A Research on Character's Facial Expression in Anime Production

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ABSTRACT

As we know, it is very important to produce a distinctive character in animation industry. The character's facial expression plays an important role in reflecting characteristics of characters. However, it depends on the designers' own talents and efforts to design creative expression of the characters. We hope to improve the work efficiency in the preliminary meeting between the producers or directors and designers. The purpose of this research is to propose a support system for generating anime characters' facial expressions more efficiently. A tool named "Expression Scrapbook" is developed based on 6 basic emotions. First, the characters' expressions in an existing animation are divided into groups of 6 basic emotions. Then, the similarities and differences of the face parts are analyzed to find out the average feature point. The average facial types are proposed in every group based on the results of that analysis.

Keywords: animation, characters' facial expression, 6 basic emotions, scrapbook

1. INTRODUCTION

Recently, the anime industry in Japan is acclaimed throughout the world. Everyone knows that character design is vital in visual contents as well as scripts. Especially when character design is concerned, character expressions becomes crucial to produce a good animation. Expression plays an important role to convey the character's uniqueness and appeals.

In animation industry, characters' facial expression collection sheet plays an important role in production process[1]. Designer designs a character based only on literal references written by a director or a producer. However, without any images, communication gap often arises between the designer and director. Therefore, to solve this problem, the director needs to create a design proposal. To create a design proposal, the director needs to draw the character. But if the director has no experience in drawing characters, this will create another problem.

The purpose of this research is to propose a sample to support the production of characters' facial expression collection sheet. The target user is producer or director who lacks skill on painting.

2. PREVIOUS RESEARCH

Research about facial movements to express human emotions is investigated. In the previous studies, the 6 basic emotions are defined as "anger" "happiness" "disgust" "sadness" "fear" and "surprise" which combine the human emotion and facial expression[2].

The cause that triggers emotion differs by culture. But the facial expression representing the emotion is universal.

Fig. 1: "happiness", "sadness", "surprise", "anger", "Fear" and "disgust"

Analysis on the muscles of facial expression is conducted. There are 26 muscles to move the face, but only 11 for facial expression[3]. There are 4 muscles for eye and eyebrow, and 7 for mouth. As a result, analysis is done on the facial expressions by three parts of the face which are separated into "eyebrow" "eye" and "mouth".

3. ANALYSIS OF CHARACTER FACIAL EXPRESSION

First, a number of characters' facial expressions in existing animation are collected according to 6 basic emotions. Then, analysis is done according to parts of the face. Next, the images are categorized based on the similarities. Finally, pattern of facial expression are determined and they are used to propose a registration method which plays an important role in developing the "expression scrapbook".

Different facial expressions of the same character are divided into six groups by 6 basic emotions. In each group they were further classified by the strength of character emotions. For example, there are few kinds of smiling type in "happy" emotion. There is a big difference in expression of the eyebrows. A number of facial expressions are analyzed according to 6 basic emotions as the Fig.3.The facial expression patterns found according to the strength of each emotion are helpful in registering the facial expression.
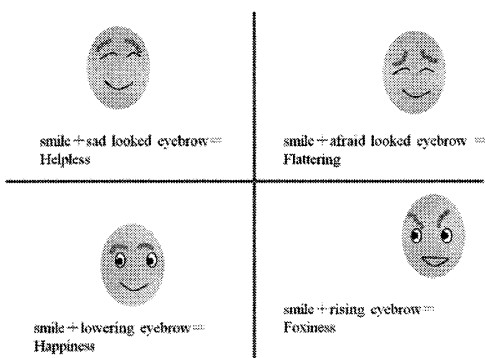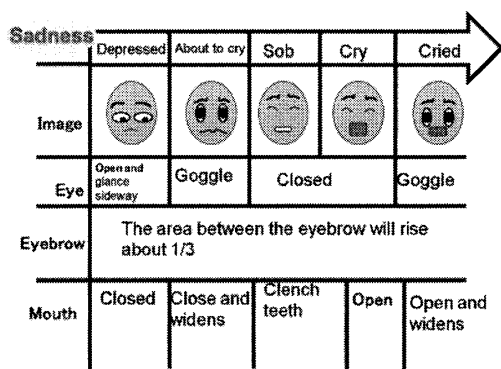
Fig. 2: Types of Facial Expression for Happiness

Sadness	Depressed	About to cry	Sob	Cry	Cried
Image					
Eye	Open and glance sideway	Goggle	Closed		Goggle
Eyebrow	The area between the eyebrow will rise about 1/3				
Mouth	Closed	Close and widens	Clench teeth	Open	Open and widens

Fig. 3:   Types of Sadness

4.   EXPRESSION SCRAPBOOK

4.1   Outline

Initially, using the system, users need to register the characters' facial expressions according to the 6 basic emotions. Two kinds of information are needed to register. One is the "emotion index" which is up to the user's own sense. The other is the literal information of characters.

Then, users can find their favorite images of facial expression by querying the name and "emotion index" of the characters.

Users can register and query the facial expression data using "expression scrapbook" as shown in figure 4.
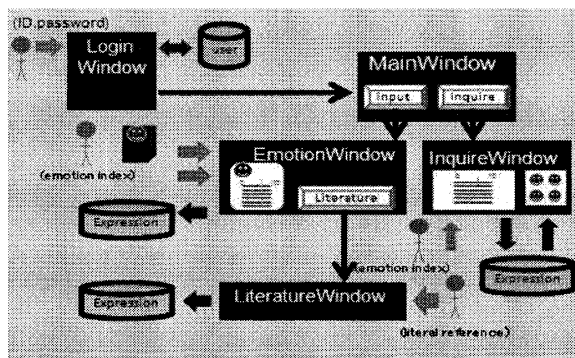

Fig. 4: System Structure

4.2   Interface

The literal information of character such as the name of character and anime can be entered within the red line. And the "emotion index" can be registered by adjusting the scroll bars as Fig.5.
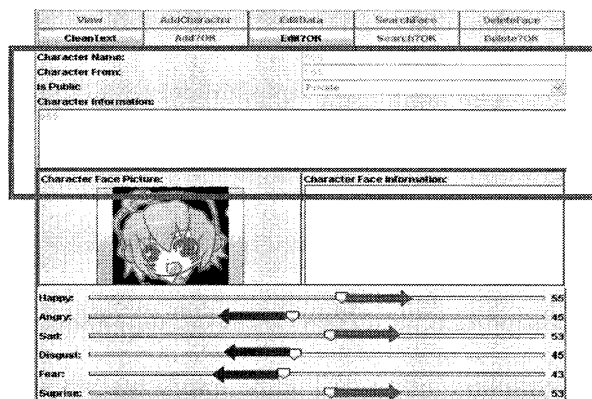

Fig. 5:Expression Parameters

5.   SUMMARY

A support system to generate anime character facial expression during pre-production character design phase is developed.

Character's facial expressions were collected and analyzed based on 6 basic emotions to look for common rule. Then, analysis of a complex expression according to the face parts which are key points of expression were also carried out. As a result, it is necessary to use the emotional information to manage the facial expressions. Therefore, the "expression scrapbook" is developed. The "expression scrapbook" is a support system used by a director or producer to manage the character's facial expressions easily.

In this research, expression scrapbook to manage characters' facial expressions is developed. In the future, support system which has the function to automatically generate or modify facial expressions is considered.

REFERENCES

[1] Kaneko M .,*The Making of Visual Content* (『映像コンテンツの作り方』),Born Digital,Inc., Tokyo,2007

[2] Ekman,Paul;Friesen,Wallace V.,*UNMASKING THE FACE*, Malor Books, Los Alto, 2003.

[3]ANATOMICAL BASIS OF FACIAL EXPRESSION LEARNING TOOL(ARTANTOMY) © 2005 Victoria Contreras Flores