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CREATING A VR GAMING APPLICATION

The increasing prevalence of sedentary lifestyles contributes to chronic conditions like obesity, cardiovascular diseases, and type 2 diabetes. VR-based games like "The Great Collection Challenge," developed with Unity, gamify exercise, offering engaging and immersive experiences that promote physical activity. This study explores how VR technology can be used to gamify movement, with a focus on design principles, gamification, and multiplayer features to sustain long-term engagement [1, 2, 3].

The game utilizes Unity, a versatile game engine known for its cross-platform capabilities and real-time rendering features. Unity's VR integration supports various devices, including Oculus Quest 3 and HTC Vive. The Unity XR toolkit provides critical features such as motion tracking, gesture recognition, and spatial awareness, ensuring realistic and responsive in-game interactions. Unity's physics engine ensures that actions, such as object collisions and item collections, are visually accurate and physically plausible.

Unity's flexible rendering pipeline is crucial for maintaining high-quality graphics without sacrificing performance. The game uses the Universal Render Pipeline (URP) to balance visual fidelity and performance optimization, vital for VR applications. Techniques like dynamic level of detail (LOD) and baked lighting help maintain optimal performance, even in complex environments.

The game's user interface (UI) has been optimized for VR platforms to remain intuitive and non-intrusive. Unity's UI Toolkit and custom shaders create an adaptive, immersive interface that blends health bars, score counters, and menus seamlessly into the VR environment, minimizing distractions.

The user journey starts with an immersive introduction, enhanced by Unity's rendering capabilities. The introductory scene uses advanced lighting, shadows, and particle effects to engage users, with optimization through Unity's GPU Instancing and Texture Atlases for improved performance.

The game's controls simulate real-world actions such as aiming, grabbing, and throwing, utilizing Unity's Input System and XR Interaction Toolkit.

Game uses gamification to make exercise enjoyable, focusing on item collection and throwing weighted balls. The thematic maps provide visual effects and challenges, while realistic collision mechanics and time constraints introduce depth. The multi-tiered scoring system rewards players with stars to unlock new levels, motivating continued progress. Unity's data management features allow persistent progress tracking, level unlocking, and achievement recording, critical for player retention. Unity's networking features are key to the multiplayer experience. Using Photon for real-time multiplayer networking, the game allows players to compete or cooperate in collecting items. The single-player mode enhances motor skills by progressively increasing task complexity, while the multiplayer mode introduces competitive or cooperative elements, further enhancing replayability.

Game focuses on player progression and difficulty, ensuring the game remains engaging. Unity's built-in game loop system adjusts difficulty dynamically by introducing new challenges, such as additional items to collect, harder-to-reach containers, heavier balls, and moving obstacles, implemented using UnityEngine.Random.

The difficulty curve is carefully balanced to maintain challenge and enjoyment. The rewards system motivates continued play while reinforcing the game's physical activity goals.

The integration of VR technology, Unity's game engine features, and a focus on UX design and gamification creates an effective solution for promoting physical activity in an enjoyable and immersive way. This study demonstrates the potential of VR games not only for entertainment but also as a tool for improving public health.

Список використаних джерел

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