Virtual Zoo - A VR Experience

CS 344– Introduction to Metaverse, IIIT Vadodara

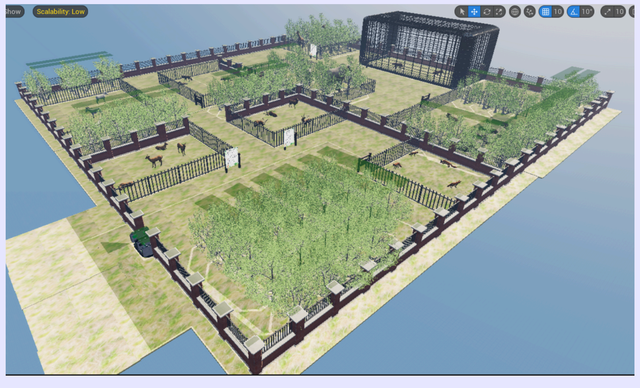
Introduction

Virtual Zoo is an immersive VR experience developed in Unreal Engine, offering an interactive walkthrough of a wildlife zoo. It features nine animated wild animals with unique behaviors, realistic interactions, and spatial navigation, optimized for Oculus Quest 2. The project integrates custom 3D models and intuitive controls, simulating a real zoo environment. Applications include education, wildlife awareness, and entertainment.

Key Components

- **Wildlife:** Includes 9 unique animals with custom behaviors like walking and idling, animated using Blender.
- **Environment:** Realistic zoo layout with enclosures, foliage, and ambient sounds; optimized with modular, low-poly assets.
- **VR Integration:** Designed for Oculus Quest 2 with teleportation movement and intuitive VR controls for a smooth experience.

Visuals and Diagrams



The image below captures a vibrant section of the Virtual Zoo, highlighting the interactive layout, animal enclosures, and immersive natural environment experienced through VR.

Challenges and Solutions

The development of realistic animal movements posed significant challenges, especially with regard to the complexity of their animations. Using Blender, we created intricate animation cycles for each animal, ensuring natural and fluid movement. We also optimized the VR experience to be accessible on Oculus Quest 2, ensuring smooth performance with high-quality visuals.

Performance Metrics

To ensure a seamless and immersive VR experience, we evaluated the performance of the Virtual Zoo application on the Oculus Quest 2 headset. Key metrics were tracked during runtime to optimize rendering efficiency, interactivity, and user comfort.

Metric	FrameRate(FPS)	SceneSize
Value	72	500MB
Notes	Stable in VR with all animals rendered and animated	Textures and meshes optimized to reduce memory load
Metric	LoadTime	Latency
Value	<10s	<0.05s
Notes	Quick scene initialization on Oculus Quest 2	Real-time responsiveness for natural interactions

These metrics demonstrate the application's efficiency and readiness for immersive use. Stability in frame rate and minimal latency are critical for maintaining user comfort in virtual environments.

Features and Highlights

- Realistic 3D models of wild animals
- Unique movements and behaviors for each animal
- Interactive zoo environment with virtual tours
- Full immersive experience through Oculus Quest 2 VR headset
- Educational experience designed for both kids and adults

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