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Multiplayer game using AR Technology - Beyblade

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ABSTRACT: This study looks at the multiplayer Beyblade AR game allows players to battle their virtual Beyblades in an augmented reality arena. As they compete against one another by assaulting and defending their Beyblades, players can select between attacker and defender roles. The goal is to either get rid of the rival Beyblade or prevent it from spinning before your own. Beyblades can be modified by players with different parts and skills for a variety of gaming options. The game was made with Unity, runs on Android devices, and uses ARCore to track players to create an immersive gaming experience. Players can engage in real-time multiplayer activities and participate in matches that resemble tournaments in PUN2.

KEYWORDS: Augmented reality (AR) technology, Beyblade, Gaming industry, Immersive experiences, Interactive gameplay and, Virtual.

I. INTRODUCTION

Immersive and engaging experiences, augmented reality (AR) technology has become a potent weapon in the game business, bridging the divide between the virtual and real worlds. This study examines the creation of an AR-based multiplayer game with a particular emphasis on the Beyblade toy franchise. The objective is to craft an immersive and captivating gaming encounter that harnesses the power of augmented reality, allowing the thrilling world of Beyblade battles to materialize in a virtual realm. This cutting-edge gaming experience will enable players to engage in adrenaline-pumping combats, skillfully manoeuvring their spinning tops to victory.
The use of augmented reality (AR) technology in multiplayer games has a lot of potential since it improves gameplay by superimposing digital material onto the real environment and enabling players to interact with virtual characters and objects in their actual surroundings. This presents intriguing opportunities for simulating the furious battles, personalizing the spinning tops, and designing dynamic environments where users may engage in real-time competition and cooperation.

The technological obstacles of creating an AR multiplayer game will be examined in this research study, along with the necessary hardware and software, networking elements, and synchronization issues. Additionally, it looks at how the planned AR Beyblade game may enhance player engagement, encourage physical exercise, and help players form social bonds. The report also evaluates the business potential and practicality of such a game, taking into account the target audience's rising interest in both Beyblade and AR technologies.

II. RELATED WORK

Apple's ARKit is a complete framework for creating augmented reality (AR) applications that are optimized for iOS devices. It provides functions including motion tracking, ambient comprehension, and light estimate, all of which are essential for building realistic augmented reality experiences.
ARCore is an augmented reality (AR) framework created by Google that enables programmers to create AR applications for Android smartphones. It offers characteristics that are comparable to those of ARKit, such as motion tracking, environmental comprehension, and surface identification, enabling the development of interactive AR experiences.

A game's engine
Unity: A well-liked gaming engine that encourages the use of AR technologies is Unity. It offers a selection of AR development tools, such AR Foundation, which enables creators to create cross-platform AR apps. For building realism into virtual landscapes, controlling motions, and adding multiplayer capabilities, Unity provides a vast range of functions.

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Unreal Engine: Unreal Engine is yet another potent gaming engine that encourages the creation of AR games. It offers resources like ARKit and ARCore plugins that allow game creators to include augmented reality (AR) capabilities in their creations. Unreal Engine provides complex physics simulations, high-quality graphics rendering, and networking features for multiplayer interactions.

Tracking based on markers
In order to anchor virtual material in the actual environment, marker-based tracking uses physical markers or codes that are recognised by the AR system. For the sake of tracking and aligning virtual objects, these markers serve as reference points. Virtual Beyblade spinning tops may be tracked and controlled via marker-based tracking, enabling users to participate in combat.

marking-free tracking
The location and surroundings of the user are tracked using markerless tracking techniques like simultaneous localization and mapping (SLAM), which makes use of the device's sensors like the camera and accelerometer. With the help of this method, the AR system is able to locate virtual items precisely in the physical environment without the need of physical markers. A multiplayer AR Beyblade game that is fluid and simple to play may be made using markerless tracking.

Synchronization and networking
An AR Beyblade game has to include networking and synchronization methods in order to provide multiplayer functionality. Players can communicate with one another in real time while engaged in combat using networking libraries and protocols like Photon Unity Networking (PUN) or Unity's Networking API. The locations and activities of spinning tops are kept constant across all linked devices thanks to synchronization mechanisms.

III. METHODOLOGY

1 Analysis of Requirements
Analyze the requirements for the multiplayer AR Beyblade game in-depth, taking into account the required gameplay mechanics, features, and user interactions. This entails defining the precise Beyblade fighting components that need to be recreated in the virtual setting, such as spinning top customisation, combat areas, and multiplayer interactions.

5.2 AR Platform Choice
To choose the best platform for integrating the AR features of the game, compare several AR platforms and frameworks like ARKit and ARCore. Platform compatibility, hardware specifications, and available programming tools are a few things to think about.

5.3 Prototyping and game design
Make a thorough description of the game's mechanics, player interactions, and aesthetics in a document called the game design. To verify the gameplay ideas and gain user input, create interactive prototypes. On the basis of user testing and feedback, iteratively refine the design.

5.4 Creation and Integration of Assets
Create or get the necessary 3D models, textures, and animations for the fighting arenas, spinning tops, and other game components. Integrate these assets into the AR development platform, making sure that the physics simulation, scaling, and rendering are accurate.

5.5 Implementation of Marker-Based or Markerless Tracking
Depending on the needs of the game, choose between marker-based and markerless tracking as the tracking method to be utilized. Use the selected tracking method to accurately position and track simulated spinning tops in the real world.

5.6 Synchronization and networking
Utilize synchronization and networking techniques to provide multiplayer functionality. Utilize an appropriate networking framework or protocol, such as Photon Unity Networking (PUN) or the Unity Networking API, to enable real-time player communication and guarantee that the game state is consistent across all platforms.

5.7 Iterative design and user testing
To assess the gaming experience, obtain comments, and pinpoint areas for improvement, hold lengthy user testing sessions. Utilize customer feedback as part of the iterative development process and make the required changes to the gameplay, graphics, and user interface.

5.8 Performance Enhancement:
By addressing problems like memory management, network latency, and frame rate optimization, you can improve the game's performance. Conduct extensive testing to guarantee responsive and fluid gaming on a variety of devices and networks.

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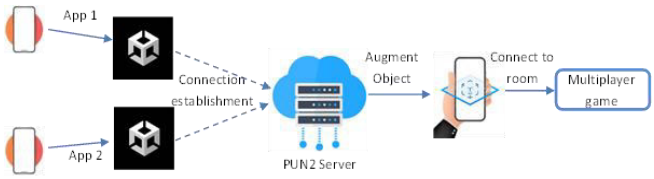
5.9 Assessment and Validation:
Utilize user feedback surveys and quantitative measures, such as player engagement and satisfaction levels, to assess the multiplayer AR Beyblade game. Analyze the data to determine whether the game was successful in achieving the targeted goals and to confirm its viability as a multiplayer AR gaming experience.

IV. EXPERIMENTAL RESULTS

Fig.1 shows how to physically construct software system components through a visual depiction. It shows the connections, restrictions, and boundaries between every component as well as the general organisation of the software system. Fig 2 : shows the main menu for the game, which consists of four options play, help, credits, exit. Fig 3: shows the augmented stadium where two players are playing with their own Beyblades and defeating each other.



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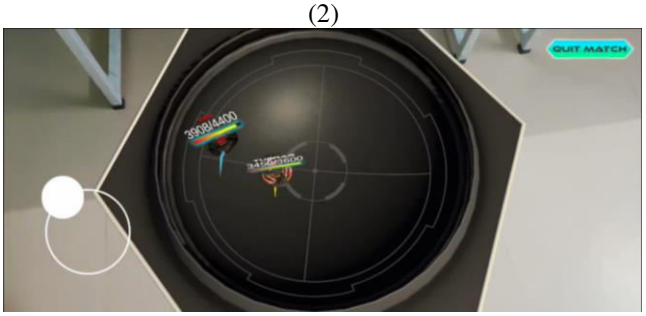

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V. CONCLUSION

In conclusion, this study advances knowledge on creating multiplayer video games utilizing augmented reality technologies, notably in the context of Beyblade. The suggested technique acts as a manual for programmers who want to make an excellent multiplayer AR Beyblade game. The study emphasizes how AR technology has the potential to change gaming and spur more developments in the industry.

REFERENCES

[1] Andi Nur Rachman, Muhammad Adi Khairul Anshary, and Nazmi R "Implementation of Augmented Reality in Multiplayer Games " Advance in Intelligent Systems Research, Volume 172 2019
[2] Emil Sundström, Shared Augmented Reality" Developing a Multiplayer AR Mobile Game to Study Playability" published in International publication for Luleå University of Technology 2019

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[3] Rong Fan, Ying Liu, Research on "Augmented Reality Interactive Games" published in Third Pacific-Asia Conference on Circuits, Communications and System (PACCS), DOI:10.1109 2018
[4] Akhil Krishna Chowdary, Dadi Hemasri "Augmented Reality in Gaming" published in Third Pacific-Asia Conference DOI:10. 13140/RG.2.2.15595.21288, 2022
[5] Anabela Marto and Alexandrino Gonçalves "Augmented Reality Games and Presence: A Systematic Review "published on Journal of Imaging,vol ll DOI:10.3390/jimaging804009120 , 2022
[6] Swati Singh; Amanpreet Kaur "Game Development using Unity Game Engine 2022" published in 3rd International Conference on Computing, Analytics and Networks (ICAN). DOI: 10.1109 / ICAN56228.2022.10007155, 2022
[7] Jingming Xie "Research on key technologies base Unity3D game engine" published in 7th International Conference on Computer Science & Education (ICCSE). DOI: 10.1109/ICCSE.2012.6295169, 2022
[8] Riya Aggarwal; Abhishek Singhal "Augmented Reality and its effect on our life" published in 9th International Conference on Cloud Computing, Data Science & Engineering (Confluence) DOI: 10.1109/CONFLUENCE.2019.8776989, 2019
[9] Nurdaulet Nurym; Raushan Sambetova; Muhit Azybaev; Nurassyl Kerimbayev "Virtual Reality and Using the Unity 3D Platform for Android Games" published in 10th International Conference on Intelligent Systems (IS). DOI: 10.1109/IS48319.2020.9199959, 2020
[10] Claudia Lindner, Andreas Rienow, Carsten Jürgens, Augmented Reality applications as digital experiments for education – An example in the Earth-Moon System, 2019.
[11] Aldo Uriarte Portillo, Ramón Zatarain Cabada, Mara Luca Barrón, Mara Blanca Ibáez augmented reality's effects on pupils in public and private Mexican schools' academic performance and motivation. A case study from a geometry class in middle school, 2019.

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