

DESIGNING EMOTION OF CHARACTERS BY REFERENCING FROM FACS IN SHORT ANIMATED FILM “RANA”

Fransisca Adis¹
Yohanes Merci Widiastomo²

Abstract: Facial expression is one of some aspects that can deliver story and character's emotion in 3D animation. To achieve that, we need to plan the character facial from very beginning of the production. At early stage, the character designer need to think about the expression after they done the character design. Rigger need to create a flexible rigging to achieve the design. Animator can get the clear picture how they animate the facial. Facial Action Coding System (FACS) that originally developed by Carl-Herman Hjortsjo and adopted by Paul Ekman and Wallace V. can be used to identify emotion in a person generally. This paper is going to explain how the Writer use FACS to help designing the facial expression in 3D characters. FACS will be used to determine the basic characteristic of basic shapes of the face when show emotions, while compare with actual face reference.

Keywords: animation, facial expression, non-dialog

Introduction

Since the dawn of man, human tried to communicate to other human, for example we can see many cave paintings to tell the story to their child, and to their grandchild, and so on as indirect communication. The basic form of indirect communication is facial expression. This kind of communication is hard to be falsified because it's connected to our extrapyramidal system which causing involuntarily action.

Non-dialog animated film use various elements for communicate or express the

mood and point of story. Facial

expression is one of the key that non-dialog animated film can deliver its messages. When we talk about character's expression, there is a theory that every film director must understand very deeply, which is called Three Dimensional Character. Three Dimensional Character which is consists the description of physical aspect, sociology aspect and psychological aspect of a character that can affect the way a character react to external stimuli and how they express the emotions that occur within the character itself.

¹Fransisca Adis adalah alumni peminatan animasi, program studi Televisi dan Film

e-mail: fransisca.religita@gmail.com

²Yohanes Merci Widiastomo adalah pengajar tetap di peminatan animasi, Program Studi Televisi dan Film, Universitas Multimedia Nusantara

e-mail: yohanes.merci@umn.ac.id

"RaNa" is a non dialog short animated film. It will rely in facial expression of each characters to deliver the message to the audience. To achieve that, the writers using FACS to help the character make a good expression in this movie.

"RaNa" is a collaborative project which done by a group consist of 5. Each person has specific research. In this paper only discuss about how the Writers use FACS to help 3D rigging visualizing the emotion on each characters.

Facial Expression in Animation

"Eye is the window of a soul". This proverb explain why facial expression is complicated and crucial to animation. In our face, there are a lot of movement happen in the same time. Sometimes we can see the expression very clearly, and sometimes don't. Facial expressions can tell us many things in many occasions. For example, we can know whether the person is angry or sad, whether he/she is feeling happy or feeling disgust without telling it to us. Besides that, it also can convey how the character will react when he/she face something in the story. These are the reason why facial expression is a complicated aspect when it comes to character animation.

There is many research about facial expression. Titled *Mecanisme de la physionimie humaine* (Mechanism of Human Physiognomy) by Guillaume (1862) is one of oldest research of human facial expression. The writer of this research, De Boulogne (1990) wanted to know how facial expression be affected by a soul of man through muscle contraction.

Many years later, human still trying to study the expression of his own face. Ekman comes with framework how to analyze the expression. He invented Facial Action Coding System (FACS) that contain every detail of facial movement. This system helps many researchers to read micro expression (the expression that less obvious) that occur on human face. Tian and Kanade (2001) using FACS to capture human emotion by creating AFA (Automated Face Analysis). They said, FACS is considered the best foundation for recognizing facial expression.

According to Fast Company (2002), Toy Story is the first feature animation that using FACS as the foundation of character's expression. After that, Ekman also advised other Disney and Dreamworks film for cast members on acting to scripted facial expressions. These facts show that today we have good foundation to create designed expression.

Relation between Expression and Emotion

Every person is unique, different race, different gender, different habit, and so many things that show us unique. That is why we need to express our self to others. According to Roberts (2012), hu-



Fig.1 Eight Basic Expression (Roberts, 2012)

man face can show approximately 5000 different universal expressions divided by 8 basic emotions, happiness, sadness, surprise, fear, angry, disgust, excitement, and pain.

Plutchik (2001) created wheel of emotion based on his research. By placing

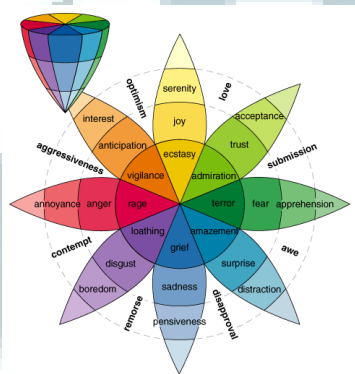


Fig.2 Wheel of Emotion (Plutchik, 2012)

similar emotion close together and the opposite 180 degrees apart, just like complementary color wheels. He also extended his model into 3 dimension, the result is cone shape model describe the depth of emotion itself.

Understanding the Characters

The Writer use 3Dimensional characters as an approach to each character in this short and make the character is more believable to the audience. With this method, the Writers must define the physiology, the psychology, and the sociology of a character. As a result, the Writers will get the motivation of character when he/she do something. And then the Writer also get the emotion of character when he/she do it, and consequences that he/she get.

Basically, Rangga and Anna have sim-

ilarities, which is shy. They have been bullied by their friends in school. They want to tell someone, but they are too shy for it. All they can do is crying and crying without anyone know about it.

Understanding the Character: Anna

Anna is a 16-year-old girl that live in Brooklyn, United States. She is very smart and come from a wealthy family. She always be the number one in her school. However, in her social life, Anna is a shy girl that cannot socialize well with her community. Her college sees Anna as an arrogant person that won't share or play with other friends. Some-



Fig.2 Wheel of Emotion (Plutchik, 2012)

times this event leads to bullying. Anna is Anna live in 1950. Her appearance will be referring to that time which using, long sleeve, skirt, and classic Oxford shoes which is a common appearance for student at that time.

Understanding the Character: Rangga

Rangga is a 17-year-old boy that live in Jogjakarta. He is not smart as Anna,



Fig.4 Character Rangga Concept (drawn by Aybi F.)



Fig.5 Anna and Rangga Concept (by Aybi F.)

but his appearance looks different from his friend. He always uses black leather jacket over his school uniform and wear earing on his right ear. Same like Anna, he cannot communicate well with other. From his friend POV, Rangga seems like have his own world, doesn't talk much and share much. Some of his friends

afraid of him, others sneered at him.

Production Process

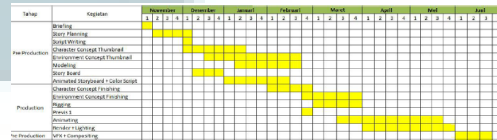


Fig.6 Project Timeline

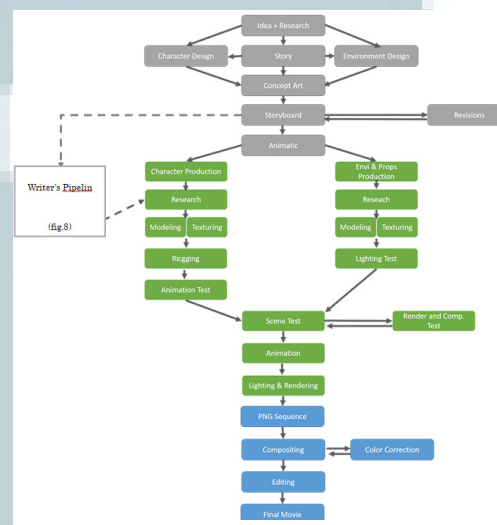


Fig.7 Project Pipeline

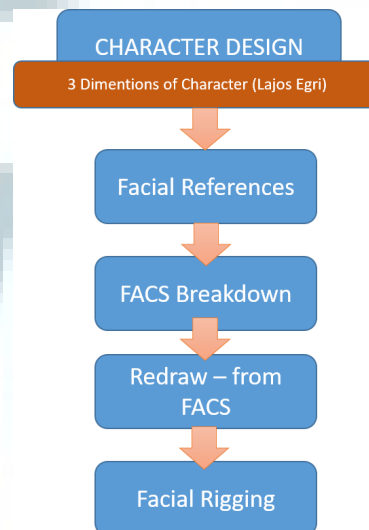


Fig.8 Writers Pipeline

Timeline and Pipeline Production

The production of "RaNa" started in 2016 between February until June 2016. However, the pre-production process has begun from December 2015. The entire timeline and the research pipeline can be seen in timetable below.

Facial Breakdown

Before the asset production began, the writers with team members evaluate

Table.1 The Expression List (example)

Shot	cast	Expression Details
3	Anna	Her normal face expression
5	Rangga	His normal face expression
8	Anna, Rangga	Anna's face is kind of afraid (anxious), because she doesn't want to meet her bullies ----- Rangga's face is at normal state but his eyes are sharp
11	Anna	Start with anxious face, then turn into scared face (terror) when meet her bullies Focus into her eyes because she will cover half of her face with her book.
12	Rangga	Start with normal face, then turn into sternness face when the bullies come.
13	Anna	Still with scared face (focus at her eyes)
14, 15	Anna	Anxious face, her book doesn't cover her face
16	Anna	Face full of worries, focus on her eyes
20	Anna	Start with her worries face, then turn into surprise, because her own worried face
21	Anna	Slowly turn into normal face, slightly smile, trying to calm down
22	Rangga	Start with sternness face
23	Rangga	Close up to his lips, He smirks, trying to get grip of his emotions
24	Rangga	Smile, finally calm down
26	Rangga	Turn into sternness face again because someone bumped him

the progress that the team achieve in pre-production phase. First the Writers analyze and discuss the storyboard with the director and storyboard artist to eliminate multi interpretation among group members. The duration of "RaNa" is around 5 minutes that consist of 80 shots total and 42 shots that reveal character's facial expression. The writers break down each shot and what expression the character should be shown in each shot.

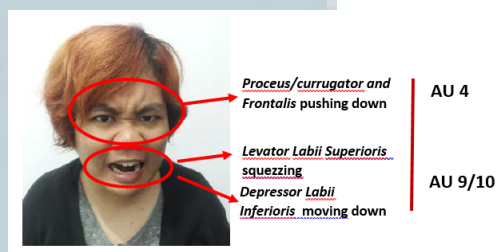


Fig.9 Expression Breakdown

Facial Expression on Characters

the Writer used human facial for the references and redraw the expressions to get clear reading of facial shape of an expression. This research will be limited

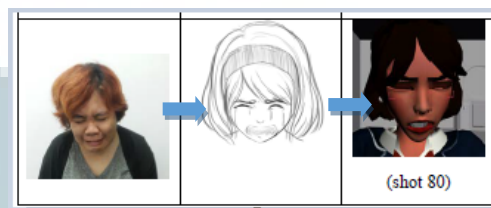


Fig.10 Expression Redraw

only for 3 basic emotions that the Writer refer to wheel of emotions by Plutchik (2001) and Robert (2012), angry, sad, and fear which is based on the Expression List that writers made before.

After analyzing every facial reference

that writers got, next step is to applied the expression to the character by draw a character facial with the expression to visualize before the writers gave it to rigger whom charged to design the facial rigging for the characters.

The writers also create a guideline for animator about facial expression that character will achieved in shots. Based on Wheel of Emotion described by Plutchik (2001), the Writer create 2 level of emotion, the first one is the lowest level of emotion e.g. pensive-

ness, apprehension, and annoyance. After that the Writer make the high level of emotion e.g. grief, terror, and rage. Based on this guideline, animators given a little flexibility to adjust each expression based on shots that they working on.

Writers use FACS database from FACS table that revised by Paul Ekman, the Writer divide into 2 facial areas, the upper and lower area. Upper area is the area around the eyes, that consists of forehead, eyebrows, and eye. Lower area are lips, chin, and cheeks.

Here is an example how the writer analyzed the facial reference. Each expression is demonstrated by Fransisca that being triggered by some certain stimuli that artificially created.

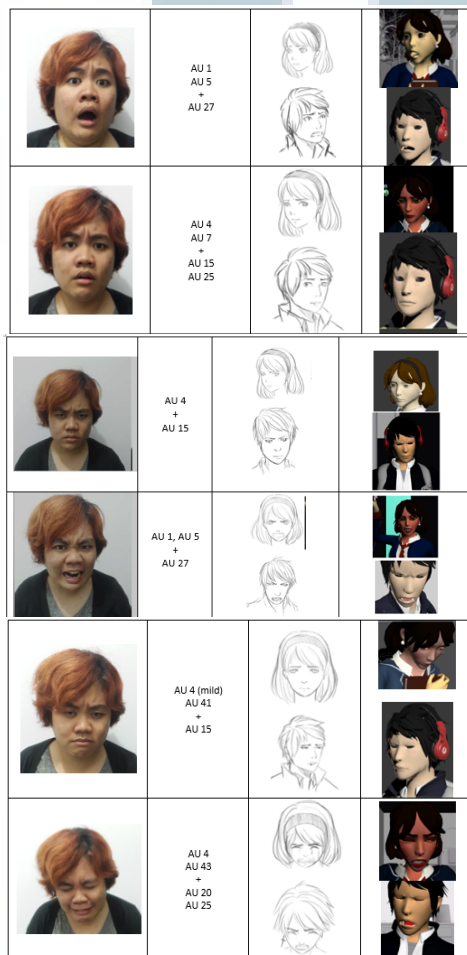


Fig.11 Expression to 3D model Chart (fear, sad, angry)

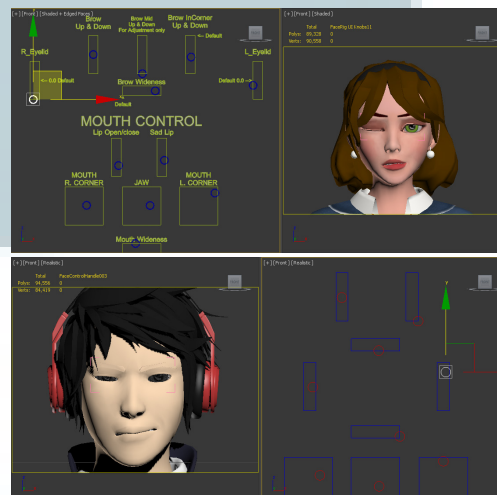


Fig.12 Facial Expression of Anna and Rangga in 3D Model

Facial Rig

The facial rig for the 3D model was created based on the data that the Writers collected from previous process. The character expression should be made as flexible but as simple as possible to replicate human expression. The rigger given

flexibility to choose the way how the character should be rigged. The rigger divides the facial controller in 5 parts, which are eyebrows, eyelids, cheeks, mouth area (lips and tongue), and jaw.

Result

The production of "RaNa" animated short was completed in the beginning of June 2016. The short duration is 5 minute and 12 seconds. "RaNa" first screening is in the second write's thesis defense in front of the lecturers in 29 June 2016 and the second screening held in August 2016 in campus auditorium. These screening gave team had some feedback related to the movie and especially for the animation. Overall the audiences get the message of this animated short, but we need work harder to increase the quality of the animation to increase cinematic aspects of our short.

Conclusion

This research has helped writers understand how important is character expression in animated short, especially in non-dialog animation. Each character must tell their feeling or what they wanted using expression. In conclusion, this study shows several points.

First, in production team, this process will help the rigger when designing the facial rig for characters. It will give the clear picture which part of the face will be moving and how it will be moving. Of course, rigger can add more rig and facial controller to achieve the flexibility that production wanted, but this method will give the minimum standards for it.

Second, this method will help the animators when it comes to animation process. Because FACS is a detail description

of facial movement, animators can use it as an additional reference that support real facial reference that animator achieve when they do acting for character.

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