

УДК 004.35

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## **GAME DEVELOPMENT USING VIRTUAL REALITY AND AUGMENTED REALITY**

Game development using virtual reality and augmented reality is an exciting field that is rapidly gaining popularity. Virtual reality (VR) and augmented reality (AR) technologies are increasingly being used in the gaming industry to create immersive experiences for players. The use of VR and AR in game development has the potential to make a revolution in the gaming industry, creating more interactive games.

There are interesting scenarios in which VR and AR are being used in game development. VR allows players to enter a completely new world, where they can interact with objects and characters in a way that was not possible before. Some games provide even superhuman abilities, so that it creates an experience we can't feel in real world. AR, on the other hand, overlays digital content onto the real world, creating a mixed reality experience. These technologies are being used to create a variety of games, from action-packed shooters to puzzle games.

One of the main advantages of using VR and AR in game development is the level of immersion that it provides. Players can become fully immersed in the game world, interacting with objects and characters as if they were actually there. This creates a more engaging and interactive experience for players, increasing their enjoyment of the game. When you 'enter' VR, you can experience wonderful events and get a feel of completely new adventures in your life. Of course, level of the immersion depends on quality of your headset, because each of them has different viewing angles, screen type, refresh rate and resolution. So, some of them can lower the level of immersion, that can lead to not so interesting experience. However, through time you get used to it quickly and start to enjoy the adventure.

Another advantage of using VR and AR in game development is the potential for increased interactivity. VR and AR technologies allow for a greater level of player interaction, enabling players to control objects and characters in new and exciting ways. This can lead to more creative and innovative gameplay mechanics, enhancing the overall player experience. For example, some headsets have finger tracking on their controllers, that drastically improves level of the immersion. If you want to pick something up, instead of holding the button, you just have to close your palm and the item is in your hand. It depends not only on headset, but on the game itself too. Some old games do not give such level of interactivity and may seem too simple for modern standards. That is, sometimes you cannot even pick up a thing which not important for the main story. These cases ruin the level of immersion and can lead to bad experience with a game.

However, there are also challenges associated with using VR and AR in game development. One of the main challenges is the cost of developing games that use these technologies. Developing games for VR and AR requires specialized hardware and software, which can be expensive. Additionally, the level of complexity involved in developing these games can be challenging for game developers who are not familiar with these technologies. Through time quality of VR and AR games increases, as well as level of effort needed to create a game with up-to-date technologies.

As for the software, some game engines have limitations, that can make VR and AR game development much harder. Developers must keep up with the latest VR gamedev innovations to overcome these challenges. It is important to be aware of the limitations of VR and tailor ideas to its specific strengths.

During the first wave of VR games, a lot of developers just took popular existing concepts and translated them for VR. But time has proven that VR needs ideas tailored for its specific strengths, because the differences between gameplay in VR and on a regular PC or console are night and day. However, situation is constantly changing and the most bleeding edge game

engines like Unreal Engine 5 only help with development of unique games with complex technologies, and don't get in the way.

Despite these challenges, the future of game development using VR and AR is bright. As the technology becomes more widely available and affordable, more developers are likely to start using these technologies in their games. The future of game development using VR and AR is promising, offering players immersive and innovative experiences.

Furthermore, the technology used in VR and AR hardware is constantly evolving, which, on one hand, can pose a challenge for game developers, but on the other hand, greatly improves the possibilities and breaks technology borders, which allows developers to create nearly anything they can imagine. New hardware innovations, such as eye-tracking technology, haptic feedback, and improved motion tracking, are continually being developed and integrated into VR and AR headsets. For example, all of these mind-blowing traits are present in a brand-new PlayStation VR2 headset for the PlayStation 5. While these advancements can enhance the player experience, they also require game developers to keep up with the latest technology and develop games that are optimized for these new features.