EXPERIMENT OF PROGRAM FOR DESIGNING OF THE HULA DRESSES

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Abstract - This Hawaiian culture spreads out today in Japan. In particular, the hula is high in popularity as one of the learning. On the other hand, designing dresses for the modern hula 'auana' is difficult for dancers lacking in knowledge about apparel. In this paper, we study about software for designing hula dresses, and deal with the experimental program for designing the Hawaiian dress material by using the traditional motif in Hawaii and Japan. The algorithm is implemented in the Visual Studio Community 2015 and C++ on a personal computer.

Keywords - Auana, Design, Dress, Hula, Motif, Visual Studio

I. INTRODUCTION

In recent years, sundries, clothes, gourmets, etc. with Hawaiian motifs have become routinely seen in Japan. Above all, Hawaiian dance called hula (Hawaiian: Hula) can be learned in hula class called halaau (Hawaiian: Halau) while being in Japan and is loved by people of a wide age. On the other hand, the fabrics used for hula costumes mainly use Hawaiian motifs. This is a motif designed from Hawaiian mythology and nature, and each has a meaning because it reflects the Mele (Hawaiian: Mele) which is the song and poem used in hula. These motifs used not only for costumes but also for accessories. However, most of the fabrics used in hula costumes are made in Hawaii, and there is little mass production, so it is difficult to obtain the same one even if you find a design you like. Also, although there are specialized software for creating designs individually, there are many specialized ones, so it is difficult for beginners to handle easily. Other, there is also a theory that Aloha shirts used for men's hula costumes originate from Japanese kimono. For that reason, it is used patterns such as yukata are sometimes used. Therefore, in this research, we tried to create design software for hula costumes that incorporates not only Hawaiian motifs but also Japanese patterns, and the goal of being easy for even beginners to handle.

II. BACKGROUND AND PURPOSE OF RESEARCH

A. Hula

Hula (Hawaiian: hula) is a traditional Hawaiian dance that includes all of dance, choir and singing. In Japan, hula is known as hula dance, but hula is dance, that is, it is dance and it becomes a "dance dance" if it is hula dance, so it is correct to call hula. Although there are various theories, it is thought that the origin of the present hula was transmitted with the Polynesian towards Marpuesas which has been passed from the South pacific since about 500 AD, when viewed historically. Because there was no character in the natives of Hawaii, all the history and myths are memorized by chant(chanting) called Ori (Hawaiian: Oli) and the traditional chorus called Mele (song) (Hawaiian: Mele) which has a Break at Ori. The hula wad danced in line with the chants(chanting), Meles(song) and percussion instruments. Since then, there has been a large amount of migration from Tahiti, so Hula is influenced by dances in various Polynesian regions such as Marquesas, Tahiti, Tonga, Samoa, Etc. and the strong influence of Hawaii's view of nature and religion is also combined. It is said to have developed independently as a Hawaiian dance. Later, after the discovery of the Hawaiian Islands by British James Cook (commonly known as Captain Cook) in the late 18th century, Western cultures began to enter one after another. And in the first half of the 19th century the hula dancing naked are said wild by Christian missionaries, so we could not dance publicly for about 50 years. However, King Kalakaua, who became the 7th king of the Hawaiian dynasty, succeeded in restoring the traditional Hawaiian culture, including hula, in 1874. However, it did not dance naked, and it became a style to dance elegantly to the accompaniment such as ukulele and guitar that appeared in the 19th century in a western style costume.

According to the above, hula is roughly divided into two types today. One is Kahiko (Hawaii: Kahiko), a classical hula that has long been dedicated to the gods as a religious ritual in connection with nature and faith in God and is danced in line with the chants (Fig. 1). At the beginning, there were many cases where only limited excellent men were permitted to dance in the sacred place (Heiu), but today it is possible to dance regardless of gender. On the other hand, what is generally recognized as hula dance in Japan is the modern hula, that is, Auana (Hawaiian: `Auana), which began from the age of King Kalakaua (Fig. 2). As described above, Kahiko and Auana have different origins, and the songs and dances are distinctly different, but there are many things that were originally arranged in contemporary style by putting

the melody of Auana on what was originally Kahiko's poem [2-5, 10, 12, 15, 17, 19]. In this paper, we deal with the design for Auana dancing in a European-style costume, not Kahiko dancing with natural things such as plants and shells.



Fig. 1. Kahiko [12] .



Fig. 2. Auana [12] .

B. Hawaiian motif

The Hawaiian motif is a traditional design that has been handed down from Hawaii for a long time, mainly based on Hawaiian nature. Each motif has its own meaning, and it is said that if give people the one what is designed a motif, you will entrust the feelings for them to the design. Typical motifs are hibiscus (Fig. 3), plumeria, tiare, lehua, anthurium, rose, millet, monstera, fern, palm, pineapple, taro, and other plants, Honu (sea turtle) (Fig. 4), dolphin, and there are animals such as tails of whale, waves such as snails, scrolls, and even barrels and hula dancers.



Fig. 3. Hibiscus[16] .



Fig. 4. Honu [16] .

C. Aloha shirt and Japanese pattern

Aloha shirts have a theory that they have their origin in Japanese kimono, and those who moved to Hawaii from Japan around the end of the 19th century get hints from the open-collar cotton shirt "Baccarat" worn by Hawaii Native, and it is said that the beginning was to remake the worn kimono and use it as a Baccarat well. The beautifully Japanese patterned Baccarat has a reputation in Hawaii, and is increasingly used well by local people, and "Colorful Baccarat which incorporated Japanese pattern" has since evolved as an aloha shirt. Therefore, many Japanese patterns are found in vintage aloha shirts (Fig. 5), and motifs such as salmon, goldfish and dragon are also often used [8]. Recently, Japanese patterns may have also been used for puff skirts used by hula dancers (Fig. 6).



Fig. 5. Aloha shirt[18] .



Fig. 6. Pauskirt [9] .

D. Purpose of Reseach

As mentioned above, it is difficult to obtain the same fabric for hula costumes, also it may be desirable in some cases that you want to want an original-designed fabric that suits you. In this paper, we aimed to develop design software for hula clothes, and conducted basic research on a program that allows users who are not very familiar with paint software to easily create designs using Hawaiian motifs. The target design is mainly based on the Hawaiian motif, but also incorporates the Japanese pattern that has recently begun to stand out.

III. PROGRAM AND EXECUTION RESULT

A. Program Outline

This program uses Visual Studio 2015 (C ++) [1, 13], and the costume data used in the paper uses free materials and the Sakamoto laboratory original images [8, 11, 14, 19, 20]. In this program, several kinds of Hawaiian motifs and Japanese pattern motifs are prepared in advance, and the user can draw the design of the entire hula costume by placing an arbitrary pattern on the costume type. Several kinds of type of costumes are prepared, and users can freely select from these. Costume data is expressed by overlaying images [6, 7]. When doing color editing and pattern design for costumes, it is possible to design with a high degree of freedom by making each work independent. Therefore, the costume data consists of 4 sheets of follows: the first layer PictureBox which is the lowermost layer representing the color of the fabric of the costume, the second layer for putting the pattern etc. on the whole, the third layer displaying the motif individually placed on the fabric, the fourth layer which is the top layer which shows the type of costume. Images in the second to fourth layers are image data such as bmp format, but the reason that the first layer is a PictureBox is to use the color changing function of the PictureBox itself. In addition, the use of a pen allows the user to freely draw on the clothes and fabric design to create a design of his choice, but the pen can be freely selected from among several kinds of type of thickness and color [6].

B. Development Environment

Development environment such as OS and programming language used in conducting this research is as follows.

1. OS：Microsoft Windows 8.1 Pro
2. Environment：Visual Studio Community 2015
3. Language：C++

C. Contents of the Program

1. Hula costume type selection: There are various types of hula costumes, but in this program, four types can be used: momu (Fig. 7), bear top dress (Fig. 8), camisole dress (Fig. 9), and paw skirt (Fig. 10). And in addition to the above, a type of Aloha shirt (Fig. 11) that can be used as a costume for male Auana is prepared.

In the initial screen, the costume type of the mumo is displayed as the initial state in the PictureBox, and can be changed to another type of display by operating the check of RadioButton on the same screen. It is also possible to change the costume type during pattern editing so that the design pattern of the same fabric can be compared with different costume types.



Fig. 7. Muumuu.



Fig. 8. Bare top one-piece.



Fig. 9. Camisole one-piece.



Fig. 10. Pauskirt.



Fig. 11. Aloha shirt.

2. Selection of fabric design: We prepared two types of fabric design: plain and paraca [6]. The display can be switched by changing the check of the RadioButton as well as the hula costume. Moreover, it is possible to change it at the time of pattern editing as well as the hula costume (Fig. 12).

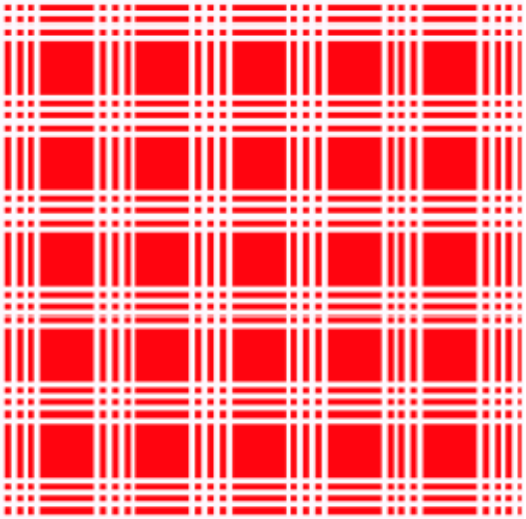

Fig. 12. Palaka check.

3. Selection of the overall pattern of the Hula costume: This time, you can choose a base pattern in the second layer so that you can add a detailed pattern to the entire base costume in advance. In addition, Japanese patterns are also included, and patterns such as blue sea waves and arrows are included (Figs. 13 and 14).



Fig. 13. Muumuu (Wave crest pattern).

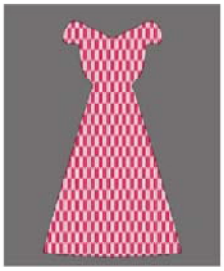

Fig. 14. Muumuu (Arrow pattern).

4. Word selection: The motifs used for hula costumes are prepared in advance, and the relationship with words is also set. When you press the motif selection button on the initial screen, another form will pop up and you can select a word (Fig. 15). Both Hawaiian and Japanese are used as notations so that users can use it even if they do not understand Hawaiian. In addition, Japanese pattern can be selected this time, and it is separated from the motif of Hawaiian language. When you select a word, the related motifs are displayed in ListView. When you double-click on the motif you want to use, DrawImage draws it on the first form PictureBox. The image to be used uses PNG format and GIF format which are file formats that can be specified transparently. This is because when the design using white, it can be displayed without breaking the motif design better than performing transparency processing in the program [6].



Fig. 15. Screen of words selection.

5. Collision judgement: In this program, move and delete motifs by mouse operation. At that time, collision detection is performed to check whether there is a motif at the position where the mouse is down. Since the motif image actually used is rectangular, collision detection using coordinate components is performed [3].

- Collision judgment using coordinate component

: Let the coordinate of the upper left corner of the image be (x_0, y_0) and the point of adding the width of the image to x_0 be X_1, y_0 be the point of adding the height of the image to y_1 and (x_0, y_0) to (x_1, y_1) This is a method to judge whether there is a coordinate specified by mouse down within the range of. The y coordinate is positive in the downward direction, and the x coordinate is positive in the right direction. Assuming that the specified coordinates are (X, Y), the collision condition is
$x_0 \leq X \leq x_1$ and $y_0 \leq Y \leq y_1$.

6. Motif placement: You can move the motif you want to move by holding the mouse cursor on it and dragging with the left click and move mouse cursor. Judgment as to whether or not there is a motif at the position where the mouse is down and determination of the motif to be moved are made by collision judgment. If there is no motif at the position where the mouse is down, a message dialog "Please select the image you want to move" is displayed. If there is a motif at the mouse down position, drag the mouse, release the button at the position you want to move, calculate the movement distance, and redraw the motif according to the movement distance.

- Calculation of movement distance：

The moving distance is from the position coordinates of the mouse when the mouse is down to the position coordinates of the mouse cursor when the mouse is up. To draw an image, specify the coordinates of the upper left corner using the DrawImage method. Therefore, it can be moved by adding the movement distance to the coordinates of the upper left corner before movement and redrawing it as the coordinates of the new upper left corner (Fig. 16). The formula for determining the arrangement of motifs by mouse dragging is shown below.

afterPoint = currentPoint +
(m_EndPoint-m_StartPoint)

- CurrentPoint: upper left corner coordinates before movement
- AfterPoint: upper left corner coordinates after movement
- M_StartPoint: Position coordinates of mouse when mouse down
- M_EndPoint: Position coordinates of mouse when mouse is up

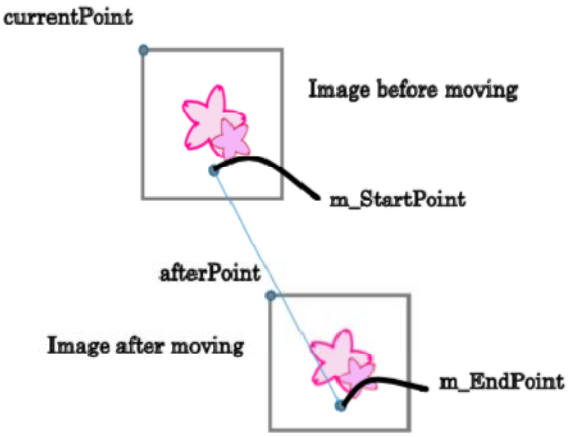

Fig. 16. Screen image.

7. Delete motif:Motif deletion is performed with the right click of the mouse. Similar to the arrangement of motifs, collision judgment is used to judge whether there is a motif at the position where the mouse is down or not and delete or not. If there is no motif at the position where the mouse is down, a message dialog "Please select the image you want to delete" is displayed.If a motif is present, the target motif is deleted.

8. Changing the color of the costume:The color of the costume can be changed by manipulating the color of the PictureBox. Pressing the Change Color button launches the color dialog box, and selecting a color allows the user to determine the color of the costume. In addition to the basic 48 colors, it is possible to select a color created by the user.

9. Free drawing by mouse: Not only motif movement but also free lines can be drawn by pressing the pen button [6]. As a method of drawing a free line, the method of drawing an infinite number of thin straight lines at the place specified by the mouse is adopted. To do this, you need to draw a straight line on the Picture Box. Every time the mouse moved, I drew a short straight line from where the mouse cursor was originally to where it moved and drew it to look like a curve.

- Line color change

Add the specified color to the free line by changing the check of the RadioButton in the area of the line color in the initial screen. In this program, a total of five colors, black, red, green, white and blue, were prepared (Fig. 17). The default color is black [6].



Fig. 17. Color of line.

- Line thickness change

By changing the check of the RadioButton as well as changing the color of the line, the thickness of the free line can be changed, and three sizes of large, medium, and small can be selected [6]. The initial thickness is small (Fig. 18.



Fig. 18. Line weight.

D. Execution result

This time, I adopted Japanese pattern and total pattern, so I used them to design. For example, we present Aloha shirts using Mu-mu and Japanese-style motifs with full patterns (Figures 19 and 20).



Fig. 19. Design of muumuu.



Fig. 20. Design of aloha shirt.

IV. CONSIDERATION

In this program, there are functions that will be necessary at the very least for costume design, and it can be easily operated with a mouse, so it is easy for beginners to use and can try out various combinations of motifs and colors. In addition, in this program, costumes using Japanese patterns are also made in Japan, so the Japanese patterns are examined, simple patterns are added, and a slightly different design can be enjoyed. Japanese patterns are similar to flowers and rhomboids, such as Hawaiian-like geometric patterns and hibiscus and other flower patterns, and their color and shape are similar, so I think that depending on the combination, the design using both patterns should be wonderful. And, as a function that could not be added to the convenience of the time this time, there is a function to scale the work screen and a function to save the finished design. When adding the scaling function, it becomes a problem how to handle jaggies in stretching of the motif at the time of enlargement, and I thought that it would be better to save the image with using in the vector system, I could not find a way to save as vector method when creating it. When adding the scaling function, it becomes a problem how to handle jaggies in stretching of the motif at the time of enlargement, and I thought that it would be better to save the image with using in the vector system, I could not find a way to save as vector method when I had been creating it. Since it was found that it would be difficult for this program to display the image superimposed on the current PictureBox if it is difficult to use the storage function, I think that a method not using PictureBox should be considered. We will continue to improve the program in the future, and we want to make it a program that can be used as it is for general users and has a high degree of freedom.

V. CONCLUSION

In this research, we conducted basic research on hula costume design that even beginners can easily handle, and tried a design program. Especially this time, we added a function to select Japanese pattern motifs and

total patterns [6].However, there are parts that seem to be still insufficient to make designs more freely. Also, the method of select overall pattern is the same as the costume type, but if the number increases, I think that it may be better to switch to the method using ImageList or ListView as in the case of motif selection. Furthermore, I thought C # was considered easier to handle while examining the code example when adding a function, so it might be better to rewrite it in C # or to use it partially. Finally, it is hoped that this research will lead to the development and spread of hula in Japan.

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