



Term Paper

Storytelling & Directing in 3D animated Films

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1 Introduction

This paper deals about the aspects of storytelling and directing that an animator should beware of. Making films in real life does not really differ that much from making animated movies. Of course the animator has more freedom when it comes to several aspects, but knowing about the filmmaking jargon and which influence it has on the work, makes the film even better.

The 3D animated films of Pixar won several Academy Awards and are the industry standard now. There is a reason why they have such a huge success. It is not only the great 3D-animation software that they are using, also the story and the use of traditional elements of filmmaking make these movies fantastic. These movies will underlay the theoretical aspects of this paper.

In this paper examples of three Pixar movies will appear:

Ratatouille

“In Ratatouille, a rat named Remy dreams of becoming a great chef despite his family’s wishes and the obvious problem of being a rat in a decidedly rodent-phobic profession. When fate places Remy in the sewers of Paris, he finds himself ideally situated beneath a restaurant made famous by his culinary hero – Auguste Gusteau. Remy’s passion for cooking soon sets into motion a hilarious and exciting rat race that turns the world of Paris upside down.”¹

¹ Ratatouille. <http://www.pixar.com/featurefilms/rat/tale.html> accessed 15. January 2010

Finding Nemo

“Life in the Great Barrier Reef is full of dangers for a tiny fish. When Marlin, an overly cautious clownfish, helplessly watches his son get scooped up by a diver, he must put aside his fears of the ocean and leave the safety of his coral enclave to find Nemo. Buoyed by companionship of Dory, a forgetful but relentlessly optimistic fish, Marlin finds himself the unlikely hero in a seemingly impossible land-and-sea rescue.”²

Monsters, Inc.

“There’s a reason why there are monsters in children’s closets – it’s their job. Monsters, Inc. is the most successful scream processing factory in the monster world, and there’s no better Scarer than James P. Sullivan. But when “Sulley” accidentally lets a human girl into Monstropolis, life turns upside down for him and his buddy Mike. Believing human children are toxic, Sulley and Mike risk life and limb to return the girl, Boo, back home and expose the factory’s underhanded plans.”³

² Finding Nemo. <http://www.pixar.com/featurefilms/nemo/tale.html> accessed 15. January 2010

³ Monsters, Inc. <http://www.pixar.com/featurefilms/inc/tale.html> accessed 15. January 2010

2 Storytelling

2.1 Definition and History of Storytelling

As the name says storytelling is to tell a story. This can be done by words, images, and sounds. Human beings always had the need to tell others about their lives or simply entertainment. As time went by the invention of new media created a new way of telling stories. The visualization of the scene and characters are not longer up to the listeners mind. The storyteller now can create his own microcosmos and do not have to explain every little detail.

A story needs three basic components:

- Character: Is the main person, about whom the story is.
- Goal: This is the object that the character wants to reach. This can be a princess as well as recognition.
- Conflict: The conflict describes what is between the character and his goal. There are three different types of conflicts:
 - Character vs. Character
 - Character vs. Environment
 - Character vs. Self

Other elements of the story can be location, inciting moments, story questions, theme, need, arc, ending, and resolution.

2.2 The Hero's Journey

There are a lot of different theories about how to structure a story. The best-known one is often called "the hero's journey". This term is used first by Joseph Campbell in his book "The Hero With A Thousand Faces" (1949). He found out that there were universal images and characters that existed in one story shared by all cultures through different time periods. This story occurred again and again, so he called it monomyth and contains of many stages:

- Introduce the Hero
- Hero Has a Weakness
- Unexpected Event
- Call to Adventure
- The Quest
- The Return
- The Crisis
- The Showdown
- The Resolution

In the beginning the hero is introduced. He is the character through whose eyes the story is told. We follow him through his ordinary day. The hero has a flaw, so that the audience empathizes with him. Then something happens that changes the ordinary world of our hero. He needs to sally out to reach a goal, but often he needs his friends or a mentor who convince him to do so. He leaves his world and has to pass tests, trials, and challenges until he achieves his goal. Then the hero returns, but something is different. He has to win one last challenge. For this he has to use all that he had learned on the quest. Usually the hero succeeds.

Of course there are a many films that deviate from this pattern, but often the main stages are the same. In the film “Finding Nemo” Marlin, a clown fish, wants to find his son Nemo and goes on a big adventure, but he failed to find his son and returns without him. Nemo managed to get out of where he was caught by his own and then was found by Dory, a friend of Marlin. She brings Nemo back to him.

2.3 Conflicts

The conflict can be a situation or a problem that keeps the hero from reaching his goal.

In the book “Ideas for the Animated Short” conflicts are summarized as followed:

- **Brains vs. Brawn:** These conflicts pit intelligence against brute strength
- **Rags to Riches:** These are stories about personal struggle for achievement.
- **Good vs. Evil:** Sets equal forces against each other.
- **Role Reversal:** Allows us to see through the eyes of the “other” and experience how others live.
- **Courage and Survival:** The conflict that is usually environmental. There is a disaster or disease that must be overcome.
- **Peacemakers:** These are underdog stories where the “good” are those who protect the weak or stand up for what is right.
- **Tempting Fate:** The conflict arises when the hero goes against the established order of things (the law, God, nature), sometimes for the greater good, but more often for personal gain.
- **Fish out of Water:** A character or characters are transported to a different time or place where they must learn how to survive.

- **Ship of Fools:** Several fully defined but distinctly different characters must navigate an adventure together.
- **Buddy Stories:** These stories focus on the strengths and contrasts of the characters to overcome adversity and become friends.
- **Love Stories:** The study of romantic relationships that focuses on the trials that bring two people together or tear them apart.⁴

Most films have one main conflict, but also a secondary or tertiary conflict. Below a few examples:

| | Main conflict | Secondary conflict | Tertiary conflict |
|----------------|-------------------|----------------------|-------------------|
| Finding Nemo | Fish out of Water | Rags to Riches | Buddy Story |
| Monsters, Inc. | Role Reversal | Buddy Story | |
| Wall-E | Love Story | Courage and Survival | Fish out of Water |
| Ratatouille | Rags to Riches | Role Reversal | Fish out of Water |

⁴ Sullivan, Karen; Schumer, Gary; Alexander, Kate. „*Ideas for the Animated Short*“ (2008). Focal Press. p. 8-22

3 Directing

Now we have seen what storytelling means and what the basics are, when you want to come up with an idea or write a script. But if you want to make a movie it is important to learn not only to tell the story with words, but also with pictures. When it comes to movies, no matter if animated or not, it is important to talk in pictures and not with words. The audio track should be an addition and give the image a deeper meaning, and not tell the audience what they already see on screen.

For this it is important to know the basics of cinematography and the film jargon that will be described in the next chapters. It is essential to understand that even when an animated film is drawn or computer-generated these camera techniques give the animated film a better look.

3.1 Camera

For a good movie perspective and positioning the camera is also important. The camera can draw the attention on something and guides the audience through the whole movie. Many animators overlook this significant aspect.

The camera in a 3D application is built after a real camera, so the following terms are essential:

- Aperture
- F-Stop
- Focus
- Depth Of Field

- Aspect Ratios and Pixels
- Film and Grain

3.1.1 Aperture and f-stop

The Aperture controls how much light falls through the lens on the film or sensor of a camera. It is controlled by f-stops. The f is short for focal length of the lens divided by the aperture. The smaller the number of the f-stop is, the bigger the hole, where the light comes through.

3.1.2 Focus

Something is in focus means that we see something clear and sharp. F-stop and the distance to the object can influence this.

3.1.3 Depth of Field

Many 3D animated movies look too “clean”, because everything is in focus. This can be a huge drawback, because a filmmaker maybe does not want that everything is in focus, because it draws the attraction of the audience in the background, whereas the most important thing is in the foreground or vice versa. Therefore depth of field can be a significant tool of directing the attention of the audience. It defines the space that is in focus and which is not. A shallow depth of field means that only a small area can be seen clear and sharp and the area in the back and front is blurred.

If you add depth of field to an animation movie it also adds more realism and it look more natural to us humans.

The picture below shows a scene from Pixar’s movie “Ratatouille”. This scene takes place in the shelter of the rats, so therefore there are many of them in the background to let it look

more realistic. The problem is that they would attract the audience's attention. That's probably the reason why they decided to use a shallow depth of field, the viewer now sees a busy background like it would look in reality, but still can focus on the main protagonist and what he is talking about.



Figure 1 Depth of Field Ratatouille

3.1.4 Lenses

Changing shot size in real life is made by changing the lens. There are many different lenses, e.g. telephoto lens for shots where the camera has to be far away from the object or wide-angle lenses for scenes with an overview of a landscape. In the digital world you cannot change the lens of the camera, you talk about focal length and zoom factors that are adjusted.

3.1.5 Aspect Ratio

The aspect ratio defines the image's display and describes the ratio of the width and height of the image. A long time there was used an aspect ratio of 4:3 or so-called 1,33:1, but

nowadays the high-definition standard is 16:9 or 1,78:1. The first number indicates the width of the frame and the second number indicates the height.⁵

3.2 Types of Shots

Shots can be classified by different aspects. This can be the shot size, the camera movement, or simply by saying what they do.

3.2.1 Shot Size

The shot size defines what the audience sees in a frame. You can break this down into three basic categories:

- Close-up
- Medium shot
- Long Shot

Close-Up Shot

The close-up shot, often called CU, shows a part of an object, e.g. the head of a human. If the shot size goes smaller, e.g. you just see an eye or the mouth, it is called extreme close-up (ECU). It can draw the attention of the audience or show emotions of the protagonist. They are very dramatic and intimate. The advantage for an animator is that you do not need a sophisticated background and this means less render time.

Medium Shot

⁵ Ablan, Dan. „*Digital Cinematography and Directing*“ (2003). New Riders Publishing. p 9-22

The medium shot (MS) shows a human to his/her waist. It is close enough so that you can see the emotion, but particularly the gesture of the protagonist. Therefore it is often used to carry the dialogue.

Long Shot

The long shot (LS), also called wide or full shot, does not define the length of a shot, it simply shows the whole body of a person. This is used for showing a persons environment. The extreme version of it is called establishing shot and it shows the whole landscape. An establishing shot is mostly shown before a new scene so that the audience knows where it takes place. Persons are often not recognizable.

The figure 2 shows an establishing shot from the movie “Ratatouille”. In this case it is not shown in the beginning of the scene, but at the end. Accidentally, Remy the main character was taken from his home at the countryside to a big city. After moving around he entered the roof of a house and found out that he was in Paris all the time.⁶



Figure 2 Establishing Shot Ratatouille

⁶ Ascher, Steven; Pincus, Edward. „*The Filmmaker's Handbook: A Comprehensive Guide for the Digital Age*“ (2007). Plume Publishing. p 311 - 368

3.2.2 Camera Movement

- Pan/Tilt Shot
- Tracking Shot/Dolly Shot
- Steadicam Shot
- Crane Shot

These are the basic camera movements. Pan and tilt are very similar. Pan means the camera is fixed on a tripod and is moved horizontally, whereas tilt means it is moved vertically.

Figure 3 shows a scene of the movie “Ratatouille”. In this scene Remy the rat learns how to control Linguini and teach him how to cook. The scene begins with a shot of Linguini’s hands cutting leek. Then the camera tilt to his head, where Remy is placed. Then the shot works as a transition from the cooking scene at home to the cooking scene in the restaurant. Now, the tilt goes into the opposite direction and ends with the shot of Linguini’s hands cutting leek again. In this case the tilt works as a smooth transition from one scene to another and symbolizes the connection of these two similar scenes.

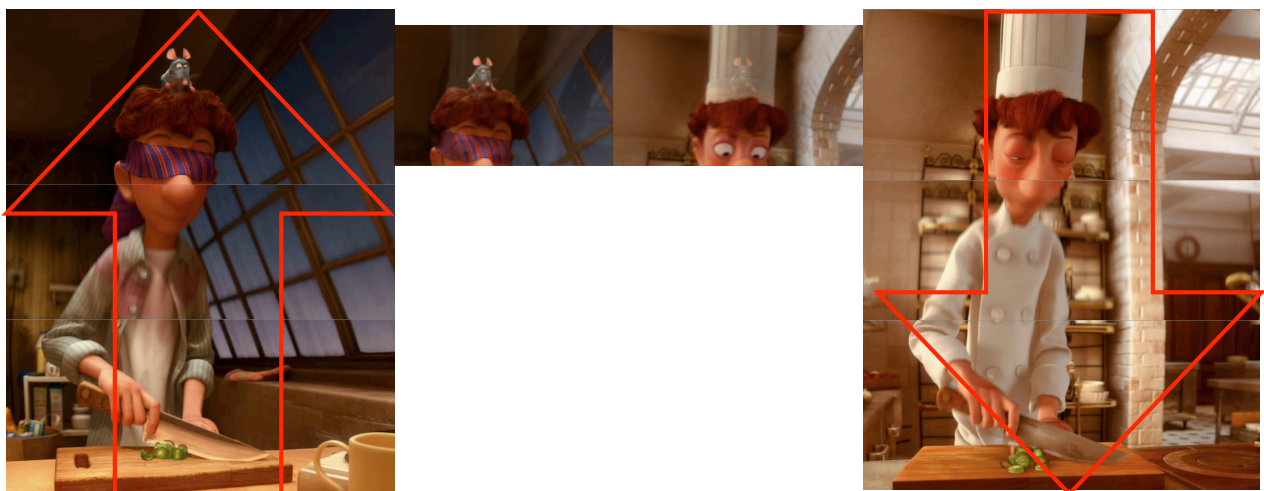


Figure 3 Tilt from Ratatouille

Tracking Shots follow the protagonist, wherever he/she is going. This can be realized with a dolly. A dolly is a vehicle on which the camera and the camera operator are positioned and is then pushed by a second person. This can have either wheels or tracks. A dolly shot is very smooth and guarantees a floating movement. Sometimes there is not enough space for a dolly or the protagonist heads directly to the camera. Then a steadycam is a better choice. It is a stabilizing mount that reduces the movement of the camera operator.

For crane shots a crane is used, this is like an arm that moves the camera in places that are difficult to access. The audience gets a good overview over the whole scenario. All of these different camera movements add a special look to a movie and can show a scene from a different angle or perspective.

In the physical world such shots can be hard to realize and very expensive. When it comes to animated films, this is no problem, because the camera movement is easily animated, without a dolly, crane, or steadycam. Tracks, cables, and other limitations will never be in the way. But the animator has to realize that there are such possibilities and how to adapt them properly.

3.2.3 Other Shots

Rack-Focus Shots

A rack-focus shot plays with depth of field. Within a shot the focus on an object in the foreground will be changed to an object in the background or vice versa. The eye cannot focus on something that is near and on something that is farther away at the same time, e.g. when having a conversation at a street corner with two people, the eye will refocus when talking to the second person. This is exactly what a rack-focus does. This can be an effective way to draw the audience attention.

The lens of a camera is not able to focus on everything that is within a frame, it is comparable to the human eye. In the computer environment everything is in focus. This might be good for a novice, because it is one thing less to care about, but for a professional this means one more thing to adjust to get an advanced look.⁷

Figure 4 shows a rack focus from the film “Ratatouille”. In this scene Colette is disappointed because she found out that the real cook of the restaurant she worked in is a rat. She is crying and the main focus is on her to show her emotions. Then the focus changes to the shop window in the background. It shows a cooking book from the famous cook Gusteau whose main slogan always was “Anyone can cook!”. In this case the rack focus symbolizes that she recognized that this rat really can cook, which is the main topic of the whole movie.



Figure 4 Rack Focus from Ratatouille

Zoom Shots

A zoom is a movement of the lens. The camera itself will not be removed in any form. By changing the focal length not only the shot size will be changed, the whole perspective will be a different one. This is the difference to a dolly shot.

⁷ Ablan, Dan. „*Digital Cinematography and Directing*“ (2003). New Riders Publishing. p 85 - 106

When these two shots are combined, it is called a dolly zoom shot and often referred to as “Vertigo Effect”, because Alfred Hitchcock made it famous in his film “Vertigo”.⁸

Cutaway Shots

A cutaway shot is a shot that splits another shot into two. It shows something that happens at the same place somewhere else or something that people in the scene were talking about. It also allows the director to make a smooth transition between two similar shots. Cutting from one shot size to the same shot size is an absolute no-go in editing, because it let the image appear jumpy. Therefore such cuts are called jump-cuts. To avoid jump-cuts, a good solution is to insert a cutaway shot.⁹

3.3 Lighting

Lighting can add a great value to a movie, but also can cause a lot of problems. The traditional filmmaker has to think of the whole production process at once, whereas the animator often thinks in stages like modeling, character rigging, texturing, lighting, camera placement, and rendering. The problems like exposure, continuity, and lens reflections are negligible for an animator. There is no light until the animator creates it. Effects like gobos or cookie cutter images are easy made, the only drawback that occurs is the prolonged render time, when the light is too complex.¹⁰

⁸ Ablan, Dan. „*Digital Cinematography and Directing*“ (2003). New Riders Publishing. p 100-102

⁹ Ablan, Dan. „*Digital Cinematography and Directing*“ (2003). New Riders Publishing. p 95-97

¹⁰ Ablan, Dan. „*Digital Cinematography and Directing*“ (2003). New Riders Publishing. p 57-58

3.3.1 Lux, Lumen, and Kelvin

Setting the light can be a tough job. Light settings vary, if a scene takes place inside or outside, at noon or at night, etc. Lumen, Lux, and Kelvin are units of measurements for illumination.

“Lumen is a unit of measurement of the amount of brightness that comes from a light source. Lumens define “luminous flux,” which is energy within the range of frequencies we perceive as light. For example, a wax candle generates 13 lumens; a 100 watt bulb generates 1,200 lumens.”¹¹

“Lux is a unit of measurement of the intensity of light. It is equal to the illumination of a surface one meter away from a single candle.”¹²

Whereas lumen and lux are quantitative values, Kelvin is a qualitative measurement, because it measures the color temperature of light. *“It is the color of a light source’s output in relation to the degree of heat generated, which produces a specific color of light.”¹³*

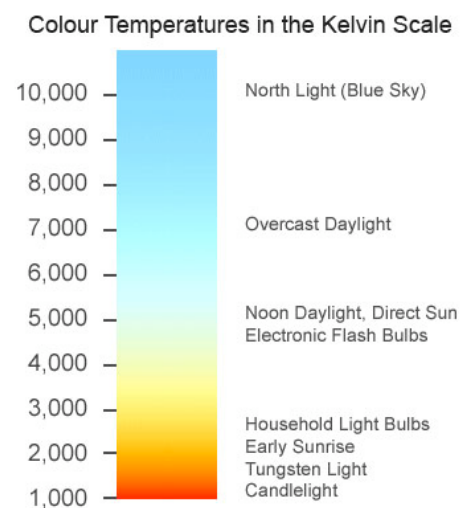


Figure 5 Color Temperature

The figure¹⁴ shows changes in color of light.

¹¹ Lumen. http://www.pcmag.com/encyclopedia_term/0,2542,t=lumen&i=46391,00.asp Accessed 15. January 2010

¹² Lux. http://www.pcmag.com/encyclopedia_term/0%2C2542%2Ct%3Dlux&i%3D46398%2C00.asp Accessed 15. January 2010

¹³ Ablan, Dan. „*Digital Cinematography and Directing*“ (2003). New Riders Publishing. p 62

¹⁴ Color Temperatures in the Kelvin Scale. <http://www.lightingstyles.co.uk/images/Kelvin.jpg> Accessed 15. January 2010

3.3.2 Ambient Light

Ambient light is the light that is there without having direct light, e.g. the area under a table or the space behind an open door. It can also be the sunlight coming in through a window, when you are indoors. Sometimes the 3D application's default settings concerning ambient light is too bright, therefore it will add a more realistic atmosphere, when you set the settings yourself.

However, the best way to begin working is in darkness and then add some light. Ambient light will add a slight color to a scene. Choosing a bluish-green ambient value can simulate an outdoor daytime situation. In this case blue and green represent bounced color of the sky and ground. A blue or grey color can also create a cooler look that can be used in nighttime or creepy situations. Adding some yellow or orange tones will cause a warmer look. It is important to find a good balanced ambient light. Adding too much ambient light can cause an unnatural up to artificial look, whereas no ambient light means that another light source is needed for background objects that should be seen in the scene. On the other hand, this flaw can be used to create specific styles in scenes that should look dream-like.

3.4 Lines of Action

Line of action is a visual element. It is a strong line that you can follow through your character. As audience you are not really conscious of this, but the eye will recognize it.

3.4.1 Framing

There are two important terms when it comes to framing – open-framed shots and closed-frame shots. An open-frame shot contains things that are beyond the director's control, e.g. birds in the sky or a huge crowd. Closed-frame shot means the careful placement of props

and everything that can be seen in the shot. This is a huge advantage of an animator, because there are no open-framed shots. The digital filmmaker can control really everything - nothing is unexpected.

Another essential aspect is aesthetic. A shot should be pleasing and balanced. For example, a person looking into the frame, meaning he/she is on the left side of the frame and is looking in the right direction, will appear more balanced and comfortable. Whereas a person looking out of a frame, e.g. the same person is looking on the left side, will make the audience feel uncomfortable, because of not allowing the viewer to know what he/she's seeing. This does not mean that the shot is bad, depending on the story it can also arise interest, but using it for a dialogue scene it would be poorly framed, because it does not allow to know to whom he/she is talking.¹⁵

3.4.2 Camera Angle

The camera angle defines the height and angle of the camera. There are different kinds of camera angles:

- Eye-Level Shot
- High-Angle Shot
- Low-Angle Shot
- Dutch Angle Shot

Eye-level camera angles are the most common. The camera is on the same height as the characters, looking them directly in the eye. Whereas the high-angle camera position is above the character and looking down on him. The character will look small and powerless. It can symbolize a spy cam and can have a voyeuristic look. Low-angle camera perspective

¹⁵ Ablan, Dan. „*Digital Cinematography and Directing*“ (2003). New Riders Publishing. p 133 - 138

means that the camera is on the ground and looks up to the character. This let the character appears more powerful and gives him strength. If the camera is rotated upon its bank axis, it is called Dutch angle and can symbolize odd situations or emphasize disorientation.¹⁶

In figure 6 we see a low angle perspective on the top and below a high angle perspective. In this scene of “Monsters, Inc.” the antagonist on the right side of the frame corners Sulley, the main character of the film. The use of different angles boosts the impression of predominance of the antagonist. He looks more powerful and strength, whereas Sully appeals weak and helpless, although he is a terrifying monster.



Figure 6 low angle (above) and high angle from Monsters, Inc.

3.4.3 Axis of Action

In every movie continuity plays an important role. One shot to another should have a floating and smooth transition. Continuity can make or break this. Bad continuity can cause the loss of the audience. One aspect that helps to keep good continuity is the axis of action. Imagine two people having a conversation; they build an imaginary line that is called action axis. When filming it is important not to cross this line, otherwise the audience will get confused. To make this a good shot correct framing is also important. The best shot flow that will work is to show a full shot of both characters. Then show the left one on the left

¹⁶ Ablan, Dan. „Digital Cinematography and Directing“ (2003). New Riders Publishing. p 141 - 145

side of the frame looking into the frame and then show the right person vice versa. Now it looks like that they are talking to each other. This is just possible when the camera stays on one side of the action axis. If the axis is crossed for the shot of the right person, he would be also on the left side of the frame and it now would confuse the audience, because of not knowing to whom he is talking to and disorientation.¹⁷

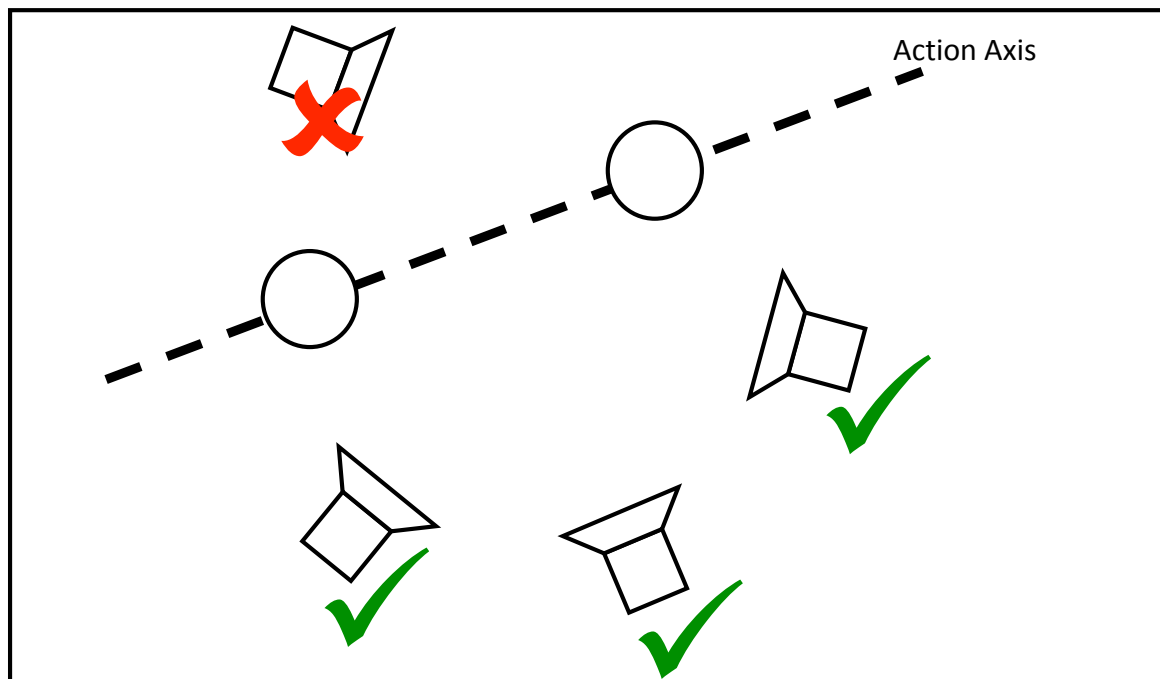


Figure 7 Axis of Action

3.4.4 Lines of Composition

Another important aspect is line of composition. The objects in a frame can create lines on which the viewers eye pick up. It is important that such lines do not divide the frame into pieces. This does not mean that there should not be such lines. It just depends on the right composition, e.g. a tree in the middle of the frame can cut it into two, but a strong vertical line like the tree can symbolize strength, so therefore it would be better to move the camera so that the tree is on the right or left side in the frame.

¹⁷ Ablan, Dan. „*Digital Cinematography and Directing*“ (2003). New Riders Publishing. 150 - 151

3.4.5 The Triangle System

Objects and characters create visual triangles that keep the viewer's eye on track and hold them from wander around in the frame. Tall or wide triangles can be used for establishing shots of a landscape to show stability and the width of the shot. Whereas a vertical triangle of a close-up of trees can symbolize strength and height. Triangles are not the only shape that can be a visual reference; circles, squares, or the letters of the alphabet also will work well.

The triangle system can also be used for the camera movement.¹⁸



Figure 8 Combination of Triangle and Circular Shape from Ratatouille

Figure 8 is another scene from “Ratatouille”. It combines different shapes. The cook is looking through a round-shaped window into the dining room of the restaurant. He is watching the waiter bringing soup to a guest in the back of the room. For drawing the attention to this guest and not to the others a few aspects are combined. The main guest that ordered the soup is placed in the middle of the room. She builds a triangle with the two guests on a table in front of her. The viewer's eye will pick up on that triangle and its

¹⁸ Ablan, Dan. „*Digital Cinematography and Directing*“ (2003). New Riders Publishing. p 153 - 158

attention is also led through the waiter who goes directly to her. To create a realistic environment the room has to be full, because it is a popular restaurant. Therefore, a few other guests are placed on the right and left side of the room. A second shape is added, namely a half circle symbolizing the window through which the chef looks through. This causes the effect that the other guests are cut. Now, the viewer has the impression that it is a busy dining room but can focus on the main guest.

4 Conclusion

Storytelling has changed. The filmmaker has much more possibilities to tell a story. He/She has not to explain every little detail, because they can show “living” pictures that can explain much more, like a picture is worth a thousand words.

To make a professional animation it is also essential to know about the filmmaking jargon. The right framing, being beware of axis of action, and use of different camera angles are just a few terms that are important and can add a great value to one’s work.

The professional 3D-animation studio’s apply these elements of traditional filmmaking in their movies and this is also a part of why they have such a huge success.

This paper gives a good review about the most essential aspects of filmmaking and how important they are concerning 3D animated films. A continuative paper could deal with more details about these aspects. Every topic in this paper could fill a whole book.

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