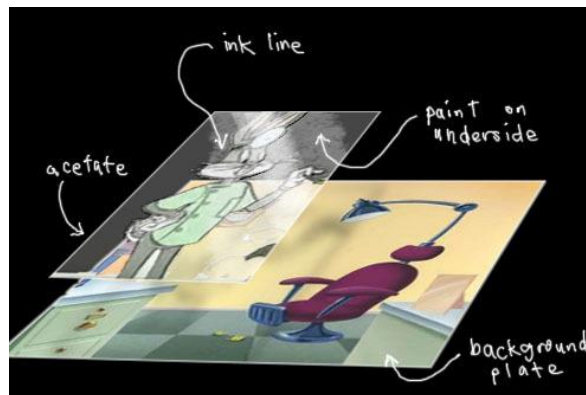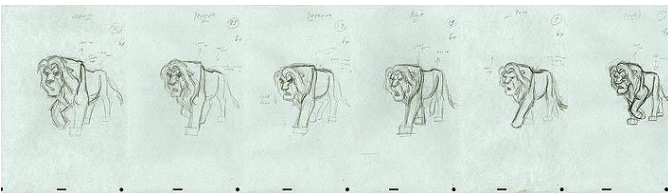# Creating Digital Animation

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Cel Animation

Cel animation is a traditional form of animation used in the production of cartoons or animated movies where each frame of the scene is drawn by hand. A full-length feature film produced using cel animation would often require a million or more drawings to complete. They make animated cartoons, such as Tom and Jerry, and feature-length films. Moving characters are drawn on transparent sheets (called cel) and placed over fixed backgrounds. Each set of cels (foreground action and fixed background) is then photographed. Normally 12 or 24 drawings are required for each second of the film. Finally before projecting them, appropriate music, voice overs, are added.
 Usually looks flat - not 3D.

The Lion King' is one of the most famous traditionally animated feature films.

Advantages and Disadvantages of Cel Animation

Advantages :

- **High details:** Looks cleaner and crisper, because it has a more highly detailed look to it. This is due to the repetition of similar scenes resulting in a build up of artwork.

- **Express ideas**: It allows animators to expressive their style even further (since the animators have the chance to be creative and use their ideas). Has a much more classic feel to it, because makes the audience more easily able to relate to characters, since they still enjoy watching them (cel animation).

- **Cheap:** this is due to no technology required and therefore the resources would be a minimum of cels and equipment in order to draw and sketch illustrations. This is because the resources needed are mainly a pencil, sharpener, paper and colours. These are all limited resources which are all easy to get hold off.

Disadvantages :

- **Time consuming :** It takes a long time to produce a cartoon or film due to the huge amount of frames needed to make movement . Also its time consuming, because of this it is more expensive to produce 2D/traditionally animation films. Meaning it requires a lot of animators(for a film).
- **Correcting mistakes:** A mistake in traditional animation requires you to repeat the whole drawing instead of deleting and correcting a mistake. The repetition of work can become tiresome and time consuming.
- **Lack of a market:** Traditional animation requires the use of a wide range of special artistic tools. Large rooms are required for the entire process, from drawing, tracing to photography, and finally filming. The size of traditional equipment like the rostrum camera demands a lot of space.

Computer-generated imagery (CGI)

Computer-generated imagery (CGI) is the application of the field of computer graphics or, more specifically, 3D computer graphics to special effects in art, films, television programs, commercials, simulators and simulation generally, and printed media. The visual scenes may be either dynamic or static. It is used because the quality is often better and the effects are more controllable than, for example, using models. Another use is for crowd scenes, because it allows more flexibility than other methods and avoids the hire of expensive extras (actors).

A computer generated image (CGI) is an image that has been taken from one format such as a CAD file, and converted using computer software tools that manipulate lighting and reflections to create a photorealistic image. CGI is used for visual effects because the quality is often higher and effects are more controllable than other more physically based processes, such as constructing miniatures for effects shots or hiring extras for crowd scenes, and because it allows the creation of images that would not be feasible using any other technology.

The purpose of this computer graphic is to entertain people, as it's a bitmap image, meaning it would have a good quality of the image shown and high resolution. Also it this graphic is a vector based as it based on shapes and curves, meaning a high resolution too.

Advantages and disadvantages for CGI

Advantages:
- **Simple interface**: CGI is that it's a very simple interface . It's not necessary to have any special library to create a CGI program, or write programs using a particular API. Instead, CGI programs rely on the standard concepts of standard input, standard output, and environment variables to communicate with the Web server.
- **Professional:** Due to the way in which CGI animation is made, the final product looks extremely professional compared to cel animation.
- **Easier editing:** With CGI animation, due to the way in which the animation is made on the computer, you are able to create characters and setting easily, making them look exactly how you want.
- **Use of Computer:** Also for CGI animation, only a computer which is easily accessible and you can create the whole animation on this one resource, compared to cel animation(since it requires pencil, papers etc).
- **Language independent**: CGI programs is that they are language independent. CGI programs can be written in any language that allows one to write normal programs, since they are executed in the same way as the normal programs.

Disadvantages:
- **CGI programs:** CGI programs are slow since they need to fork a new process for every HTTP request and the database connection must be reopened for the next instance of the program, which is quite costly. One solution is to use FastCGI instead of CGI. FastCGI implements a technique using which forking one process for every request is not necessary, therefore can improve the performance.
- **Time consuming:** creating CGI animation is extremely time consuming because you have to be very precise in every image you create.
- **Complex:** using CGI animation is very complicated and would require a lot of time, due to the style in which the animation is made.
- **Specific software:** you may not have the required software that is needed which can be quite an issue to get hold of the correct software, otherwise the animation may not look as good as it should.

Avengers (Computer-generated imagery)
https://www.youtube.com/watch?v=MnQLjZSX7xM
(Avengers clip)

What animation technique is used?
This animated clip is produced by Marvel Studios, an American television and motion picture studio .

It is played on YouTube over the Internet and its a computer generated animation, which lasts 4minutes and 44 seconds. This animated clip can be saved as Mpeg-4, which shows how the movie Avengers was created, using the special effects . It also shows how some part of the movie was created, in more detail and more clearly than written explanation could.

There is dramatic action music played throughout the clip. There are also sound effects for explosions.

The animation uses both vector and bitmap graphics. The resolution is good but there are some pixelated scenes. The size dimensions of the animation are 560 x 315 pixels.

There are a range of special effects used in the Avengers animation clip like; various camera angles and zoom effects are used to increase realism. Also motion blur, shading and textures give a 3D realistic look to the animation.

Purpose/ Fit for purpose

- **What are the purposes of the animation product?**

The purpose of the animation product is to advertise and promote the movie avengers. This animation can be played on TV or the Internet to persuade people to watch the movie avengers. The clip is designed to show the best parts of the movie and a uses effective music to get the audiences attention. The animation is design to also entertain people to be interested in the mission and to find out more about it and follow its progress.

- **Fit for purpose:**

The purpose of this animation is to advertise and get people interested in the movie. The animation gives a much better idea of how the Avengers was created as an animation, than a written description which is effective in educating people(who like drawing/ visual learners.

The last part of the clip, where the creature has landed it does not continue on the actions. It gives a sense of humour how hulk punches his team mate after landing the creature and destroying it , on the floor. Therefore, this is the best way to show what will happen and get people interested.

The quality 3D animation gives a really good impression ,of the landing of the creature. It presents a professional/ fun image of the video. The CGI technique used in this clip allows characters to do things, which would not be possible with live actions. For example, Hulk crashing through his way to chase the woman(at the starts of the video clip), showing the capability of having strong powers and strength to destroy his surrounding. Whereas in reality this is not true, since being a human meaning not having that level of strength.

Also the fast action scenes like when hulk jumps to a building to destroy his enemy/ opponents. This could not be produced in live action.

The very detailed scenes and backgrounds produced in the film are also entertaining and contain Action elements. People with ages 12+ will find this animation(video clip) very entertaining and will be willing to pay to see them, in cinema.

Strength and weakness

- **Strengths: Gives a realistic impression of how the movie Avengers was created.**
Since the Avengers animation is realistic, it can be used for education and would give a good sense of what it looks like and how it works., behind the scenes. This is important because the audience will not see it in real life(since a creatures being destroyed will not be seen) and other creatures from a different planet will not invade earth..

- **Weakness: Has a very limited audience appeal.**
However it will not be as popular as Wallace and Gromit, because not as many people will want to watch it because it is mostly educational rather than entertaining. Also it requires high level of understanding of how the Avengers was created, behind the scenes.

Wallace and Gromit films are a series of well known comedy animations. There are both short films and full length feature films, for example: Short films – A Grand Day Out (30 mins).
Full length feature film – The Curse Of The Wererabbit(85 mins). The films have won a variety of awards.

These films are stop motion animations with clay or plasticine characters and real scenes and backgrounds (i.e. physical model scenes rather than drawn, and therefore appear 3D). They include a high level of detail and are of high quality. Although the characters and scenes have lifelike characteristics they are not intended to be realistic in the same way as the Avengers animation. Some scenes include fast action which is very dramatic and exciting.

There are a range of special effects used in the Wallace and Gromit animation clip like; various camera angles and zoom effects are used to increase dramatics. Also motion blur, shading and textures give a 3D realistic look to the animation.

The animation uses vector graphics. The resolution is good but there are some pixelated scenes. The size dimensions of the animation are 560 x 315 pixels.

Purpose/Fit for purpose

- **What are the purposes of the animation product?**

The primary effect on the audience of these films is entertainment and amusement. The films have a lot of comedy content, aimed at making people laugh. The films have a wide range of appeal to different audiences with content that appeals to both adults and younger audiences. Unlike the Avengers film was is free for anyone to watch or download. Whereas the Wallace and Gromit films are commercial and people have to pay to view them.

- **Fit for purpose:**

The purpose of these films is to amuse people, make them laugh and entertain them. The stop motion technique used in these films allows the characters to do things which would not be possible with live action. For example, Gromit the dog does many things a real dog could not do e.g. his facial expressions are human like and funny. This will make children from the age of 6+ to laugh, which will meet the target audience. Also the fast action scenes like the train chase in 'The Wrong Trousers' are very dramatic and funny, but could not be produced in live action. The very detailed scenes and backgrounds produced in the film are also entertaining and contain comedy elements. The success of the Wallace and Gromit films prove that they are fit for purpose. People find them very funny and entertaining and are willing to pay to see them.

Strengths and weaknesses

- **Strengths of Wallace and Gromit : High quality detailed animation with amazing fast action scenes.**

The highly detailed clay model characters and backgrounds are both a strength and weakness of the Wallace and Gromit films. The high level of detail provides a degree of realism not normally found in stop motion films. This makes the films very entertaining and amusing. Facial expressions and movements are realistic and funny. This is a great strength of the films.

- **Weakness: Stop motion animation takes a very long time to create.**

The weakness of the detailed characters and sets is that they take a very long time to produce. Unlike a computer animated film where the software can fill in movement between key frames (tweening) with a stop motion film each individual frame must be hand positioned and photographed.

With making a full length Wallace and Gromit film taking 5 years, it makes producing a film like this very expensive