

# Computer Animation, History and Future Technology

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**Abstract—** Animation is basically a form of pictorial presentation has become the most prominent feature of technology based learning environments. Computer animation is the process used for digitally generating animated images. The more general term computer-generated imagery (CGI) encompasses both static scenes and dynamic images, while computer animation only refers to moving images.

This paper examine the several different views – historical through the modern computer generated and the future in computer animation. It covers a short history of animation with a detailed look with some example and emphasis the techniques used in the animation process. It also look at the future technologies, techniques and tricks used in animation and how computer changed the animation industry and what are the challenges and problems occur in computer animation .

## INTRODUCTION

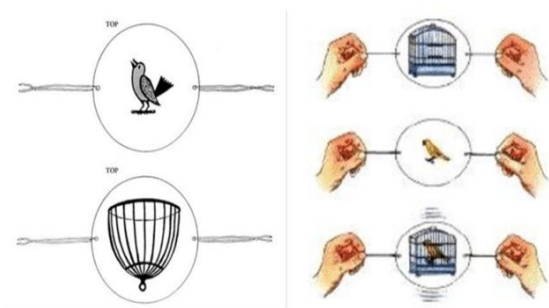
Animation has historically been produced in two ways. The first is by artists creating a succession of cartoon frames, which are then combined into a film. A second method is by using physical models, which are positioned, the image recorded, then the model is moved, the next image is recorded, and this process is continued. The term computer animation bring something new to the traditional way of animation. Animation means giving life to any object in computer graphics . Computer animation is a visual digital display technology that processes the moving images on screen. In simple words, it can be put or defined as the art or power of giving life, energy and emotions etc. to any non-living or inanimate object via computers. The basic idea behind animation is to play back the record images at very fast speed to fool the human eye into interpreting them as continuous motion .

## I. HISTORY OF ANIMATION

The past and the present animation has evolved over time. It started with pieces of paper and is now 3D animation videos. American animation owes its beginnings to J. STUART BLACKTON, a British filmmaker who created the first animated film in America. In this section, we will list the chronological order of the development of animation and animation devices. These devices were used to entertain, amaze, and sometimes even frighten people. The majority of these devices didn't project their images and could only be viewed by one or a few persons at a time. Later they are considered as optical toys rather than animation devices.

### 1. THAUMATROPE

A Thaumatrope was invented by John Ayrton Paris, an English physician in 1825. Thaumatrope was the first instrument to exploit the persistence of images on the retina. Basically it is a disk with a picture on each side is attached to two pieces of string. When the strings are twirled quickly between the figures the two pictures appear to blend into one due to the persistence of vision.



### 2. PHENAKISTOSCOPE

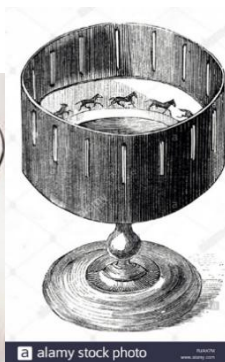
After the invention of Thaumatrope, the first phenakistoscope was invented by Belgian physicist Joseph Plateau in 1832. It is the device that is largely considered to be the first mechanism for true animation. The device uses the persistence of vision principle to create an illusion of

movement. It tricks the eye by making the figures in the pictures appear to move. It composed of similar images in different positions taken in order to relay the movement.



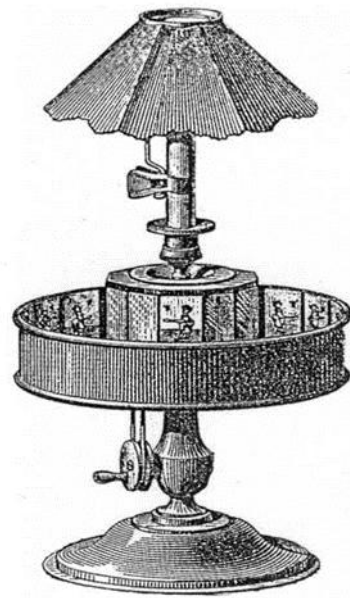
### 3. ZOETROPE

In 1843, William Horner, a British mathematician invented the zoetrope. A zoetrope produces an illusion of movement from a rapid succession of static pictures.



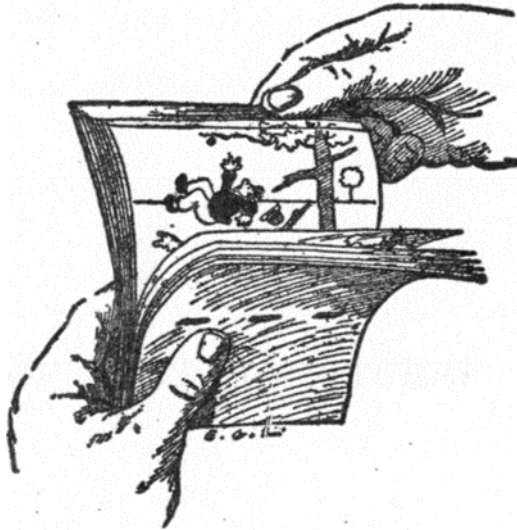
### 4. PRAXINOSCOPE

It was designed by Emile Reynaud in 1877. It is almost similar to zoetrope, the only difference was the integration of mirror to the device. It makes the user more comfortable as they watch the movement of the objects. it was known as the "action viewer".



### 5. FLIP BOOK (Kineograph)

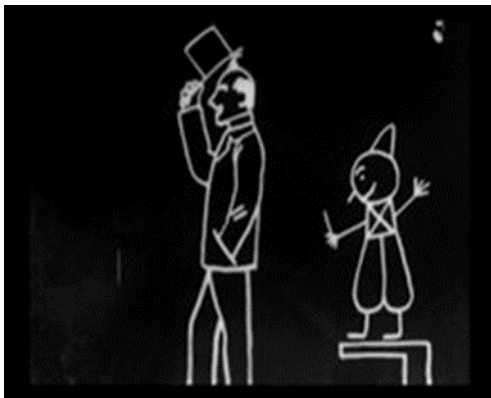
The first flipbook appeared in Birmingham, England in 1868 when the British lithograph printer John Barnes Linnett patented his new invention under the name kineograph, literally "a moving picture". It is a small book with relatively springy pages, each having one in a series of animation images located near its unbound edge. The user bends all of the pages back, normally with the thumb, then by the gradual motion of the hand allows them to spring free one at a time.



**THE KINEOGRAPH.**

## II. THE BIRTH OF CARTOON CHARACTERS

- A. The first animated film “Fantasmagorie” was released on 17 August 1908, by the Gaumont company in Paris. It was the world’s first fully animated cartoon created by Emile Cohl in the traditional hand drawn animation style. The creation of the first ever animated film also inspired many animators to create their own animations.



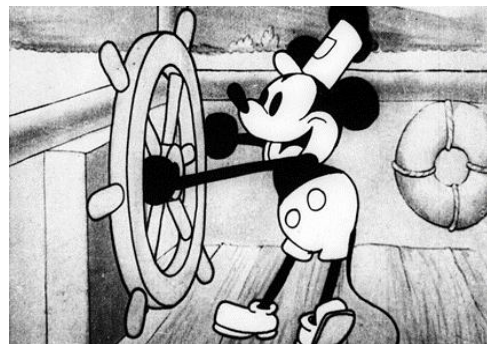
- B. Winsor McCay drew “Gertie, the trained dinosaur”. It was the animated film consist of 10,000 drawings.



- C. Next was “Felix the cat”, during the early 1920s, it become the most famous animated character.



- D. On November 18, 1928 Mickey Mouse was created. It was the first successful sound animated film. It became an international star and made way for launch of Disney Studios



- E. . And then, “Looney Tunes “ was introduced in 1930 by Hugh Harman and Rudolph Ising run by the Warner Bros. company. Bugs Bunny, Daffy Duck, Tweety Bird and Silvester are just a few of the main characters in this cartoon.



### III. STOP MOTISON ANIMATION

Stop motion animation (also called stop frame animation) is animation that is captured one frame at time, with physical objects that are moved between frames. When you play back the sequence of images rapidly, it creates the illusion of movement. The basic process of animation involves taking a photograph of your objects or characters, moving them slightly, and taking another photograph. When you play back the images consecutively, the objects or characters appear to move on their own.

### IV. COMPUTER ANIMATION

A. Computer animation first started being worked on in the early 1940s and 1950s when certain people began experimenting with computer graphics. The most notable job was done by John Whitney. In the 1960s, when computers become more available, people's interest in computer animation started spiking. The search for more innovative computer graphics started to blossom. At first, computer animation was used for scientific, research, or engineering purposes. In the 1960s, people started exploring the use of computer animation for artistic purposes. In the 1970s, more and more people put effort in experimenting with and improving computer animation with the aim of reaching public media and getting it on-screen. Much computer graphics at this time involved 2-dimensional imagery, though increasingly as computer power improved, efforts to achieve 3-dimensional realism became the emphasis. By the late 1980s, photo-realistic 3D was beginning to appear in film movies, and by mid-1990s had developed to the point where 3D animation could be used for entire feature film production.

#### B. 2D ANIMATION

A 2D shape is a figure or object with two dimensions, namely length, and height. 2D shapes have an area, but they don't have any volume. Two-dimensional or 2D animation is characterized by having its objects and characters created in the two-dimensional space. It means that they only have width and height. every aspect of the video including characters, objects, and background are rendered in two dimensional, flat space..



### C. 3D ANIMATION

3D Animation is when computer generated objects appear to move through three dimensional space. Computer animation is done on a three plane grid consisting of the X, Y, and Z axes. 3D animation is created entirely in the computer, but it is made in three dimensions. In the first part of the process of creating 3D animation, three dimensional models are created. The animations are made by moving around these 3D models, much as you would move a puppet. Once the model has been created, animation is completed by changing the poses and placements of the model.



### V. FUTURE ANIMATION

When comparing the past and present of the animation, it is like comparing the a painting and a photograph. Computer animation has been considered for many years as a new media for advertisement and special effects in films. More recently, the fast development of powerful superworkstations has led to new areas like multimedia, interactive games and Virtual Reality. For these new areas, interactive and real-time animation has become a key issue. animation in the future will be magnificent because computers and the techniques that we have used every day are becoming so advanced that they came out with supercomputers. Its technology is also constantly advancing in all the fields, especially in business and work, education and children, and entertainment.

### VI. SOME EMERGING TECHNOLOGIES IN ANIMATION INDUSTRY

With the help of the emerging technologies and the trends, the animation is going through several phases of betterment which are making it do the most of the complex things in an easy manner.

#### 1. Motion Graphics

It is used when we need to create illusions like movement. A story can be created with motion graphics if we add audio in that. Earlier the motion graphics were known to work on only the cartoon characters but it has been no longer the case. Now we can even create an illusion of movement for the human, infographics, etc. With the motion graphics, the animation looks more vivacious.

#### 2. Augmented reality(AR)

Augmented reality (AR) is an enhanced version of the real physical world that is achieved through the use of digital visual elements, sound, or other sensory stimuli delivered via technology. For example, augmented reality animation software creates an image or 3D object which the

software then blends into a real-life background. The combined image is viewed through the camera aperture of a cell phone. So, as the name implies augmented reality animation adds something to reality that wouldn't otherwise be there. The blending can be convincing that it is hard to see what is a solid object in the environment and what is an AR overlay image or object.

### 3. Virtual reality

Virtual reality (VR) refers to a computer-generated simulation in which a person can interact within an artificial three-dimensional environment using electronic devices, such as special goggles with a screen or gloves fitted with sensors. Dynamic animated stories can be created with this.

### 4. Hybrid animation

The marketers found an interesting way to entice the people, they do it by giving the 3D things the look of 2D which makes it more attractive to look at that. This is called the hybrid animation which has recently started and it is showing an effect on the users. The marketers cut costs by putting the 2D objects in the 3D space.

## VII. CHALLENGES OF COMPUTER ANIMATION

The animation industry has seen a great shift toward using computers to create cartoons and movies. Regardless of the process of animation chosen, challenges exist for an animator. Computer animation is definitely no exception. To this rule.

1. The first obstacle that comes in animation is its versatility. One may have to animate anything, from two superheroes fighting amid a city or a toys coming to life, everything is a possibility, which makes drawing the frames for these scenarios quite difficult.
2. A second problem not generally recognized is that a production animation system requires the management of hundreds of thousands of drawings, hence data base management techniques not normally found in experimental animation systems.
3. 3D thinking - Computer animation is done on a three plane grid consisting of the X, Y, and Z axes. Aligning an object takes much more effort because at minimum three, and usually four, different viewing angles.
4. Colours - Other considerable differences are the ways that colors and textures are created. People used to mixing paints and pigments will have a little difficulty adapting to the computers color mixing paradigm. Instead, a color can be selected from the palette and textures developed within the software. These components are then assigned to the model in specific regions to color and mold its characteristics.
5. Modeling - Computer modeling is no small feat. Hash Animation Master is one program that offers a lot of power in modeling but doesn't make it simple.

6. Rendering - The biggest challenge is to pick the rendering software that will produce the proper result for a given project. Some rendering systems are designed for 2D images and keep the work smooth and crisp.

7. Last but not least, because of the increasing demand in 'REAL LIFE LIKE ANIMATION', the era of hand-drawn frame animation is receding and also increasing in the amount of data rendering exponentially! The raw data for a simple 1 hour movie clip can be as much as Petabytes! And organizing such a huge and complex database is a challenge in itself.

## CONCLUSION

Computer animation has made a huge impact on entertainment, movie industries, and kids. Computer animation made entertainment more interesting and enjoyable. Huge companies, such as Walt Disney and Pixar, were greatly influenced by the invention of computer animation. Additionally, computer animation is not a replacement for traditional animation, just another tool. Finally, although the technology today is advanced, there's a greater future in store for computer animation.

## References

1. Sajid Musa, Rushan Ziatdinov, and Carol Giriffiths, "Introduction to computer animation and its possible educational applications", 34500 Buyukcekmece, Istanbul.
2. Large, A. (1996). Computer animation in an instructional environment, Library and Information Science Research, 18(1), pp. 3-23.
3. [https://www.researchgate.net/publication/2580051\\_Computer\\_Animation\\_in\\_Future\\_Technologies](https://www.researchgate.net/publication/2580051_Computer_Animation_in_Future_Technologies)
4. [https://en.wikipedia.org/wiki/History\\_of\\_animation](https://en.wikipedia.org/wiki/History_of_animation)
5. <https://www.miglia.com/a-brief-history-of-computer-animation/>
6. <http://trinityanimation.com/blog/augmented-reality/#:~:text=Boiled%20down%20to%20its%20essential%20aperture%20of%20a%20cell%20phone.>
7. <https://webdesignseattle.medium.com/history-future-of-animation-b2c9509dbba2>
8. <http://confeitariamag.com/some-of-the-emerging-technologies-that-may-impact-the-animation-industry/>
9. <https://www.dragonframe.com/introduction-stop-motion-animation/>
10. [https://en.wikipedia.org/wiki/Motion\\_graphics#:~:text=Motion%20graphics%20\(sometimes%20mograph\)%20are,for%20use%20in%20multimedia%20projects.&text=Motion%20graphics%20are%20exceptional%20way,add%20depth%20to%20the%20story.](https://en.wikipedia.org/wiki/Motion_graphics#:~:text=Motion%20graphics%20(sometimes%20mograph)%20are,for%20use%20in%20multimedia%20projects.&text=Motion%20graphics%20are%20exceptional%20way,add%20depth%20to%20the%20story.)
11. [https://en.wikipedia.org/wiki/Fantasmagorie\\_\(1908\\_film\)](https://en.wikipedia.org/wiki/Fantasmagorie_(1908_film))
12. <https://www.google.com/search?q=who+invented+kineograph+animation&source=lmns&bih=575&biw=716&hl=e>

n&sa=X&ved=2ahUKEwiWoqfzybTwAhUJBLcAHYmC  
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