APPROACHING REAL-TIME RENDERING FOR NEWS REPORTING MEDIA TECHNOLOGY.

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Abstract

Real-time rendering is the part of 3D (Three Dimensional) computer graphics, focus on producing and analyzing images in real-time. It is mainly used in video games and interactive graphics in the past two decades. The 3D images are rendered by high-performance computer speed, hence the scenes seem to occur in real-time when players interact with the game. Moreover, real-time rendering has also been used for many purposes such as media and entertainment, films, manufacturing, and architecture. In 2018 there is a Forecast channel in the United States which is famous for portraying realistic 9 feet of storm surge at Carolina coast when Hurricane Florence was approaching. This study approached the pipeline of Real-time rendering and studied the significance of media technology in the present time since nowadays media technology has been developing and it plays a major role in the production of news.

Keyword: Real-time rendering, News reporting, Media technology, 3D

Introduction

Since the state of journalism and the public relations industry has been changing rapidly in the 21st century. Social media has become the main source of online news with more than 2.4 billion internet users. There are nearly 64.5 percent receiving breaking news from Facebook, Twitter, YouTube, Snapchat and Instagram instead of traditional media. Moreover, most people are just pass through their newsfeed and read the headlines or a short video clip of the piece. The average visitor will only read an article for 15 seconds or less and the average online video watch time is 10 seconds if they do not have anything to really catch their eyes. Even though news reporting production has remarkable graphics virtualization, infographic, and video motion graphics (Martin, 2018), they still have limitations and people also require more immersive digital experiences which are vital to helping visualize and understand the experiences of news. Also, the news-production company needs to draw customers' attention from additional platforms and opponents.

In 2018, when the Hurricane Florence attacked Carolina coast, the Forecast channel in the United States reported 9 feet of the storm by showing a realistic storm effect that could interact with the reporter, as a result, people largely discuss how realistic they are and how they are able to show information about the danger of the storm. This impact makes people could decide to evacuate. The tool, which was used, is the Unreal Engine, well known as Real-time rendering game engine which is developed by Epic Games. It was originally developed for the game in a variety of genres and then it was later used in many diverse media objectives such as interactive graphic art and news reporting.

Real-time rendering or Real-time computer graphics are based on three-dimensional data stored on the computer converting 3D wireframe models into 2D images with 3D photorealistic, typically using a graphics processing unit (GPU). It widely uses in video games and interactive graphics because the pictures are rendered so quickly and appear to be being generated in absolute real-time which is different from pre-rendering. Basically, there are two major types of rendering in 3D. The main difference between them is the speed in which the images are calculated and processed (Real-time rendering in 3D, n.d.). Pre-rendering can take from seconds to even days for a single image or frame.

This study was to approach how real-time rendering tool could be effective on news reporting media by exploring the transformation of news reporting with media technology, the real-time rendering pipeline that could reduce the time and process of news reporting production and also flexibility for team development with reusable sources and how new generation hardware could support real-time rendering.

Approach

News reporting Media technology

The phrase “information overload” is well-known for a while but not many people know that it was used by the futurologist Alvin Toffler in 1970. He predicted that the rapidly

increasing amounts of information being produced would eventually cause people problems. This is true as he said, people are trying to deal with more information than they are able to process to make sensible decisions. The result is that they either delay making decisions or make the wrong decisions. This incident directly affects journalism especially when social media has become the main source of online news which is shown in Figure 1 below.

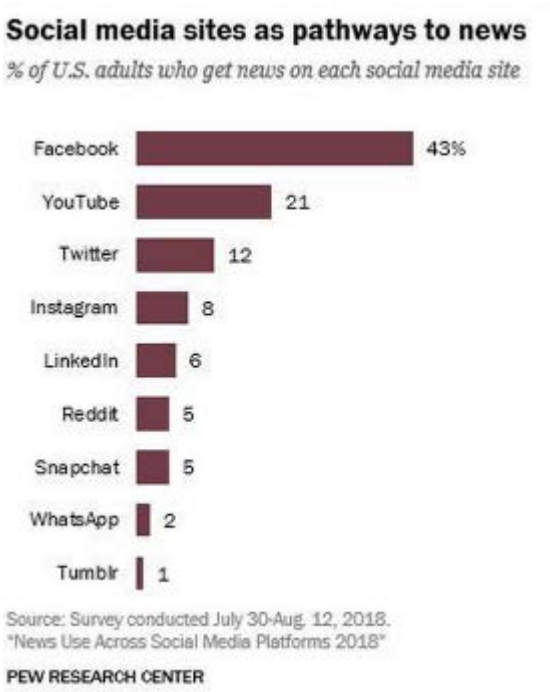

Figure 1 Social media site as pathways to news (Martin, 2018).

The survey shows that people heard about the latest news via social media before ever hearing about it on a news station. Many internet users see the breaking stories on their feed and go to the news sites to learn more. However, there has been a decrease in how much of an article that people read and watch. Most people will just scroll through their newsfeed and stumble upon relevant news content and they just read the headlines or watch a short video clip of the piece. The average visitor only reads an article for 15 seconds or less and the average video watch time online is 10 seconds. From this social media problem and information overload, people are less interested in information around them. It is important to keep it simple, relevant and clear and still attract the audience. This is how media technology has played a huge role in news reporting.

Media technology for supporting news reporting has been continuously developed such as live videos, infographic and motion graphics, particularly in forecast reporting they have various kinds of media to attract people as shown in Figure 2, 3, 4 below.

Figure 2 Classic forecast program with infographic or video from various channels in USA, China, Australia, and the UK

Figure 3 Japan forecast program ANN shown typhoon Hagibis damage with house mockup model. ("Fear of maximum instantaneous wind speed "65 meters"! What is its destructive power",2019).

Figure 4 Thailand forecast program channel 7 with 3d animation about the flood. ("Weather Forecast",2019).

Figure 2 shows the classic forecast reporting with reporters in front of many media such as infographics, videos and motion graphics. In figure 3 it seems to be interesting because of the realistic setup. Although it took a long period of time and money for building everything up. In figure 4, it seems to be much more entertaining because the reporter is interacting with 3D animation. which is difficult due to the fact that she had to act with the video from pre-rendering animation. The producer has to make sure every movement of the reporter synchronizing with the material, so the reporter has to rehearse many times and also do blocking and specify every movement clearly along with the video before shooting. Furthermore, pre-rendering has numerous process which takes a generous amount of time as shown in figure 5

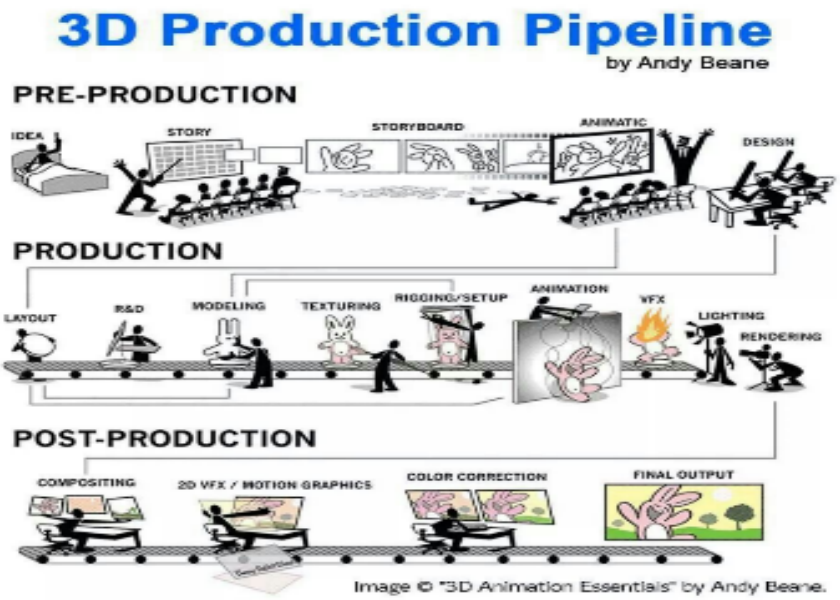

Figure 5 3D production pipeline by Andy Beane (Casmenco, 2018)

However, The Weather Channel uses a Real-time rendering technique to help virtualize 3d animation of climate that looks realistic. 3D animation could interact with the reporter immediately, as it is called "Immersive mixed reality" which is shown in figure 6. For the next stage, the real-time rendering pipeline and workflow will be reviewed and show how it processes.

Figure 6 Immersive mixed reality from The Weather Channel. ("The Weather Channel",2019).

Mixed-reality

Mixed-reality (MR) is the merging of real worlds and virtual worlds to build a new environment and visualization, where physical and digital objects co-exist and interact in real-time. Mixed reality does not exclusively take place in either the physical or virtual world, like "Immersive mixed reality". The Weather Channel uses real-time rendering to generate 3D animation for presenting news and it would be realistic and interactive in real-time.

Real-time rendering pipeline

Real-time rendering is focused on producing and analyzing images, mostly used in interactive 3D computer graphics and processes by GPU (graphics processing unit). Real-Time Rendering pipeline has three conceptual stages: application, geometry, and rasterizer as shown in figure 7. (Akenine-Moller, Haines, and Hoffman 2008)

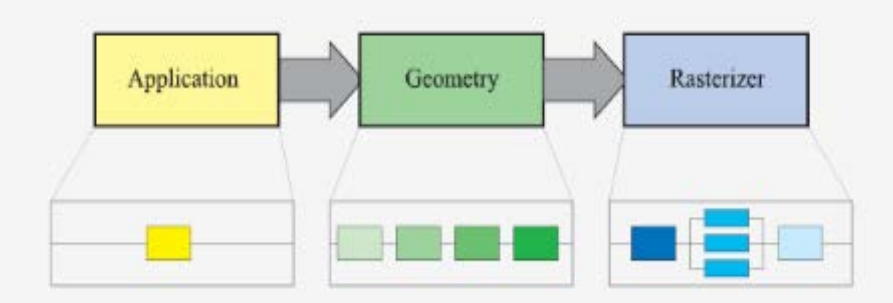

Figure 7: The basic construction of the real-time rendering pipeline.

The application stage is the first stage that enables the CPUs to efficiently run a large variety of tasks such as User input, AI Artificial intelligence and other calculation. Geometry stage, which deals with transforms, projection, etc. in 3 dimensions world. This stage is to computes what is to be drawn, how it should be drawn, and where it should be drawn. The result of the 3D image could be more delicate and realistic as shown in figure 8.

Figure 8 transformation of Tomb Raider character from 1996 to 2013 (Cussan, 2018)

The rasterizer stage is the last stage that is processed completely on the high-performance GPU. This stage gives the transformed and projected vertices with their associated shading data (all from the geometry stage). The purpose of the rasterizer stage is

to portray realistic objects in the scene, as shown in Figure 9.

Figure 9 Real-time rendering in Unity Engine (Unity Technologies, 2019)

In addition, Real-time rendering techniques have more widely used in-game industries and graphic processing companies such as Nvidia and AMD. They release new hardware that can operate the Ray-Tracing technique for real-time rendering processing. It aims to simulate the natural flow of light, interpreted as particles, as shown in Figure 10.

Figure 10 (left) Ray-Tracing Technique applied to the scene and (right) the original Rendering Technique (Candyland,2019)

Applying

A new workflow for Real-Time rendering computer graphic animation. One of the major differences in using a real-time rendering is that all segments are able to start working

immediately and simultaneously. This brings numerous invaluable benefits for news reporting media. As it is shown in figure 11 'pre-production' is actually now just 'production.' Because the project is processing from the beginning, they can remove and replace temporary animations and shots with updated as repeating. The result of feedback delivery in real-time. Artists are able to update for their team without time delays and decisions would make faster. Every experimentation is risk-free. Finally, the project is always moving forward. Even if the content changes, users can go back to production anytime. This is different from traditional workflows, where a significant change, for example, the camera angle might send you back to the beginning, a real-time production simply adjusts at the moment and all departments can carry on working. ("A Forrester Consulting Thought Leadership Spotlight Commissioned By Epic Games," 2018).

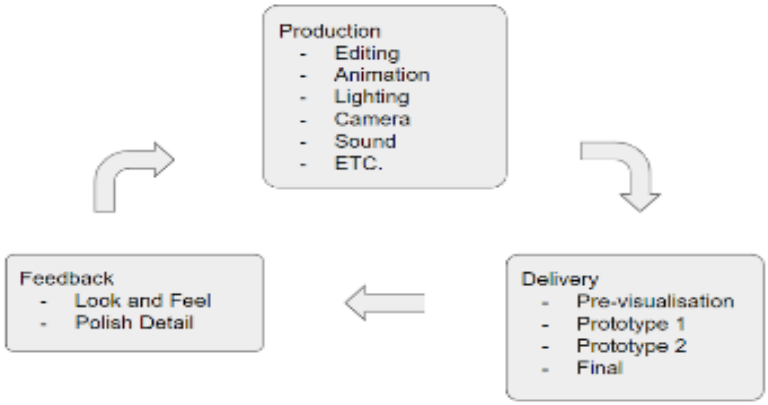

Figure 11: Real-Time rendering workflow

The opportunity and benefits of Real-Time rendering.

Many organizations have recognized the improvement of performance which gain from using real-time rendering solutions. Designing, rendering, animating and editing visualizations all benefit from real-time rendering solutions, as it is shown in figure 12

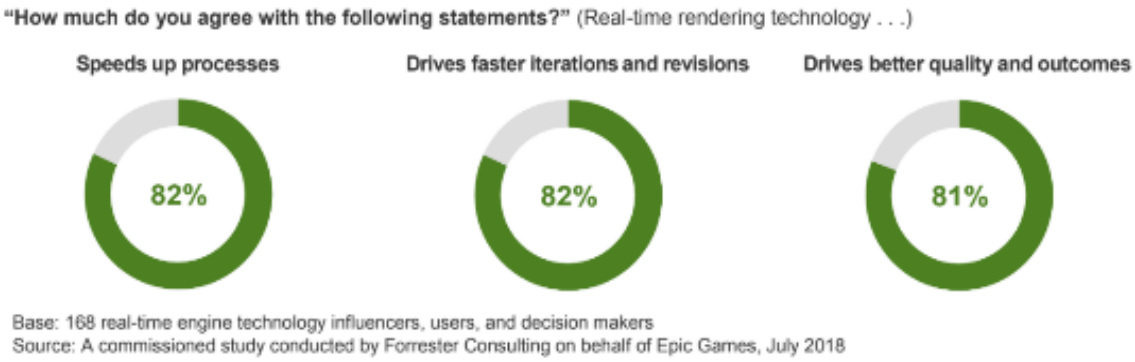

Figure 12: A survey result from a commissioned study conducted by Forrester Consulting on behalf of Epic Games, July 2018

There is obviously the significance to the result. Most people have a positive idea of Real-time rendering in every way. This outcome matches with news reporting media production as we need immersive digital experiences to help visualize and understand the content with quick process and great quality.

Conclusion

In the last decade, there is an outstanding innovation in interactive graphics software. Real-time rendering is one of them which makes faster iterations and changes to designs by comparison with traditional offline rendering methods. On the other hand, it is still not popular among news-reporting production but the performance is clearly valuable. Real-time rendering could increase productivity and also improve the visualization elements, thus it reduces design errors. At this point, when the news has to broadcast and updated at all times. It requires great content in no time. Moreover, the real-time rendering technology still could be developed in many ways in the future and be able to use with other technology such as A.I. (Artificial Intelligence)

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