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EVOLUTION OF GAMES AND FUTURE OF GAMING TECHNOLOGIES

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Abstract – *The gaming industry has grown tremendously over the past few decades. This paper presents a survey of ongoing changes that are happening in the gaming industry, as well as its advancement in the future with virtual reality. This study focuses on two main areas of gaming domain. First The way of creating games has changed since the early 2000s, including the rise of various hybrid genres, the emergence of distinct new genres, and the increasing push toward online/open-world games and online/multiplayer games, and Second How technologies like Virtual reality, Augmented reality, Cloud gaming, etc. can provide innovative gaming experiences and changing the way of the gaming world. It also presents small journey of how gaming industries are dominating in business.*

Key Words: Virtual Reality, Augmented Reality, Gaming, Artificial intelligence, Cloud gaming

1. INTRODUCTION

In today's time, the video game industry becoming one of the most successful industries. Video games have become one of the most entertainment sectors among children and young adults. The very first video game was developed around the 1950s which was around the size of a room. Throughout these years of advancements in technologies, it has evolved into the humongous industry of the 21st century. As per the article published in the year 2021, the gaming industry has generated total revenue of $180 billion combining console, mobile, and pc games

The first proper video game was developed in 1958. It was a simple tennis game that was quite a hit. Inspired by this a guy named Steve Russel created a video game called space war that become very popular. In earlier 1970s, computers were pretty expensive and large. These were only used primarily by governments, universities, and corporations. So very few people had the chance to play games. In 1972 Ralph bear invented a gaming console. Gaming consoles allowed to play the game on television. Same time two other people Nolan Bushnell and Ted Dabney of a small game company ATARI introduced their coin-operated video arcade games. The first game released on this was the famous PONG arcade game. This gained a huge amount of support and popularity. Simultaneously another game company created introduced an arcade game called space invaders. Both of these games become huge hits and were also released in the console version.

In the year, 1980 color arcade games were introduced. One of the popular video games of that time PACMAN was released by a Midway company around the world. PACMAN was developed by Japanese company NAMCO and brought by Midway. This game made revenue of around 1 billion dollars. As time goes arcade game systems become less popular because of the easy availability of PC. In 1983 new Japanese-based company called NINTENDO released its first Nintendo entertainment system. This system comes in comprised of more than one game. It was a very successful product and sold around 61 million units globally.

The creation of more powerful technologies and computers push the arcade games to the corner. Game developers started to develop different games for PCs. The introduction of LAN bought a new era of gameplay for PC games. Many team play and PVP games were introduced at this time. In 1994 Sony jumped into the gaming market with its release of PlayStation 1 Which is different from the regular game consoles. PlayStation used CDs instead of game cassettes.

One of the revolutionary launches in the game industry is multiplayer games. As the internet improved multiplayer games gained popularity among the other games. Some Most popular multiplayer games are Counter-Strike, RuneScape, Warcraft, and DOTA. After this new game category was introduced called open-world games. These are 3D games containing their own virtual world. Simultaneously the games were launched on smartphones also. Developers became motivated to make more games. The high graphic containing games like assassin's creed, and red dead redemption were released. With the increasing game's popularity, Microsoft immersed itself in this universe with its XBOX series. Both Sony and Microsoft became tough competitors in gaming consoles. In 2017 the game called PUBG was introduced on both mobile and PC. With its online multiplayer battle royal feature became a highly sensational game throughout the world.

Till now we have seen how the gaming industry has started and developed throughout the decades. In the next topics, we will see the breakdown of gaming genre characteristics and different technologies that are changing the face of the gaming world in the future.

2. VIDEO GAME GENRE

Although the video game genre was once the same, now it's not the case. As the game evolves, the game genre also became wide. Especially when game developers are combining and integrating different types of games in a new and unexpected way. The structure of the game is constantly evolving.

Table -1: Game genre and characteristics

Game genre	Example	Characteristic
Shooter (FPS and TPS)	Call of duty	Aim, Shoot, Run, Story, Action.
Real-time strategy (RTS)	Warcraft, Age of Empires	Build, Defend, gather resources, control many characters
Multiplayer online Battle royal	PUBG, DOTA	Similar to RTS, Play in teams, No build and gather resource
Role-playing Game	The Witcher, Fallout	A single character, Storyline, Action
Driving and Sports	FIFA, NFS	Racing, FPS, Indoor and outdoor sports
Action, Adventure	Star Wars, Assassin's creed	Storyline, Dialog exchange, Puzzle-solving, Exploration
Puzzle	Portal, The Talos principle	Problem-solving, planning, point, click
Survival and Horror	Resident Evil, The Long Dark	FPS, Ghost, Resource gather, Puzzle

2. FUTURE OF GAMING WITH TECHNOLOGIES

In the current time tech advancements are happening every month. Just when we start to think about gaming can't get any better another new technology comes to market. Game development can be told as a lucrative business that won't be getting downfall and an enormously popular field that youngsters are chasing. To maintain this collaboration game developers, invent unique ways of creating games, and use different technologies that attract more and more people.

2.1 Streaming games

To play games we download or install them on our PC or mobile. An advantage of streaming games over this is that the game can be picked from one another device and start playing from the point the gamer stopped. Streaming technology will become more popular in the next 10 years as internet infrastructure is moving ahead it's going to be a popular place for buying games and instantly start playing them via streaming.

2.2 Cloud gaming

Another greatest breakthrough in the game is cloud gaming. Cloud gaming helps in not to get tied to the hardware we got. The main problem gamers face is the hardware required to run the game. Some games require very high graphics cards or memory. This was taken care of by cloud servers. These handle all the graphic-intensive computations which are normally done on the local machine. The client is only responsible for displaying the visuals. A system like this potentially reduces the cost required for the purchase of hardware.

In the past couple of years, both Sony and Microsoft, which are long supported their gaming consoles, are making their own cloud gaming service. Even a big tech company like Google has released its own cloud gaming service called stadia. Amazon started a cloud gaming offering called Luna.

The biggest hurdle for this in order to become mainstream is to be able to offer a smooth and less lagging gaming experience for users. At the current time running a cloud gaming service is costly and computationally intensive. So, it will take time to get the technology right.

2.3 Virtual Reality

Virtual reality is the use of computer technology to create a simulated environment. The major reason for VR being more successful is that the experience can be very immersive in a realistic environment. It could be similar to or completely different from the real world because everything is simulated using computer programming. Currently, virtual reality systems use either VR headsets or multi-projected environments to generate realistic images, sounds, and other sensations that simulate a user's physical presence in a virtual environment. A person using virtual reality equipment is able to look around the artificial world, and move around inside it with virtual features or items. This effect is commonly created by VR headsets consisting of a head-mounted display with a small screen in front of the eyes, but can also be created through specially designed rooms with multiple large screens.

In the next 10 years, VR (Virtual technology) could become the more dominant technology in gaming. Games would be similar but virtual reality is going to be a much more popular aspect even in NON-VR games. There are some great and interesting VR games out there today, however, they need an initial investment in hardware and are also very solitary. These factors also build an entry barrier for mass audiences.

2.4 Augmented Reality

In 2016 the collaboration of Niantic, Nintendo, and the Pokémon franchise released its Augmented reality mobile game called Pokémon Go. It became widely popular among youngsters. It generated over $5 billion in sales. AR gaming can be referred to as synchronizing the visuals and audio

content of a game in real-time with the user's environment. The aim of this technology is to connect both the virtual world and the real world to create a playing field within the existing environment.

While Virtual Reality implemented games require some specialized headsets and other tools, AR technology looks like well suited for mobile gaming, not only in creating new environments but also in leveraging existing environments to create a more immersive and integrated gaming experience in both worlds.

Rogelio Cardona-Rivera, a professor of computing and engineering at the University of Utah, predicted that in short term at least, AR will become more fertile ground for game designers than VR. He also adds "Instead of trying to simulate reality altogether, I think designers might find complementing reality a more trackable design challenge". So far AR gaming has gained the most attraction on mobile devices. But big tech companies like Facebook, Apple, and Google think that the future of AR will take place through specially made glasses.

2.5 Artificial Intelligence

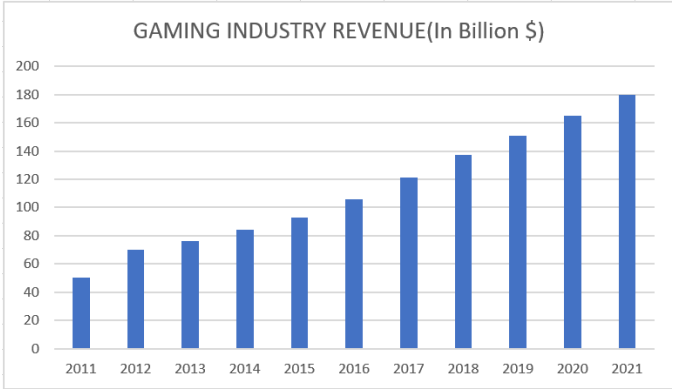
Games are changing fast. Any trending games last a year or two without updating on regular basis. Because updated content and fascinating gameplay are the two most essential features that users demand. Over the years, we saw AI has become really good at playing certain games. Consider a chess game beating it at a difficulty level is nearly impossible. But the AI that we encounter today inside of video games hasn't changed much over the years. Julian togelius an associate professor of computer science at NYU's Tandan school of engineering has stated that "Two core components of the commercial game are pathfinding and finite state machines ". Further, he adds Pathfinding is how to get from point A to point B and a finite state machine is a construct where NPC can be in different states and move between them. Real AI games are more complex than this bus these are some basic principles. So, using these basics game developers have created ever more realistic game worlds and characters. But that software is not exactly intelligent. That's because game developers have yet to really utilize the key advancements in fields of AI research. When a developer designs games first thing he has to consider is what the player will experience. If he was going to put AI there, he has to make that AI predictable.

Today researcher uses the kind of AI that actually learn to design entire games using a technique known as a procedural generation. It was popularized by the game released in 2016 called No Man's sky, but now AI researchers are using the same technique to create software that can design a game entirely from scratch. But the true role of AI in games will be a self-learning character that is complex and relatable and it has a realistic persona that can enhance the interaction with the user. In normal games, the plot twist and destinations are pre-set by developers in software. When items like AI and ML are added behind the scenes and plot the drama is expected to unfold in real-time. Depending on the action of players or based on the scenarios that are happening in the real world there could be events and shifts in the games even the developers could not predict.

Producing these kinds of results is not guaranteed any time soon. But considering how technology is growing it wouldn't be surprising to see AI being used as a major in the gaming industry.

3. GAMING INDUSTRY BUSINESS GROWTH

The gaming industry has already become a much more prominent industry in this era. It has already become richer than the both music industry and movie industry. According to some case studies, a third of the world's population was video gaming. In 2017 more than a hundred million people watched other people play video games on platforms like Twitch and YouTube. This was also the time the PUBG game was released. In the year 2021, the gaming industry made around $180 billion and this is a business that is still growing.



The popularity of the gaming industry has motivated some people to conduct a gaming tournament specifically for video games. It is called Esports or Electronic sports. Even though the history of Esports begin in the 1970s, in the recent few decades it has gained huge popularity and support around the world. In 2017, it is estimated that eSports earned a revenue of 565 million. Many eSports championships are being held across the globe that attracted many gamers. Some of the biggest eSports championships are DOTA 2 "The International", League of Legends world championship, Fortnite World cup champion, etc.

The gaming industry has already grown to a tremendous size. It has a significant impact on entertainment, arena base competition, toys, movie franchises, and more. In upcoming years this industry may dominate other industries.

3. CONCLUSIONS

The games have always been innovative and creative. New technology, new opportunities, and new experiences are to be expected. Video games can be said as a modern

form of entertainment. As the growth of our technology increases, it also grows the thinking of creative minds. The games also exposed it to the education field. Today's generation is not only excited about playing games, but they are also very much interested in creating games.

Players are very much actively contributing to this medium. Although the excessive playing of games will impact negative consequences on one's health, gaming for a limited time is healthy, fun, and educational.

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