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The illusion of life

Believable motion in animation.

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Tiivistelma

Opinnäytetyöni keskeinen tutkimuskysymys on: miten luoda animaatiohahmolle mahdollisimman elävää ja uskottavaa liikettä? Tutkin tässä opinnäytetyössä niitä keskeisiä osa-alueita, jotka synnyttävät elämän illuusion animaatioon. Näitä osa-alueita ovat: ajatus ja tunne liikkeen synnyttäjänä, ajoitus ja rytmi, liioittelu sekä hahmon suhde toisiin hahmoihin ja esineisiin.

Charles Chaplinin elokuvat ovat toimineet opinnäytetyöni keskeisenä innoittajana. Chaplin liikekieli hyödyntää kaikkia yllämainuttaja elävän animaation kekeisiä osa-alueita. Opinnäytetyöni käytännönosio on kahden minuutin animaatio, joka perustuu Chaplinin elokuvan *The Great Dictator* kohtaukseen. Kohtauksessa Chaplinin luoma diktaattorihahmo tanssii ja leikittelee yksin suuressa huoneessa maapallon kanssa. Animaatiossani yritän jäljitellä Chaplinin koreografiaa ja liikkeitä mahdollisimman tarkasti.

Kirjalliseen osioon olen kirjannut kaikki ne keskeiset havainnot, joita animaatiota tehdessä tein liittyen hahmon uskottavaan liikkeeseen.

Keskeinen havaintoni on, että täysin realistinen liike, ei useinkaan näytä animaatiossa toimivalta. Todellisuus on välttämätön lähtökohta, mutta hyvä animaatio ylittää realismin, usein tämä tarkoittaa jonkinasteista liitoittelua. Chaplin on liioittelun mestari, hänen liikkeensä ovat epärealistisia, mutta samalla uskottavia. Juuri tämä, tosielämän havaintoon perustuva, mutta rohkeasti liitoitteleva liike, on inspiroivaa animoijalle.

Toinen tärkeä oivallus on sisäisten prosessien merkitys toiminnan synnyttäjänä ja ohjaajana. Ajatus ja tunne motivoivat kaikkea liikettä animaatiossa. Vaikka liikkeet olisivat motorisesti oikeaoppisia, lopputulos ei ole kiinnostava, jos animoija ei tiedä, mitä hänen hahmonsa ajattelee ja tuntee, toisin sanoen, mihin hänen hahmonsa pyrkii. Tunne ja ajatus synnyttävät liikkeelle erityisen laadun, intensiteetin ja rytmin.

Avainsanat	Elämän illuusio, 3D-hahmoanimaatio

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Abstract

The central question in this thesis is how to create believable motion in animation. I will focus on various areas that I consider important for the creation of life in animation. Those include: thought and emotion as a starting point for movement, timing and rhythm, exaggeration as well as an animation character's relationship with other characters or objects.

The films of Charlie Chaplin have functioned as a source of inspiration during my work as his movements combine all of the above-mentioned areas. As a practical part I have created a two minute animation which is based on Chaplin's film *The Great Dictator*. In the scene I chose, Chaplin performs a playful dance with an oversized balloon globe. In my animation I try to imitate Chaplin's choreography and movements.

In this thesis I will describe and analyze the central findings and conclusions that I have made during the animation process. I will focus on the elements necessary to create believable motion.

One central finding is that movement closely based on reality is not functioning well in animation. Realistic movement is a necessary starting point, but good animation goes beyond realism. Good animation usually includes some degree of exaggeration. Chaplin is a master of exaggeration and his movements which are based on reality but are often strongly exaggerated are very inspiring for animators.

Another understanding has been the importance of the animation character's inner process, as an underlying and driving force for movement, i.e. thought and emotion as an overall motivator for movement in animation characters. The animator needs to get to know his character's thoughts, feelings because thoughts and feelings add to the whole meaning, intensity and rhythm of an animation.

Keywords	Illusion of life, 3D-charater animation

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1 Introduction

The aim of this study is to investigate the elements that are fundamental for creating the illusion of life in animation. As a practical part I have created a two minute animation scene because I wanted to challenge myself as an animator. In this paper I will describe the findings and understandings I have encountered during the animation process. I am particularly interested in the achievement of a fluid, believable motion. Etymologically, the term animation means “the act of bringing to life” (http://en.wikipedia.org/wiki/Animation) and I would like to focus in this paper which elements are necessary in order to make an animation look alive. In earlier animations I have done I have often found the line of action to be linear, and lifeless, even though the established key poses were looking good as such. I realized that this lack of vitality is due to a missing or too hesitant breakdown. One further problem I have frequently encountered is the tendency to act out my animation too closely based on a realistic line of action. As paradox as it may sound, too realistic movement does not look believable in animation. It might work in a highly realistic Computer Generated environment with realistic characters but I have found it not be very convincing in a ‘cartoony’ environment. It needs stronger, more exaggerated action not only to appear to be moving but to be believable. In animation many laws of physics can be breached if it serves the purpose of exaggerating and underlining an action. Exaggeration in animation can be brought very far but the core of every exaggeration rests in reality, i.e. before being able to exaggerate one must observe reality. Watching Charlie Chaplin’s film is very enhancing for animators because his movements are combining many elements that look good in character animation. Despite being bound by the laws of physics, they comprise a sense of exaggeration that goes beyond realistic movement. I have therefore decided to observe and animate one scene from a Chaplin film with my own 3d character.

2 Charlie Chaplin and *The Great Dictator*

The Great Dictator is a political satire from 1940. At its release Chaplin, who had always been openly opposed to Nazi-views, was criticized for it by US officials as the USA had not yet entered the war and the film was considered to be interfering with US politics. It was however immediately very popular with the British and American public. In *The Great Dictator* Chaplin is ridiculing Nazi Germany and criticizing their Anti-Semitic politics. It was Chaplin's first talking film and, playing with his apparent resemblance to Hitler, Chaplin acts two people: Adenoid Hynkel, a caricature of Adolf Hitler, who strives for the persecution of Jews and for global power, and a Jewish barber who tries to survive Hynkel's cruel schemes. Due to their resemblance Hynkel's and the barber's identities are mix up and while Hynkel end up imprisoned by his own soldiers, the barber gives a speech in which he proclaims humanity and the end of dictatorship. In one scene Chaplin alias Adenoid Hynkel performs a darkly-comic dance with a globe. The globe is a rubber balloon and explodes at the end of the scene. This is an obvious criticism of Hitler and his politics and a metaphor easy enough to read of what Chaplin foresees for the future of the world if ruled by Hitler. This is the scene I picked up for my animation.

2.1 Rhythm and dance

One reason why I picked a scene from Charlie Chaplin as a reference for my animation is Chaplin's intriguing sense of rhythm and dance.

Already before he came to Hollywood Chaplin had acquired a great rhythmic skill due to his participation in various acting and dance groups, the most famous of which being Fred Karno's group of pantomime artists. He was trained to perform well-practiced and accurately timed gags and later adapted that skill to film. (Fawell, 2014).

The rhythmical element of Chaplin's films is also emphasized by Chaplin's tendency to include dance in them. The globe scene that I picked up being just one

of many notions of dance in Chaplin’s works. Other famous examples are for instance the end-dance in *Modern Times* where Chaplin accidently throws away his cuffs on which he had written the lyrics, the fork-dance in *Gold Rush*, or, also from *Gold Rush*, his dance with Georgia Hale during which he first tries to hold up his overlarge trousers with his walking cane and ends up to tie them with a dog leach completely unaware that a dog is attached on the other side and consequently drags it along the dance floor.

Dance is all around Chaplin's films, even though the scene would not depict dance in a classical sense. Think of the boxing match in *The Champion*, Chaplin working at the assembly line or the blind-fold roller skating scenes in *Modern times*. Chaplin is said to have created his own rhythm in filmmaking (Fawell, 2014). Being intrinsically rhythmical, dance and dancelike elements are very inspiring for animators.

Interesting from the animator's point of view is also Chaplin's playfulness of movement. His movements are exaggerated but at the same time purposeful and controlled.
I think in this combination lies the brilliance of Chaplin. His skill to make movements look playful, unintended and even superfluous when in fact they are carefully choreographed and strongly support the childlike excitement and truthfulness of his characters. His movements reveal his characters' thoughts and emotions to the audience and create a deep sense of empathy.

> ...those moments where life escapes the utilitarian and chases the beautiful, those moments, in his mind, where life starts to exhibit rhythm, loveliness, artfulness and meaning. (Fawell, 2014)

Charlie Chaplin’s humor is extremely sophisticated and manifold. From an animator’s point of view the key to the humor of many of his scenes lies in rhythm and the interplay of minimalism and exaggeration of his movements. In animation those closely correspond to timing and spacing and to holds, anticipation, action and reaction.

3 The little dictator

3.1 Creating the character and adapting it to Chaplin's globe scene

I decided during my internship which I spent at Talvi Digital Oy as an animator trainee that I want to focus on animation in my final work. At first, I planned to write a short film script for one character which I would model myself. My new born son gave me the idea to create a baby character. I wanted a simple, cartoony and likable character which raises sympathy with the audience. There are certain features that in my opinion make a baby or toddler recognizable and sympathetic and I tried to exaggerate these, as for instance the size of the head comparing to the rest of the body, the roundness of the eyes, the chubbiness of arms and legs and the small amount of hair. By dressing him only in a bodysuit I tried to further underline the character's likeness to a toddler.

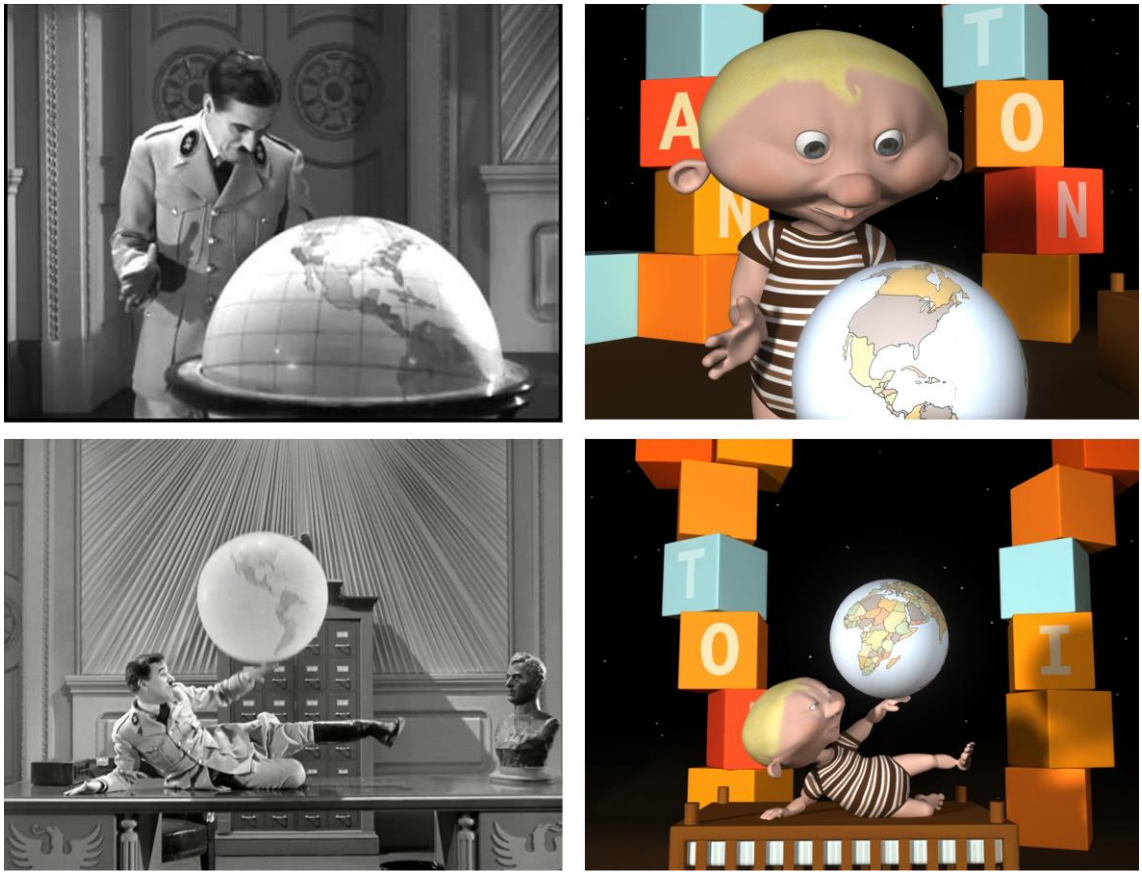
As part of my internship I became acquainted with Autodesk's Softimage and I decided to realize the entire practical part of my final paper with this program. However, I decided to switch to Maya after the modelling phase, due to the fact that Autodesk abandoned the development of Softimage and I thought it wiser to work with a program I will still work with in the future instead of with a program that will be out of use in a couple of years' time.

I soon realized that I did not want to spend too much time on creating a story but that I would in fact rather concentrate on observing in order to be able to find and research the crucial elements of creating the illusion of life. I picked Charlie Chaplin as my animation mentor because in his art he brilliantly combines many of the fundamental elements that are important in animation, like rhythm and timing, exaggeration, anticipation and dance. So I was looking for a scene from Chaplin's films, preferably a dance scene that would look interesting and believable if my toddler character acted it. I chose Chaplin's dance with the globe from the movie the Great Dictator, because small children have sometimes almost dictatorial qualities and because Chaplin's Great Dictator has many childlike elements.

After having chosen a fitting scene for my character there were certain parameters I had to abide by in order to achieve a similarity between the original and my scene. These include the built of the set as well as camera settings, movements and cuts.

3.1.1 Set

The set of Chaplin's globe scene is quite plain. It is shot in the same setting of a room of which only two walls are visible. The most dominant elements in the set are two huge doors and a large table. I also wanted my version of the scene to be plain and to have a reference to the original set in Chaplin's dictator. However, I did not want the Albert Speer like look of the background but rather bring it to a more sympathetic and more fitting level for my character. I decided on building blocks because they are clearly related to the children's world. Chaplin looks rather tiny due to the size of the ball and especially the vastness of the architecture. By making the building blocks bigger than they usually are comparing to the size of a child I wanted to underline this mismatching proportion also in my scene. I arranged the blocks in two big arches to resemble the doors in the reference scene. For a long time during the animation process I used a polygon cube object as a placeholder for the table as a table did not seem to fit to my scene and character, but still I needed some kind of surface. Only towards the end of the process I had the idea of replacing the table with a baby bed turned upside down as it fits well to a toddler's world and moreover emphasizes the dream likeness of the scene.



PICTURE 1. Comparison of the original scene and the adaptation.

3.1.2 Camera and cutting

As far as the camera settings and movements are concerned I kept close reference to the original globe scene. The scene includes nine camera cuts and I therefore dived the scene into ten parts. Fixing the camera position and movement was always the first thing to do in each scene. This was a useful means to make the animation more manageable and easier to control as the complete scene consists of close to three-thousand frames.

All in all I am satisfied with the workflow during the animation process and I think it was a good idea to split the scene into smaller parts, because it made the animation easier to control. On the other hand, this resulted in the situation that I had to do some cutting and camera editing after cutting the scenes together as a couple of cuts were problematic. One problem was that even though the camera set up of the scenes looked fine individually, the transition between the two

scenes did not always work. In one scene for instance the change of the camera shot between the scenes was not big enough. I had broken a rule of cutting, according to which the camera shot should never be changed to the immediate next size, i.e. for instance from extreme close up to close up or the other way round but to jump over at least one size to give enough contrast to the eye. In one other scene I had to readjust the first key pose in order to achieve a believable continuation of movement between the shots.

3.2 The illusion of life

In my animation I used the pose-to-pose animation technique. In this technique the first step is to create the poses which are most expressive and most important with regard to storytelling. Those poses are referred to as key poses. After adding the key poses the audience should get already a pretty clear picture of what the animation is about and it can be compared to comic books is which a story is visually told by depicting only the most essential pictures (Huuhtanen, 2009, page 9). The work phase of key posing is followed by the so called breakdown, which itself combines a number of different work phases like overlapping, offset and in-betweens to mention just a few of them. The overall purpose of breakdown is to create a smooth, functioning and non-linear transition between the key poses. For further reference to this technique I recommend reading Peke Huuhtanen's bachelor thesis 'Pose-to-pose-tekniikka 3D hahmoanimaatiossa' in which he describes the different work-phases of this technique in great detail.

We watch people's movements every day and can instantly detect a movement that is not natural. It is one of the challenges in creating animation that mistakes jump to the eye immediately. The audience's attention is drawn to the mistake and is distracted from the good parts of the animation. I encountered this situation several times during my own animation process when I play blasted a scene and saw only the mistake. I usually knew that the mistake was gone though, when after adjusting the animation and play blasting the scene again I realized only after watching the whole sequence that I was trying to check whether the mistake

was gone. If there is no obvious mistake in the animation the movements go almost unnoticed and the audience can freely follow the story.

In the following chapter I will investigate individually several concepts that I consider to be essential for creating the illusion of life: acting the thought, timing and spacing, anticipation and reaction, realism vs exaggeration as well as the relationship between actor and object. While I was aware of the importance of some of these concepts, like timing and spacing, the significance of others, as for instance the relationship between actor and object revealed themselves to me only during the animation process.

3.2.1 Acting the thought

'The mind is the pilot when it comes to animated characters' (Hooks, 2011, page 14)

I first became aware of the importance of thought in animation when I attended Ed Hooks lecture *Acting for Animators* in Stuttgart in 2013. Animators are often referred to as actors or in my opinion more fittingly as shy actors. Hooks who is an actor himself and who has been teaching acting for many years has designed special classes to teach acting to animators after realizing that classic acting teaching is not working well with animators. Many animators are rather shy and unwilling to perform in front of others. Also they simply have no need to study breathing technique etc. However, despite the fact that the animator’s approach to acting is quite different from real-life acting as it is not generated immediately and through oneself but through another medium, the principles of acting equally apply to actors and animators.

It was very interesting how Hooks explained the role of thoughts and goals as a starting point for all believable movements. He asked two people to the podium and, starting from opposite sides, to walk across the podium and greet each other as they meet. This same walking and greeting was repeated several times only that Hooks gave them little tasks. When they walked across the room next time they were given the roles of a king and his subject. After that the ‘king’ and the

‘subject’ had to think of a place they started from and then a destination. It was amazing how the performance changed every time and the initially characterless action became more and more believable and meaningful. The thought was creating meaning to their movements.

Richard Williams answers to his self-asked question: ‘why animate? Drawings that walk, talk and think: seeing a series of images we've done actually go through a thinking process - and appear to be thinking - is the real aphrodisiac.’ (Williams, 2001, page 11).

An example from my animation could be how the character approaches the ball in the first scene:

PICTURE 2. Acting the thought: The character approaching his object of desire.

There are countless ways to approach a ball, but the character walks in a straight line, one hand already raised and his eyes hypnotically fixed upon the globe. As the audience we see his purposeful movements and are able to deduct that he

has a clear goal that derives from thought.

Hook also emphasizes the importance of creating empathy with the audience: 'The illusion of life rests on empathy'. ‘Thinking leads to conclusions; emotion tends to lead to action. Your audience only sympathizes with emotion, not with thinking.’ (Hooks, 2011, page 15). At the same time the notions of thought and emotion are inseparable, as it is impossible to experience emotion without thinking. Let’s take the example of a person going to the washing room in basement late in the evening. The person hears a door creak and approaching footsteps and will automatically start to reason what the source of those steps and what the purpose of the approaching person might be: Is a stranger with bad intentions lurking in the basement, is it the good-looking neighbor who he has been hoping to meet for days or is it the old lady who never stops chatting when she meets him. Depending on the conclusion the person draws he will feel emotion; in our case either fear, nervous joy or irritation; and the emotion will result in some sort of action. Hence, an audience watching an animated sequence will see the action that is generated through emotion and thereby be able to life through the emotion the character felt.

That is, the key to a successful animation is that the audience has to believe that the depicted movement is a result of the character’s inner process.

3.2.2 Realism vs. exaggeration

Realism or realistic movement is the keystone of animation. Before animating a scene most animators consult real-life reference by observing reality or by simply acting out the scene themselves. This however does not mean a striving for realism but is rather an attempt to detect those elements necessary to make the animation believable: 'In order to depart from reality, our work has to be based on reality'. (Williams, 2001, page 34)

A good example for that might be the art of the great painters. Picasso for instance could not have created his cubistic works without having carefully studied realistic painting before that.

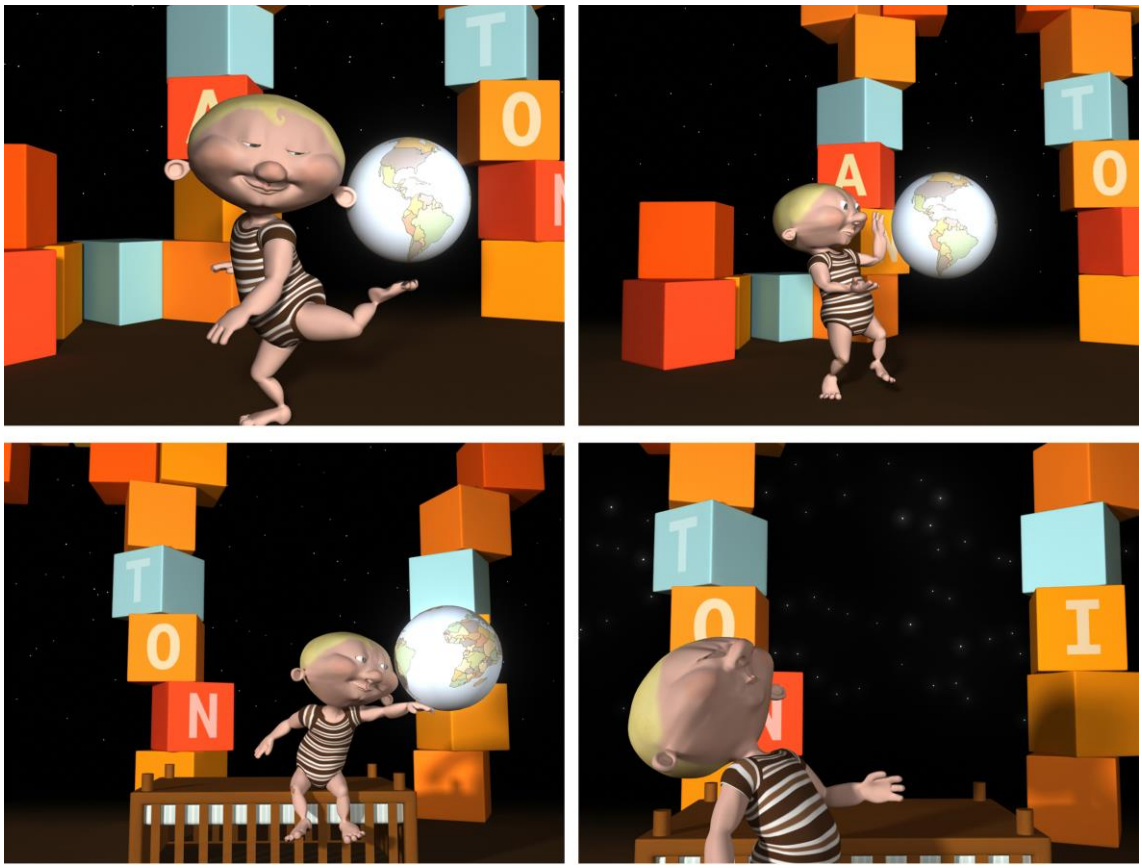
‘Caricatured matter has the same properties as natural matter, only more so. To understand how cartoon matter behaves it is necessary to look more closely into the way matter behaves naturally.’

In animation, caricature characters work particularly well. Etymologically the word caricature derives from Italian *caricare* which means overloading or exaggerating. In animation, exaggeration is the crucial element to bring the animation to another level.

….’naturalistic action looks weak in animation. Look at what actually happens, simplify down to the essentials of the movement and exaggerate these to the extreme.’ (both: Whitaker and Halas, 2002, page28)

Charlie Chaplin is a master of exaggeration and an excellent reference for animators also because he shows that there are practically no limits to how far exaggeration can be taken. A good example can be found in *Gold Rush* were, after having successfully made a date with his admired Georgia Hale, he literally ransacks his shed out of joy. He does not only jump of joy as one might expect; but jumps, swings wildly on the roof beam, furniture is turned upside down and his pillow is hit so hard that all feathers come out. He leaves absolutely no doubt with the audience about the amount of his joy.

Similar kind of exaggeration can be found in many animations, only that in animation frequently a breaching of physical laws is used in order to create the effect of exaggeration. I have once seen an animated scene where a character who is fleeing form the police is very quickly entering a room through a door. While still holding the door knob the character is swinging almost up to the ceiling as a reaction to speediness of his entering.



PICTURE 3. Exaggerated poses.

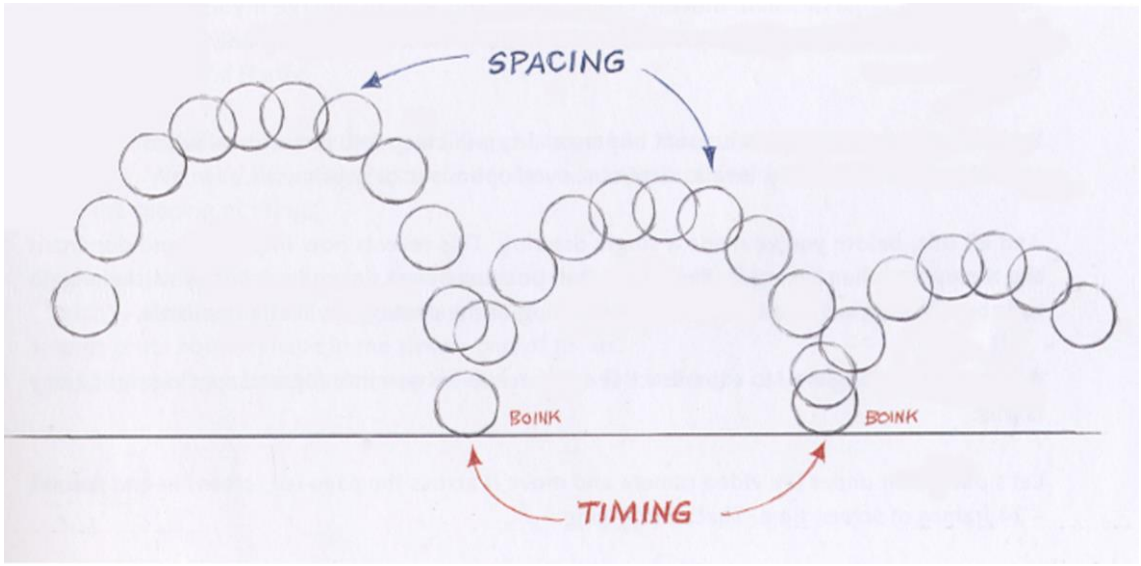
The globe scene is also full of exaggeration but the exaggeration in this scene lies not so much in the extremeness of the poses, but rather in the nature of the poses and movements in reference to the situation. The nature of the dance is highly exaggerated: Chaplin shows dictator's fascination and feeling of power towards the ball by bouncing it with his head and backside and by leading it through the whole room, lying and jumping on the table, always catching the ball in the last moment.

It is brilliant how far Chaplin carries the exaggeration in acting his disappointment as a reaction to the explosion of the balloon. In addition to the overacting of the physical reaction to the explosion he emphasizes his frustration with a highly theatric turn before crumbling head down onto the table and not enough with this he still lifts his back-side up in frustration like a stubborn child at the very end of the scene.

3.2.3 Timing and spacing

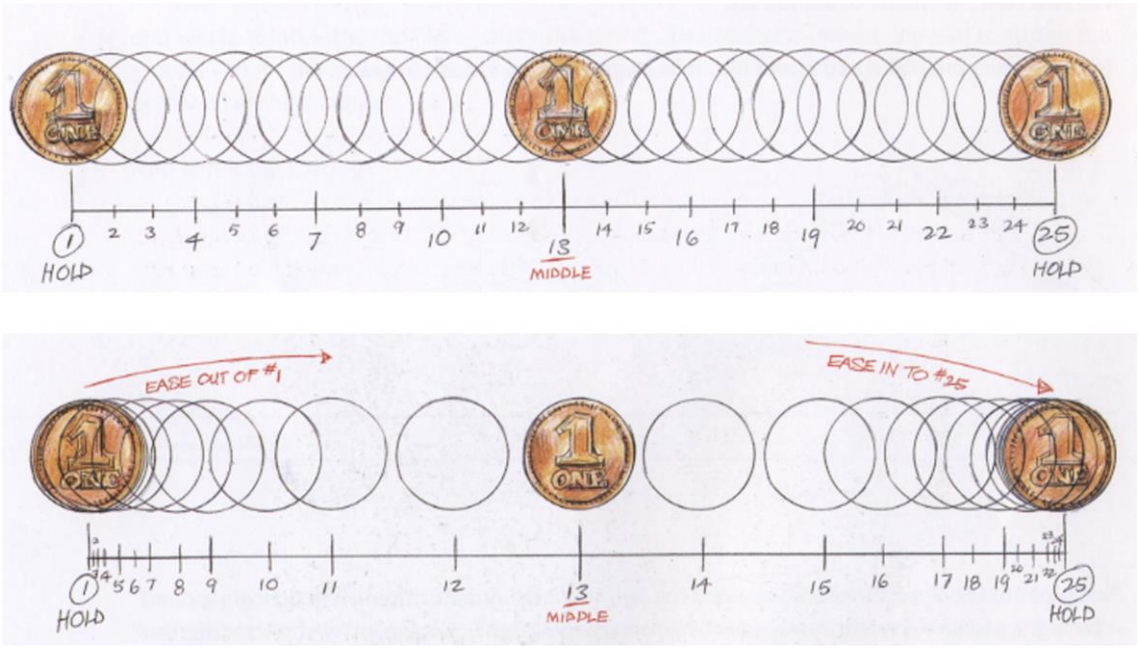
Timing and spacing are the two basic elements in animation and their interplay is crucial for the illusion of life.

Timing refers to the speed or the rhythm of an action and therefore is giving meaning to the animation. This meaning can be both physical and emotional. This meaning is further emphasized by the spacing which is a frame to frame displacement of the moving elements within a certain time.



PICTURE 4. Timing and spacing. Richard Williams, 2001

If we look at the frequently-quoted bouncing ball example we see that the timing of the action is determined by the hits to the surface and the amount of frames between them, or in other words, by how long it takes the ball to jump from one hit to the next. The spacing on the other hand refers to the distribution of pictures within a given time. This is nicely illustrated by the following two examples:



PICTURE 5. Spacing. Richard Williams, 2001

In both pictures a coin is moved an exactly same distance within 25 frames. The timing of the action is identical. The spacing however is quite different: In the first example the coin is moving with an equal spacing, i.e. it moves linearly from start to end point. In the second example the coin covers a shorter distance at the beginning and the end of the action and a bigger distance in the middle, or with other words it starts the movement slowly then accelerates and slows down again before stopping. This phenomenon is called *easing in* and *easing out* and is inherent to most natural movements.

The timing and spacing are often dependent on physical properties as in this example the speed with which it is thrown and the material of the ball. According to Newton's first law of motion things do not move unless a force acts upon them (Whitaker and Halas, 2002, page 12). Consequently, it is essential in animation not only to depict the movement itself but to show how the action represents the underlying forces by which it is triggered.

With computer generated animation it is easy to make an object move. Whereas in drawing animation twenty-four or at least twelve pictures (if it is shot on twos) is needed to create one second of animation, in computer Generated Animation only two key frames are required to make an object move across the screen

within one second. But movement alone does not qualify as animation, leave alone believable animation. The computer has no knowledge of the objects properties (size, weight, material). In character animation also the factors of thought and emotion are coming into the game. Is the attitude with which someone is moving sad or happy? This brings me back to thought and emotion as the starting point for believable motion. Is the driving force that moves an object anger, happiness, hesitation or giddiness? In addition to the nature of the action, timing and spacing are the key to transfer thought and emotion to animation.

Or is the object even having a will of its own. For me, one of the most fascinating things in animation is that also non-living objects can be bestowed with a soul of their own that will enable them to make decisions and move on their own account. Think of a golf player who is about to hit the ball with his rocket. If we assume that it is just an ordinary golf ball, as an animator we still have to consider the size and material of the ball and of course we have to take into consideration the golf player himself. Is he angry or happy, has he played golf before or is it his first time. That's a lot to take into account, but what if the ball is not a static object, but is a character with thoughts and feelings of its own. Maybe the ball eager to be hit or is it afraid of the hard rocket and tries to escape it. There are countless possibilities, all of which will influence on the timing and spacing of the action played out.

In the globe scene the slow and overall peaceful rhythm is the crucial nature of the timing. I was well aware of that already during the animation process but it became crystal-clear through a technical flaw. After rendering and importing the scene to After Effects I was shocked with the result. Even though the scene contained all frames the feeling of the animation barley resembled the original or my play blast versions. I then realized that even though I had animated at a frame rate of 24 fps it was imported to After Effects as 30 fps. The result was that the animation was too fast and looked almost hectic. A too fast timing is fatal particularly in this scene as the slowness of rhythm is giving meaning to the scene. The slowness is creating intensity and underlines the power of the character over the ball. The dictator rules the world and it moves according to his will. With a fast

timing this meaning is lost and the character looks rather like a jumping jack chasing a ball.

Further, when the timing is too fast also the contrast between the slow and the quick movements is lost. The fast movements in the scene are important accents and also serve the purpose of emphasizing the characters superiority over the ball. There are several moments in which he seemingly lets the ball go only to catch or kick it with a fast movement in the last moment.

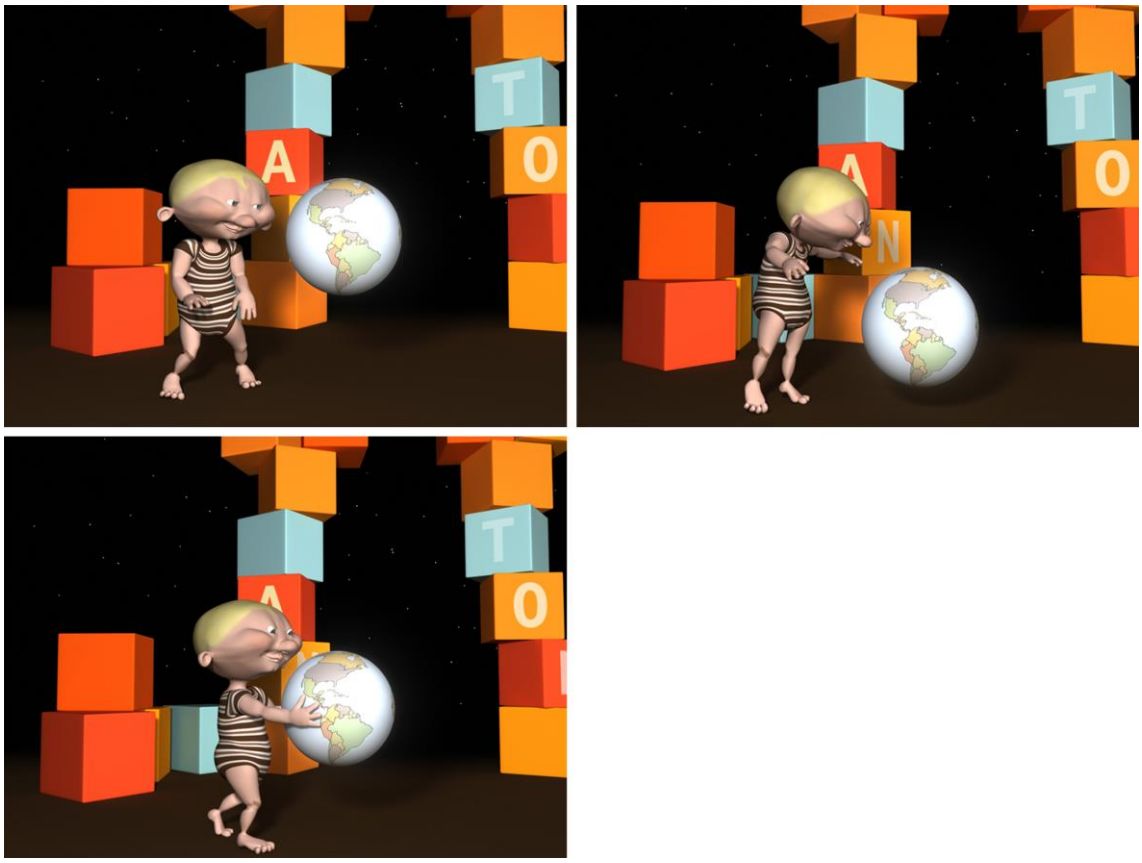
3.2.4 Anticipation and Reaction

‘Good timing, so that enough time is spent preparing the audience for something to happen, then on the action itself, and then on the reaction to the action.’ (Whitaker and Halas, 2002, page 10)

Anticipation describes the preparing movement for an action. For example a character about to get up from a chair will make a little downwards movement with the upper body in order to achieve the thrust needed before actually moving upwards. A character about to throw a ball will not do so without a swing to the opposite direction and a shift of weight in order to create momentum. The degree of the anticipatory movement hereby depends on the degree of the action to follow. The action of throwing say a chocolate bar to a classmate requires far less anticipation than the throwing of a spear trying for world record.

Being an essential part of real life action, anticipation is also vital to animation. Not only to create a feeling of authenticity but also as an important means of attracting the audience’s attention and of preparing it to the core action. This is particularly important if the core or main action is very fast.

‘If the audience can be led to expect something to happen then the action, when it does take place, can be very fast indeed without them losing the thread of what is going on.’ (Whitaker and Halas, 2002, page 58)



PICTURE 6. Anticipation

Before catching the globe in the second scene of my animation the character anticipates its movement by slightly crouching and bending backwards when the globe is coming down and by then stretching himself and moving forwards when the globe is moving upwards before he actually catches the globe.

The notion of reaction is very alike to anticipation, only that it describes not the movement that precedes but the movement that follows a movement. Say, a baseball pitcher throwing a ball will not freeze the motion after the ball has left his hand, but his arm will swing downwards and he will have to shift weight to his other leg in order to re-establish balance.

PICTURE 7. Reaction

In the globe scene the explosion happens very fast indeed. Within two frames the balloon has disappeared. Before the explosion, it is crucial to show the character for a couple of seconds happily hugging the ball before we are ready to take in the disappearance of the ball. Maybe even more important than the anticipation in this scene is the character's reaction to the explosion. The character's head is thrown back and his spine curves backwards in reaction to the surprise and the

force of the explosion, but most importantly, in addition to the physiological reaction the character reacts emotionally to the explosion as I have referred to in the chapter on exaggeration.

3.2.5 Holds

Holds are those moments in animation when the movement stops or as good as stops. In fact, the movement should never stop altogether as the animation would lose its vitality and believability. Holds are important for the rhythm of animation. They give the audience the chance to digest what they have seen and equally prepare them for the next movement. Breaks of movement are inherent also to real live action. Even though people appear to be moving constantly, they regularly pause for little moments, for instance to think. Those pauses can be very short indeed, but if we do not give our character the chance to pause and think his movement will not look like it is the consequence of thought and instead of looking alive he will seem mechanic or to be dragged by an invisible line.

3.2.6 Relationship between actor and object

One crucial thing to remember for creating the illusion of life in this particular globe dance scene is the relationship between the actor and the ball. So to speak, there are two actors present whose interaction is vital for the success of the animation. The character is highly interested in the ball and only for seconds, only for good reasons, takes his eyes of it. He is like a cat, fascinated by its food but enjoying the power over it. Like a cat playing with its food the character is playing with the ball, luring, almost letting it escape only to catch it again in the last moment.

The ball is this scene is inanimate object without a life of its own. Its movements are solely evoked by the character's touch. When animating a scene in which one character is bringing about movement to someone or something else it is important to first animate the actor or driving force and only then the follower and

not vice versa.

There is an interesting dynamic between the character and the ball, because, even though the character is the driving force, the one who makes the ball move, he is also dependent because of his fascination towards it and not at least because he has to anticipate and react to ball's movements. Chaplin is brilliant in creating this dynamic. The interplay between the intensity of look and seemingly careless treatment as a demonstration of power.

PICTURE 8. Focus on the ball

The importance of this dynamic became obvious to me after animating the first scene. Even though all poses were set and the general movement looked good, it did not work very well. I then realized that when the character shoots up the ball for the first time his eyes were not fixed on the ball for a couple of frames. This

little break destroyed the intensity of the whole scene.

‘Because people are interested in the objects they scrutinize, we can measure their interest by the way they look at an object...Scrutinizing an object is a fleeting action that adeptly expresses a person's feeling, making it a very important part of animation production.’ (Iijima, 2004, page 47)

The globe, the second 'actor' in the scene is a balloon and therefore exists of thick, elastic, rubbery material. In order to convey this property it has to squash and stretch to some extend on the interaction with a hard surface, i.e. the floor or the characters head.

Also, being a balloon it needs very little time to start it moving. The flick of a finger is enough to make it accelerate quickly away. When moving, it has little momentum and the friction of the air quickly slows it up, so it does not travel very far. (Whitaker and Halas, 2002, page 33f).

3.2.7 Constraints

Constraints are means of controlling an objects position, scale or rotation through another object (target object). This is particularly useful in animation when we have a situation in which we need an object to follow the position, rotation or scale of another. Constraints are very important in making an animation look believable as it is almost impossible to key an object in such a way that it would look like it is following another's movement.

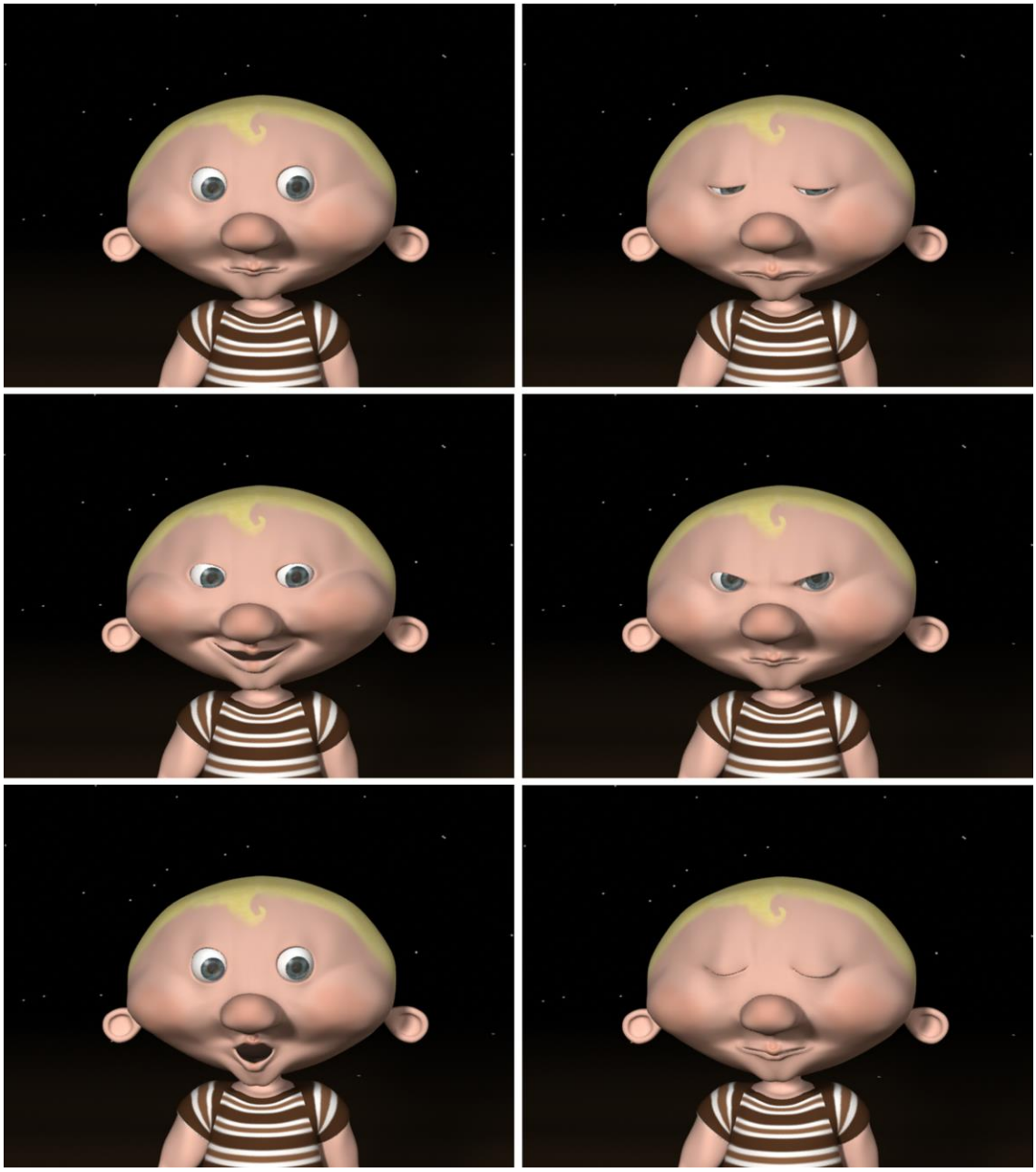
In our globe dance scene the character is constantly catching, carrying and releasing the ball which calls for the use of a constraint. In order to make the ball follow the character’s hands in the way we want we need a parent constraint as the parent constraint controls both the constrained object’s position as well as its rotation.

As the character is repeatedly flipping the ball from one hand to the other the ball is constrained to two different target objects (both hand controls) in several scenes.

In the last scene the ball explodes. The character holds it up to his face and then throws himself onto the bed. The broken balloon not only has to follow the movement of the hand but needed an animation of its own for the overlapping action while maintaining to follow the movement of the hands. Therefore I created a locator which I parent constrained to the target object i.e. the hand controller and then parented the rig of the exploded ball object to the locator.

3.2.8 Lip synchronization

When I modelled the character I was still planning to animate my own short script that would be without dialogue. So, when I modelled the blend shapes I focused on achieving some facial shapes to express the character's emotions like surprise, a frown, a smile, sad face and so on, but not face or lip shapes in order to create vowels and consonants.



PICTURE 10. Blend shape expressions. From top left to bottom right:

Thin mouth, sad, happy, angry, surprised, eyes-closed

As the film sequence I chose to animate contains a short speaking sequence I had to make best use of the facial shapes I had. I had never done lip synchronizing before and was happy to realize that the shapes I had were sufficient to create a functioning lip sync for the sequence. In his thesis '*Pose-to-pose-tekniikka 3D-hahmoanimaatiossa*' Peke Huuhtanen states that a common mistake in lip synchronization is the creation of an overly pronounced and accentuated animation which draws too much attention to itself and which easily looks unnatural. (Huuhtanen, 2009, page 25f).

I therefore tried to boil down my text sequence to the most essential sounds:

(*spoken text)*

Aut C**ea**sar, aut nullus. **Emp**eror o**f** the **w**orld. **M**y **w***orl*d.

[oːt sizɑ, oːt nuːlʊs. empərə(ɹ) pf ðə wɜː(ɹ)ld. maɪ wɜː(ɹ)ld]

(*phonetic transcription)*

In articulating vowels the mouth is opening to varying extends. When articulating consonants the mouth is generally more closed but most noticeably with the bilabials phonemes *p,b,m* and *w* and the labio-dentals *f* and *v*.

I therefore animated a closed mouth at the pronunciation of p,b,m,w,f and v and a slight opening slightly especially at stressed vowels.

Overall, the strongest stress lies on the starting syllables of *Caesar, emperor* and *world* (first mention of the word) among all of which the word *world* is clearly the most strongly articulated. Due to that I animated the strongest mouth movement or mouth opening in the pronunciation of the word *world*.

4 Summary

The aim of my final work was to create a concise and coherent animation sequence because I would like to work in animation after my graduation and felt that I need still more practice. I wanted to achieve an animation that depicts a good rhythm and movements that are fluid and believable. I wanted to focus on exaggeration and timing and in order to learn from observation, I decided to animate a scene from Charlie Chaplin because both concepts are inherently present in all of his works. During the animation process I started to think about the believability of motion and became interested in the crucial elements that are needed to create the illusion that an animated character seems to be alive.

There are several moments in my animation with which I am not fully satisfied. Particularly the arms would need more overlapping action to achieve a more smooth and natural look. In addition, two moments in the original globe scene look slightly clumsy by today's standards: when Chaplin jumps on the table it is obvious that he does not perform the jump himself but rather that he is pulled up by a wire. The other is the explosion of the ball which in fact does not explode at all but merely disappears after one frame of increased transparency. After the ball has disappeared Chaplin's hands are seen for a couple of frames without holding anything before leaving the picture. When his hands re-enter the camera-view he is holding the broken remains of the ball. I started to create an explosion simulation using particles but soon found that it would be extremely time consuming to create a good-looking simulation and as the explosion lasts only a couple of frames I decided to stick with the original version. Due to the decision to keep closely with the original I also did not attempt to animate the jump onto the table more jump-like but imitated the pulled-nature of Chaplin's jump.

Nevertheless I am satisfied with the overall rhythm and intensity of the animation.

In my thesis I decided investigate the question of believability of motion and particularly the creation of the illusion of life. Writing the thesis as well as creating the animation have been a very inspiring and instructive processes. I am satisfied with the choice of picking Charlie Chaplin as animation reference and I feel that I have learned a lot and gained more experience and confidence as an animator.

The creation of a good and believable animation is a painstaking process. It comprises many work-phases all of which directly contribute to the success of the result and can therefore be considered equally important. If for instance the timing of the animation is problematic, the animation will not be convincing even though other areas are working well. By the same token, we cannot get a satisfactory result if a well-timed animation is lacking for instance a functioning breakdown.

For me the most eye-opening discovery during this process has been the understanding of the importance of the character's thought and emotion not only as a starting point of all movement but as a string of motivation and meaning throughout the whole animation. I think that the presence of the character's thoughts can make the difference between a good and a brilliant animation. I have once heard about the person who was animating the yellow m&m who found himself in the dilemma of having to animate his character in a certain way, knowing that this would contradict its personality. That is, he was very aware of the importance of the character's character and his way to express thought and emotion and by being asked to deviate from it saw the believability of his animation endangered.

In that way I think that animators are very much resembling actors as we have to put ourselves into the position of our characters, get to know them, learn to feel what they would feel in a certain situation and how they would go about doing certain things.

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