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Implementation of Dynamic Character Art using Image Association

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Abstract

This study is about the creation of a character art using the free association. Character in proposed artwork induces the viewer's unconscious experience associated with it and creates new meanings to invigorate the character. When a character that performs both a linguistic function and a visual image function goes through a free association process, the viewer can induce interest and convey the meaning of the character more effectively. We proposed two ways to express the dynamic movement of the character more actively. One is drawing using various colors and free lines, and the other is the movement of the character synchronized with the gesture of the viewer. As a result of implementing dynamic character art, we can see that the viewer was actively involved in the free association process and immersed in the artwork. The viewers participated in the creation of the artwork, changing the shape of the character according to their various gestures.

Keywords: *Free Association, Character Art, Visual Transformation, Dynamic Character, Interactive Character.*

1. Introduction

Human unconscious occupies the largest part of the human mind and is deeply latent and in charge of all human conscious thoughts and actions. When the experience suppressed in consciousness is infiltrated into the inner world and is associated with any impulse or work by external stimuli, it becomes unstable, which leads to unconscious conflict, which in turn has a profound effect on consciousness. Freud sought to cure this conflict by introducing free association and proved that free association could lead unconscious into consciousness [1].

The purpose of this study is to create an artwork that uses the free association method to induce the viewer's unconscious experience to be combined with the artwork and to develop a tool that can effectively communicate with the viewer by using characters. People think of subjective associations and various images depending on their experience and psychological state, even if they see the same characters. In other words, it gives life to the form of characters by giving them new meanings. If a character that performs both a linguistic ability and an image role goes through a free association process, it can deliver more effective meaning and cause visual interest. Character has several levels of meaning and viewers experience abstract and symbolic levels of meaning through character image association.

Characters presented in various expressions using visual associations are understood by the viewer as concrete and abstract forms beyond the meaning of formative language symbols. And it has an arbitrary and special meaning through association with the viewer's subjective emotions, cultural experiences and values. Characters as symbols become meaningful through the process of associating objects. Viewers can connect different meanings associated with it from characters through free association and create new related meanings. In particular, the visualized character image with the free association can convey the message of the viewer

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more powerfully than the simple text and can be remembered for a long time in the viewer's memory. This proposed artwork uses two methods to derive the free association of the viewer related to the character. One is the representation of character in various colors and free lines. The other is the representation of active character movements synchronized to the viewer's gestures.

2. Backgrounds

2.1 Free Association

Free association, proposed by Freud in 1896, is a technique that helps humans unconsciously express the inner world, and is a way of identifying mental problems by showing language or pictures and freely thinking about something [2]. In Freud's psychoanalysis, free association helps suggest associations by presenting certain elements first. The associations that emerge from one element move to other associations that are adjacent to each other, resulting in a chain association with the elements of personal perception and memory. Free association causes a chain association according to the similarity of image form or language because the experience embodied in the body is accumulated in memory and then exposed to the surface.

Association is the action that leads one idea to another. For example, it is a psychological process where people think of 'red' and 'heart' from the word 'love'. Humans not only communicate and accept information through communication, but also express their senses and imagination. Therefore, they have the ability to judge and accept itself when faced with an object. Visual symbols such as characters stimulate human associations based on past experiences and periods to create meanings, creating new meanings by expanding and reconstructing meanings or concepts contained in characters. The most special feature of association is creativity. Creativity means different things for different people, and it means mental ability to produce unique and diverse images. Therefore, the creation of artworks using associations is a meaningful work in that it is a technique of expressing the viewer's unconscious with consciousness.

2.2 Visual Expression of Character

Characters have been conveyed constantly as visual communication symbols of languages for communication with each other. Early characters were meant only for verbal communication, but modern characters are more convincing and more effective in conveying information, fun, and persuasion through the use of pictorial expressions in addition to simple information delivery [3-5]. This is to satisfy the change of the intention of the communicator and the demands of the recipient who always seeks newness in the highly developed modern civilization. Digital characters are characterized by free and diverse expressions out of the formal and rigid framework. If various abstract attributes are applied to characters, an image or a concept can be formed through the mental association of human. The concept or image formed at this time is based on the viewer's experience or knowledge. Characters using image associations combine the meaning of language and images to create a broader association and visualize novel and creative ideas that have never been seen before, increasing the delivery of character messages and the efficiency of communication. This is a way for free creation of new visual expressions, which can give a variety of possibilities to character information. Thus,, the perception of characters is shifted from symbolic symbols to objects with visual forms Is changed.

Associations are made in the process of characters being represented in images. Characters are symbolic symbols representing social and cultural specificities, and at the same time, they are basic formative languages. Characters have an original form, and there is a good possibility that they can be expressed in a visual language. The formative principle of the characters being imaged and the association of images help each other communicate. The purpose of this study is to create creative characters through image association, which is the basic and common language of human beings, and to increase the possibility of communication between information providers and receivers.

This study provided an interface with the ability to draw and color characters, allowing viewers to express their feelings and emotions rather than simply typing characters. There are three reasons for introducing color

into Dynamic Character Art. First, color is a very powerful visual message whose interpretation varies depending on the times and social culture. Second, color is associated with a certain object or image, and sometimes accompanied by emotion. Lastly, the colored artwork is very visually appealing to the viewers. The character image input into the proposed system is not a simple representation or transference of information, but a unique formative language that expresses the inside by expressing the thinking and logic of the viewer. Every action the viewer does is an internal expression. If the viewer's behavior is expressed as a personality, leaving a mark, it is certain a drawing that fully expresses the viewer's mind. The viewer is involved in the expression of characters, forms and colors to create a complete artwork. The characters look flat, but the viewer assembles them in three dimensions. This is because the viewer occupies the space of the artwork and interacts to transform the form of the artwork.

3. Dynamic Character Art

3.1 System Overview

In the proposed system, the process of expressing the unconsciousness by free association and modifying the character image input by the viewer is proceeded in three steps. In the first step, the viewer consciously approaches the artwork and takes action to transform the character image visually. The second step is the viewer's immersion in the artwork. The character image appears as a visualization with abstract properties. In the final step, viewer unconsciously creates meanings and expresses emotions through free associations from the form of the character image expressed. Figure 1 is an overview of the proposed system.

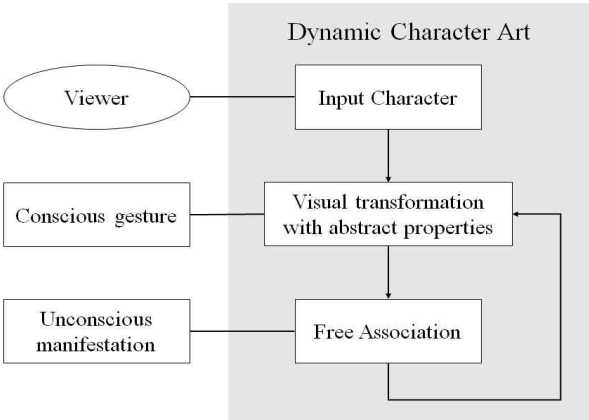


Figure 1. Overview of the proposed system

3.2 User Interface

The proposed system provides an environment for the viewer to draw characters or images at will using lines. In particular, it added a coloring function to make viewer's message more powerful. Figure 2 shows the user interface screen provided by Dynamic Character Art.

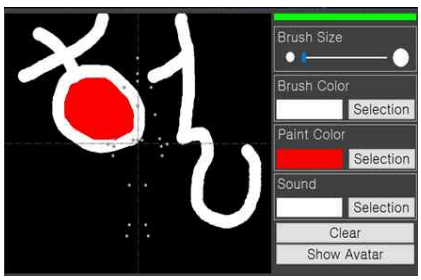


Figure 2. User interface screen in Dynamic character Art.

3.3 Implementation

3.3.1 Image Processing

Figure 3 is a flow chart showing the process of input character image processing in the proposed system.

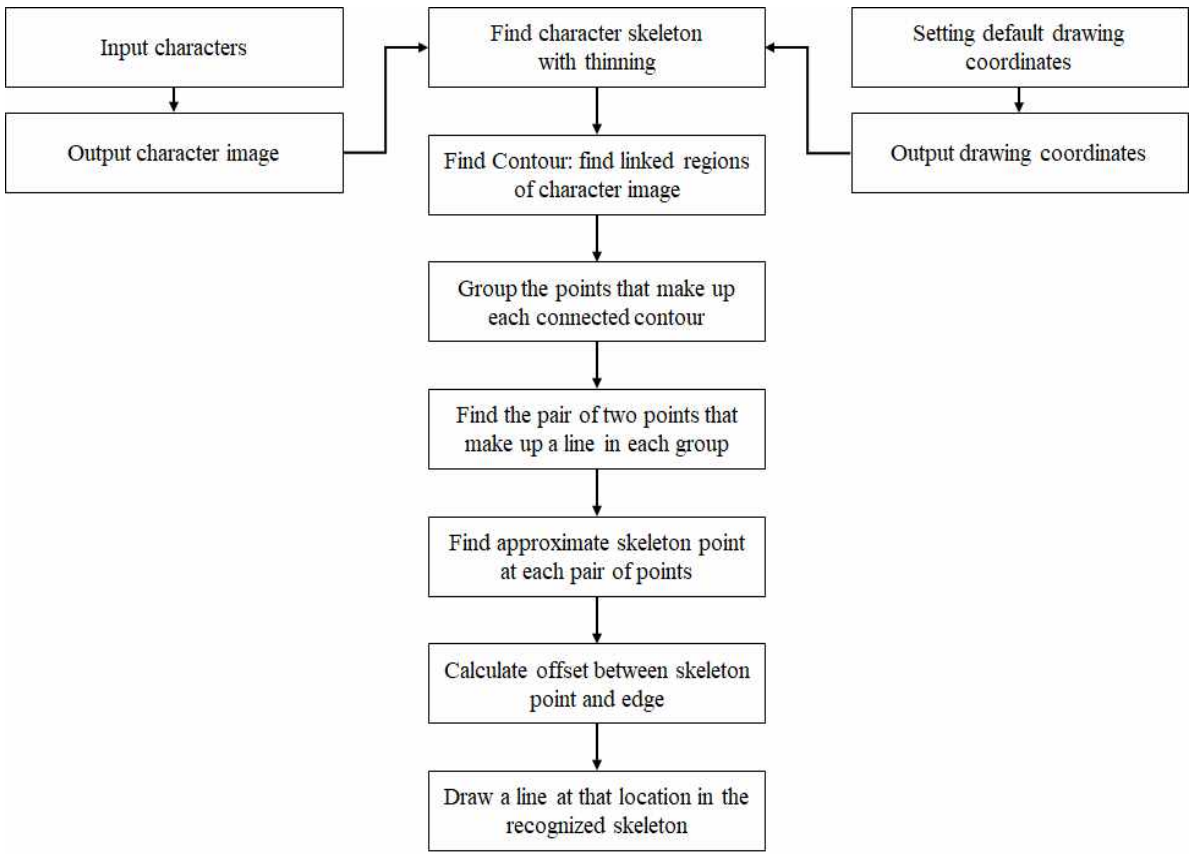
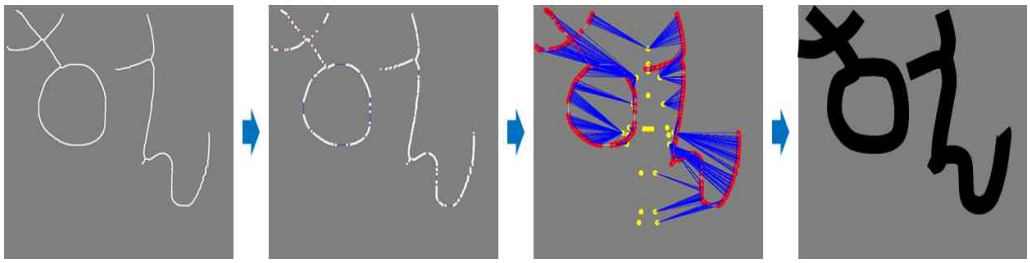


Figure 3. A flow chart of input character image processing

First of all, the character image drawn by the viewer is processed by the thinner algorithm to find its skeleton. In thinning process, if the stroke in the image is thin, the tip of the stroke is sensitive and not directional, so we want to keep the stroke thicker than a certain thickness. The skeleton found by the thinner is represented by non-overlapping points or lines. The next step is to find the contour for the skeleton of the character image from the thinner. Finding contour means finding the points that make up the objects in the character image. Connecting these points with a line completes the object. We stored two pairs of points together to represent the points in each contour that came out through the thinner as lines. If there is an inner contour inside the object, an additional painting flag is saved to perform painting on the closed object. Then, when drawing, points with painting flag turned on are drawn in mesh form, not line.

The extracted points are connected to the nearest human skeleton points using a weighted nearest matching algorithm [6-7] based on Euclidian Distance [8]. Human skeleton points are obtained from Kinect sensors. Based on the points information calculated so far, offset values for natural drawing and color information, the object is drawn by receiving human skeleton coordinates in real time through Socket connection. In drawing, for a more natural visual expression, objects that have a paint flag turned on were drawn first, followed by lines.

The following figure is an example of freely drawing and coloring the Hangul '헐'. Hangul '헐' was chosen as the test character because many Koreans speak the character and express their feelings when they are surprised or embarrassed. Thus, this new character is likely to contain Korean social and cultural values in association with the '헐'.



(a) Thinning (b) contouring (c) matching (d) Drawing

Figure 4. Results of image processing for Hangul '헐'

3.3.2 Shape Generation

In the proposed system, gesture recognition technology [9-10] was used to realize personalized and realistic artwork. The drawing image of the viewer is reproduced based on the viewer's skeleton information obtained from Kinect [11]. The natural interface using gesture recognition technology such as Kinect has been recognized as an important factor that positively affects the satisfaction of information system usage. It is intuitive and simple to use, and the information provided is easily recognized and allows personal preference. Figure 5 shows the creation of the transformed form according to the various motions of the viewer.

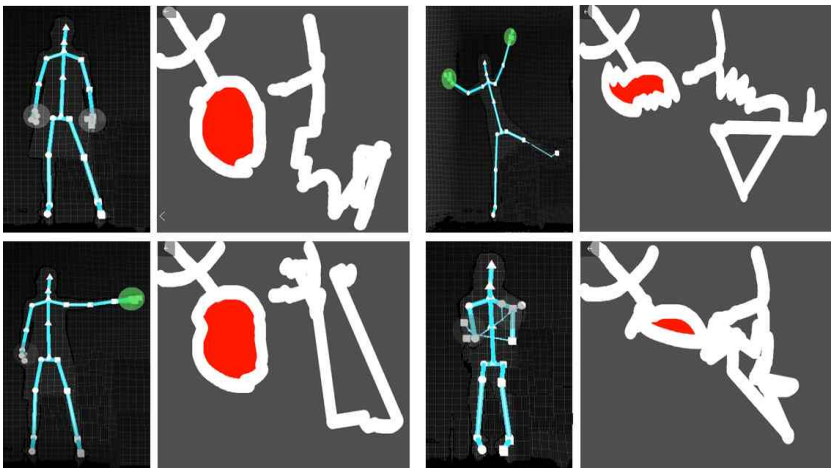


Figure 5. Hangul '헐' shapes transformed according to various gestures of the viewer

4. Conclusion & Future Work

This study is about an artwork that induce viewers' free association and imagination by providing with experiences that change the shape of characters or images drawn by using gestures. As a result of implementing dynamic character art, the viewers actively interacted and immersed in the artwork, changed the form of the

character through various gestures, fell into free association, and participated in the creation of the artwork. Free association created new meanings of character, evoking various memories and imaginations related to characters based on his background. In the future, we would like to add a process of investigating and analyzing what words are associated with lexical association experiments on the characters or images drawn by viewers. We have found from the implementation that dynamic character with various variations in color and shape can generate new meanings by extending both the external and internal meanings of the original character. In the future, we would like to further expand this research by adding a process for investigating and analyzing words related to lexical association experiments in characters or images drawn by viewers.

Acknowledgments

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