to the work and K-beauty makeup design incorporating research into Korean culture through the work.

This study was recently under scrutiny in relations to digital simulation and various three-dimensional designs, in terms of how to take advantage of a wide range of applications, and how to apply the findings through media and the dissemination of basic research. The domestic research landscape on digital three-dimensional is scarce, as literature mostly focuses on two-dimensional applications and research. This study applies the characteristics of the limited existing stereoscopic three-dimensional and digital simulation programs in order to take advantage of the empirical research, providing a basis to implement this research in a meaningful way.

A follow-up study is needed to extend these findings and theoretical foundation through continuous observation and in-depth technical development and research. In addition, a variety of digital content creation applications and proposals for specific studies will need to be developed.

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