

The Exploring of Squash and Stretch in 3D Animated Short Film in Malaysia

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Abstract: Squash and stretch is the first and most fundamental of the 12 principles of animation. Although, there is a lot of 3D animated short film in animation industry in Malaysia there are some 3D animation that lack of using the principle of squash and stretch especially in character movement and facial expression. The aim of this research is to study of fundamental and advantages of squash and stretch. This study will focus on explore ways to implicate the principle of squash and stretch in 3D animated short film. Therefore, this principle of squash and stretch will allows to distort a shape to properly convey the impression of the forces action upon it and give more animated character look more lively.

Key words: 3D animation, squash and stretch, character design, shape, properly convey, animated character

INTRODUCTION

Animation is a type of optical illusion, it is the process by which we see still pictures move. It involve the appearance of motion cause by displaying still images one after another at the rate of 24 frame per second. According to Ghani and Ishak (2012), Animation can be defined as a motion picture made by photographing successive positions of inanimate objects (such as puppets or mechanical parts) or an animated cartoon or film made from a series of drawings simulating motion by means of slight progressive changes (Ghani and Ishak, 2012).

There are three types of animation is 3D animation, 2D animation and stop motion animation. The 3D animation, also referred to as CGI animation is made by generating images using computer graphic that create series of images that form an animation. Software that to produce the 3D animation is Autodesk Maya, Autodesk 3DS Max, Zbrush, etc. The term "2D" refers to animation that created using two dimensional drawings. Classic hand drawn animation is the main example for this type of animation. Example of 2D animation is Steamboat Willie, Mickey Mouse and Snow White and 7 Dwarf. Famous software that animator using for producing 2D animation is Toon Boom, Adobe Flash, Anime Studio. Stop motion animation can be referred to any animations that uses object that are photographed in sequences to created animated action. The process of Stop motion animation is very long as object has to be carefully moved inch by inch while photographing every change to create a fluid sequence on animation. In stop motion have 6 different

style of stop motion animation. Example, claymation, puppets, cut-out, silhouette, action figures/lego and pixelation.

The 12 principle of animation is principle animation that should be in an animation because this 12 principle of animation is an indicator for the animator to producing a quality of animation. This 12 principles of Animation were first publicized by Frank Thomas and Ollie Johnston in their book "The Illusion of Life". This 12 principle of Animation were developed by the 'old men' of Walt Disney Studios, among them is Frank Thomas and Ollie Johnston during 1930. These principle came as a desire to devise a way of animating that seems more real in term of how things moved and how that movement might be used to express character and personality. This is the 12 principle of animation, stretch and squash, anticipation, staging, straight ahead and pose to pose, follow through and overlapping action, slow in and slow out, arch, secondary action, timing, exaggeration, solid drawing and appeal.

This research focus on the principle of squash and stretch that the number one principle in list of 12 principles of animation at the book of the illusion of life. This squash and stretch is very important to make the movement and facial of character look more lively. Squash and stretch is very important in facial animation not only for showing the flexibility of the flesh and muscle but also for showing the relationship of between the parts of the face (Lasseter, 1987). The aim of this study is to study of fundamental and advantages of squash and stretch . This research need a ways how 3D animation in Malaysia to implicate the principle of squash and stretch in 3D animated short film.



Fig. 1: Facial expression of Ali in Ejen Ali



Fig. 2: Facial expression of Ying in Boboiboy

My conclusion is in animation 12 principle of animation is very importance for the animator to know. This principle will guides how to produces the good animation. In Malaysia still lack of understanding the use of squash and stretch in 3D animated short film. In this research will focus on study the fundamental and advantages implicate the squash and stretch in 3D animated short film in Malaysia.

Literature review

Squash and stretch in facial expression: The most important principle is called squash and stretch. When an object is moved, the movement emphasizes any rigidity in the object. In real life, only the most rigid shapes (such as chairs, dishes and pans) remain so, during motion. Anything composed of living flesh no matter how bony will show considerable movement in its shape during action. For example when a bent arm with swelling biceps straightens out, only the long sinews are apparent (Lasseter, 1987). We realize a 3D face animation system that can generate realistic facial animation with realistic expression details and can apply in different 3D model similar with human (Sun and Ge, 2014).

In Ejen Ali 3D animated short film most the facial expression is have the squash and stretch but its not enough to give impact to the audiens with a simple squash and stretch in the facial expression. For example, from the Fig. 1 show that Ali show shocked expression with more squash and stretch at the expression, expression will give more impact on acting and appeal to the character.

In Boboiboy animated short film the facial expression same as the Ejen Ali facial expression. They don't emphasis the principle of squash and stretch in their facial expression. A good facial expression must have a squash and stretch and the an element of exaggerate to give more lively to the character facial expression. Facial expression very important in an animation because facial expression makes the animated character more appealing. If the animator do not express it properly it is not possible to bring life to the character (Fig. 2).

This Didi and Friends animated short film a bit different between Ejen Ali and Boboiboy because in Didi



Fig. 3: Facial expression in Didi Friends



Fig. 4: Character movement in Ejen Ali

and Friends does not have a principle squash and stretch applying at the facial expression. Most of facial expression in Didi and Friends animated short film not using the squash and stretch and the facial does not showing the flexibility of the flesh and muscle also not showing the relationship between parts of the face (Fig. 3).

Squash and stretch in character movement: Squash and stretch is not just limited to the deformation of organic bodies. Its basic concept carries on to all forms os posing and motion. Squash and stretch very importance in character movement its give flexibility and emphasizes any rigidity in the object (Fig. 4).

From Ejen Ali animated short film the movement seem constant and doest not have flexibility in the movement.



Fig. 5: Character movement in Boboiboy



Fig. 6: Character movement in Didi and Friends

Without the principle of squash and stretch in the movement it will not give enough action from the character to move with exaggerated to show the anticipation in the movement (Fig. 5).

From the movement of boboiboy its show the understanding of using principle of squash and stretch still lack in 3D animated short film in Malaysia. The squash and stretch very importance in character movement to give character more the cartoon look in their movement and give the character more lively when the character move. According to Lee, we can assume that the squash and stretch rule does not refer to the movement of an individual joint, but the movement of the whole body of the object.

From Fig. 6 there do not have the principle squash and stretch in Didi and Friends animated short film. The character look static and do not have enough to show the happy movement because the character do not have the flexibility of the body to allow the squah and stretch. When there no squash and stretch, difficult to achive the mood of character movement in something scene. It cannot give the audiens satisfaction.

In this research the conclusion is this research will focus explore the ways to implicate the squash and stretch in 3D animated short film and to study the fundamental and adavantages of principle squash and stretch. This principle very importance in 3D animation because its give the character look more lively and show the cartoon look in the animation.

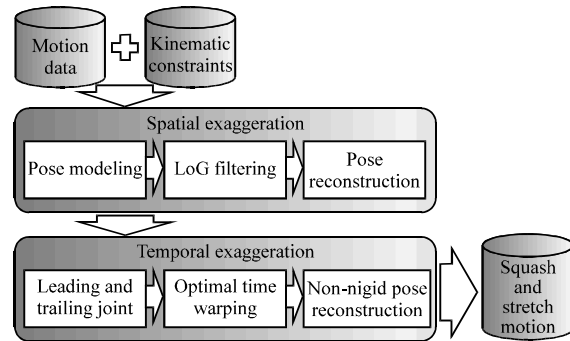


Fig. 7: Model structure for developing the squash and stretch stylization for character motion:

MATERIALS AND METHODS

In this study clearly defines the research method used to conduct the research paper. This study I will explain how the necessary data and information to address the research objective and analysed. Method that used in this paper is observation, visual research, anlysis, data comparative, primary/secondary method and last in discussion.

Research design: This research utilized descriptive correlational method. It describe the exploring the squash and stretch in 3D animated short film in Malaysia. Determine the advantages implicate the squash and stretch in 3D animation in Malaysia.

The model structure for developing the squash and stretch stylization for character motions: Refers to Fig. 7, there are 3 step in this model, from creating the motion data and lastly existing the squash and stretch motion. For this model the first step to make the squash and stretch is they start with the collect the motion data and make the kinetic constraints form the 3D software. Kinematic constraints are constraints between rigid bodies that result in the decrease of the degrees of freedom of rigid body system.

The second step for this model structure is making spatial exaggeration. In this phase the researcher is make the pose modelling, loG filtering and poses reconstruction. The joint angle representation that is generally used in character animation is not suitable to describe the global shape of a character pose. That why the researcher make the pose modelling to correct the pose. Pose modelling in this phase is to set of joint angles for the local coordinates of each joint, we have to compute the world position of each joint by using

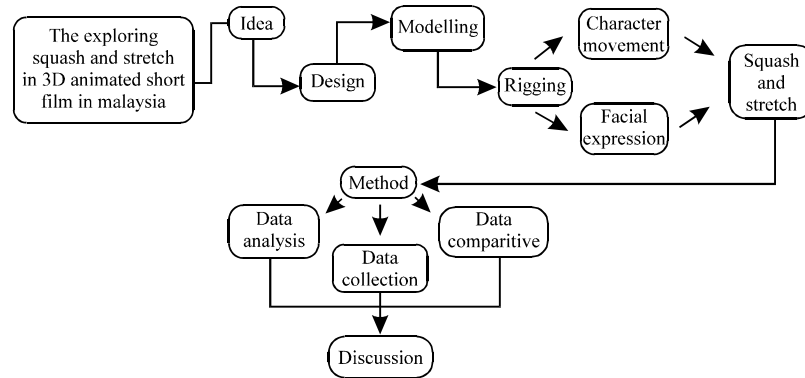


Fig. 8: Research structure for the exploring squash and stretch in 3D animated short film in Malaysia



Fig. 9: Character movement by Ali (2017)

the forward kinematics technique, so that, mapping from the joint configuration to the global shape of the pose in world space is not intuitive.

LoG filtering in this phase is in order to apply the squash and stretch effect to the character pose. The researcher inverted LoG filter produces a desired anticipation and follow through movement for a given object motion. Likewise in this case, it produces appropriate squashing and stretching poses for a given sequence of poses. For the pose reconstruction is the research give the character to exaggeration to the joint, easier to make the squash and stretch to the bone.

In phase of temporal exaggeration, the researcher make the bone to easier to flexsibel and non rigid. In this study all the process to make the character have the smooth squash and stretch and the bone can squash and stretch properly. Finally, the researcher achieve the squash and stretch motion in the research.

I uses this research model as my reference for my research because this research model have same goal. I want to exploring the squash and stretch in 3D animated short film in Malaysia so it related with my research.

According to Fig. 8, this is research structure is my research method that I using for the exploring the squash and stretch in 3D animated short film in Malaysia. The crucial part for this research method is at the part of rigging, facial expression and character movement. At this phase required the research much time to make the observation and data analysis to make the squash and

stretch applied to the animation. The rigging part play the important role for creating the squash and stretch because to apply squash and stretch start with the rigging part. For the research method, researcher using three important method, data analysis, data collection and lastly data comparative.

Data collection: For this data collection researcher use observation method for the main method for this research paper. All data from the observation have been recorded by researcher, researcher using Youtube channel as method to make the observation. Animated short film that researcher use for this research paper is Boboiboy from Animonsta Studio, Ejen Ali from Wau Animation and lastly Didi and Friend from Digital Durian. This animation is the famous animation in Malaysia that why researcher choose this three animation for the research paper and researcher want to see how far the using of principle of squash and stretch in their animation because the principle of squash and stretch is lauded as the most important principle in the art of animation (Roberts and Mallett, 2013). For the data collection research make two observation based on two main factor in principle squash and stretch. First is squash and stretch in character movement and second is squash and stretch in character facial expression.

Character movement: According to Fig. 9, this character movement researcher take from the observation form the

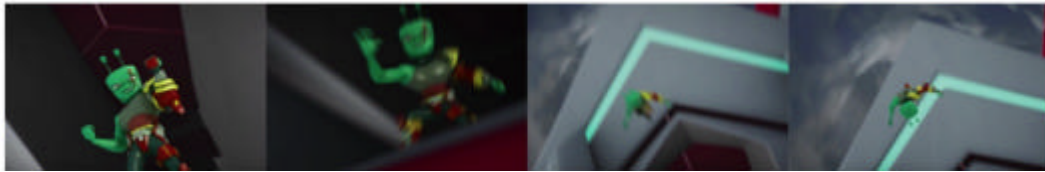


Fig. 10: Character movement in Boboiboy: Monsta (2016)



Fig. 11: Character movement in Didi and Friends: Anonymous (2017a, b)



Fig. 12: Character facial expression by Ali (2017)

Ejen Ali animated short film. What can researcher observe is the character have the basic movement in their animation. They don't use the principle of exaggeration on their animation form the observation Ejen Ali animated short film only use the basic squash and stretch in their animation. Not many their animation use the exaggeration to make the character squash and stretch. One factor that make the character can squash and stretch is applying the principle exaggeration on the movement with the basic squash and stretch in their animation it can produce the good animation but with the squash and stretch in the character movement in can give more impact on the character movement.

According to Fig. 10, this shot is take from the Boboiboy animated short film. From this Boboiboy animated short film what can researcher can observe is same goes to the Ejen Ali animated short film they use the basic principle of squash and stretch in this Boboiboy animated short film. This squash and stretch is important to make the animation is more look interesting with the cartoon style. According to Marcos *et al.* (2007) in particular squash and stretch is a strategy often used by traditional animators to emphasize key movements, create

ad hoc, yet believable, motions and in general, to make motions more interesting. According to Fig. 11, this shot frame by frame take it from the famous children animation in Malaysia, Didi and Friends from Digital Durian. From researcher observation, Didi and friends animated short film don't have the principle squash and stretch in their animation. Didi and Friends just applying basic movement on their animation their don't use the squash and stretch in their animation. We know that principle of squash and stretch is the important principle in 12 principle of animation and number one principle on the hierarchy of 12 principle of animation but on Didi and Friends animated film their don't use the squash and stretch on their movement. According to Roberts and Mallett (2013), squash and stretch is lauded as the most important principle in the art of animation.

Character facial expression: According to Fig. 12, this shot show the facial expression from Ejen Ali animated short film. From the researcher observation same with the character movement only basic squash and stretch their apply to the character expression. We can see the



Fig. 13: Charater facial expression in Boboiboy: Monsta (2016)



Fig. 14: Character facial expression in Didi and Friends: Anonymous (2017)

movement of face and mouth on the character can move less and the movement of face and mouth is limited. It difficult to express more the expression with impact. Facial expression can be more interesting and give more impact to the expression when the face and mouth can squash and stretch exaggerate.

According to Fig. 13, this character facial expression from boboiboy animated short film. From the Fig. 13, we can see Boboiboy also use the same basic squash and stretch in their character facial expression. With the basic squash and stretch applying to the character facial expression, researcher can see the facial expression cannot give more expression on their emotion. The impact of emotion on audiens is not enough with the using of squah and stretch on character facial expression it can give the movement of face and mouth exaggerate and can give more emotion to the expression.

According to Fig. 14, this is character facial expression from Didi and friends animated short film. From the researcher observation on this Didi and friends there don't have facial expression on his caracter. Most of their character don't have the facial expression. Didi and Friends use the movement of eyes and mouth to show the emotion. The movement of mouth on his character do not enough to show the emotion with the move of mouth up and down only. According to Lasseter (1987), squash and stretch is very important in facial animation, not only for showing the flexibility of the flesh and muscle but also for showing the relationship of between the parts of the face.

RESULTS AND DICUSSION

Data analysis: For data analysis, researcher make a table for the three animated short film in Malaysia, Ejen Ali from

Table 1: The using of squash and stretch in animated short film in Malaysia

| Animation title | Squash and Stretch | |
|------------------|--------------------|-----------------------------|
| | Character movement | Character facial expression |
| Ejen Ali | ● | ● |
| Boboiboy | ● | ● |
| Didi and Friends | ✕ | ✕ |

Wau Animation, Boboiboy from Animonsta Studio and Didi and Friends from Digital Durian. This table is to see the using of squash and stretch in their animation.

From Table 1, the using of squash and stretch in animated short film in Malaysia, we can see from the Table 1 from three animation only two animation that using the squash and stretch on their animation, Ejen Ali and Boboiboy character movement and character facial expression. Only one animation, Didi and Friends that not applying the squash and stretch to the character. Ejen Ali and Boboiboy have the squash and stretch on their character but it's the basic squash and stretch on the character that for the character movement and facial expression. This two animation don't have the true squash and stretch with exaggeration on the character animation that can allow the character move freely and not limited the movement that can give more impact on movement and emotion to the character.

Data comparative: For the data comparative, researcher make comparison between two animated short film, Ejen Ali from Wau Animation and Didi and friends from Digital Durian. From this two animation researcher will make comparison the using of squash and stretch in the character (Table 2).

For this discussion on method, researcher make lot of discussion with the lecturer to ensure this research finish properly and make sure the information that researcher use for this research correct and don't

Table 2: Comparison the using of squash and stretch between Ejen Ali, Boboiboy and Didi and Friends

| Principle squash and stretch | | |
|------------------------------|--|--|
| Animation title | Character movement | Character facial expression |
| Ejen Ali | Character in Ejen Ali have the squash and stretch in their movement. Have the basic squash and stretch in their movement | Facial expression in Ejen Ali same to the character movement, have basic squash and stretch in their animation but from the researcher observation Ejen Ali's facial expression better than Boboiboy |
| Boboiboy | Character in Boboi also have the squah and stretch in the animation with the basic squash and stretch that allow to make the movement don't have the squash and stretch that can exaggerate for the movement | Facial expression in Boboiboy also have basic squash and stretch that character cannot have exaggeration on their facial expression. Facial expression that have squash and stretch to exaggerate can produce better emotion into the expression |
| Didi and Friends | Character in Didi and Friends don't have and don't applying the principle of squash and stretch into their character animation | Only Didi and Friends that don't have the squash and streth in their character. They use the simpe movement of eyes and mouth to show the expression |

have the plagiarism on this research paper. Not only with lecturer, researcher also make discussion with the friend the master with this research topic for makes sure the researcher got the true information and this research paper can finish properly and perfectly without any error.

CONCLUSION

Lastly, researcher can conclude this research paper required many method to make our research paper strong. Research make many observation to make sure researcher got enough data for the analysis. For this research paper, researcher take many time to ensure the using of method and data for this study enough and correct perfectly without error. Researcher also reading many journal to collect data for this research paper because journal is the most important source for this research paper.

For conclusion, squash and stretch in very importan principle in 3D animation short film. Principle squash and stretch in the number one principle in principle of animation. Squash and stretch can give character more easily movement and can change facial expression. For 3D animation short film in Malaysia they don't use this principle frequently in their animation they don't use the advantages of squash and stretch to apply the exaggeration on character movement and character expression.

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