ARISE & SHINE

St. Vincent Pallotti College of Engineering & Technology
Department of Information Technology
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Digital Twinning in Metaverse (11)

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ABSTRACT:

The digital twin of a college model is a comprehensive virtual representation of the entire college department, including its rooms, departments, and laboratories. Utilizing advanced simulation and modeling techniques, this digital twin accurately mirrors the physical environment, allowing for real-time monitoring, analysis, and optimization of various campus activities. It enables seamless integration of data from IoT sensors, student management systems, and other sources to provide insights into resource utilization, student behavior, and facility management. By leveraging this digital twin, colleges can enhance operational efficiency, improve decision-making processes, and create immersive learning experiences for students and faculty alike.

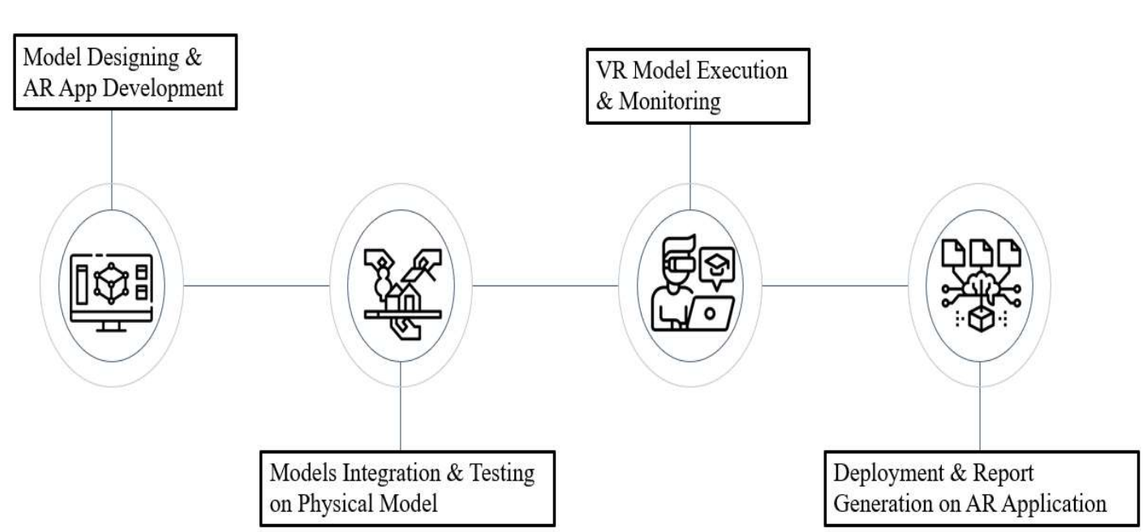
INTRODUCTION:

The project aims to revolutionize campus management by creating an immersive and interactive simulation of the college environment. Through the integration of AR and VR technologies, we seek to provide stakeholders, including administrators, faculty, and students, with a powerful tool for understanding, analyzing, and optimizing various aspects of campus life.

The digital twin model will encompass every aspect of the college campus, from individual s and departments to laboratories and outdoor spaces. By meticulously recreating the physical environment in a virtual space, we can simulate real-time scenarios and visualize data to gain valuable insights into campus operations.

With AR, users can overlay digital information onto the physical campus environment in real-time, enabling enhanced navigation, wayfinding, and interactive learning experiences. VR, on the other hand, offers immersive simulations that allow users to explore and interact with virtual representations of campus facilities, fostering collaboration and experimentation without physical constraints.

SYSTEM ARCHITECTURE:

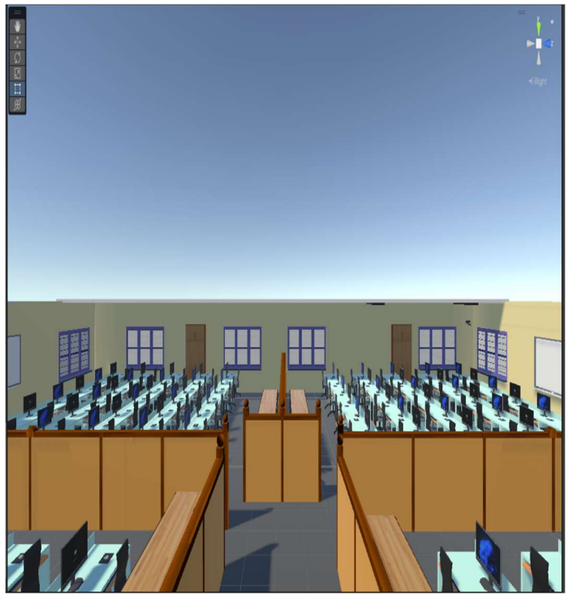


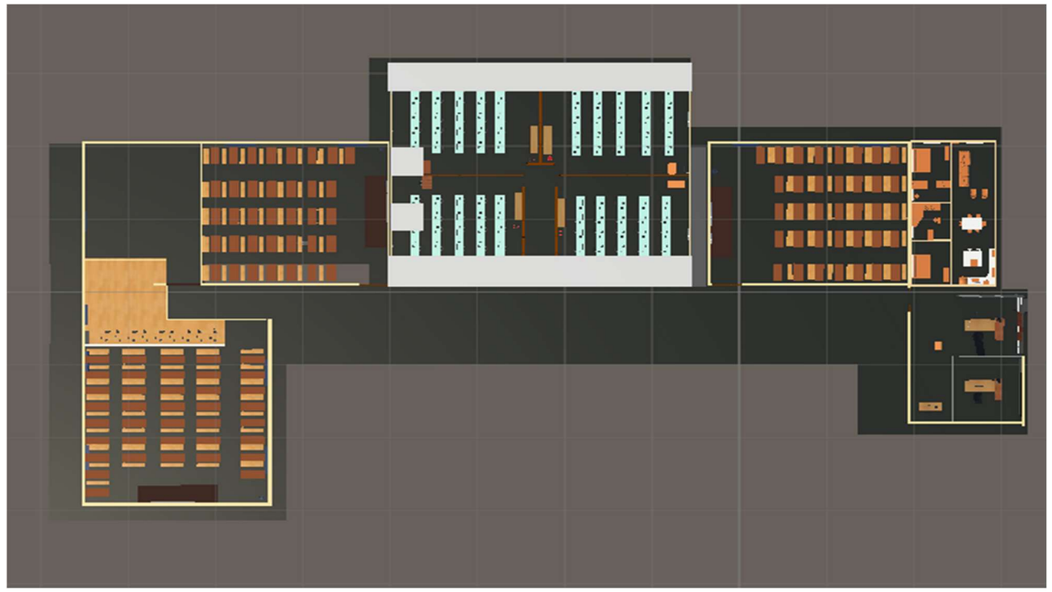
APPLICATIONS:

1. Campus navigation and tour
2. Energy consumption optimization
3. Simulation-Based Learning Modules
4. Maintenance Training Simulations

MODULES:

1. Creation & Development of 3D Model in Unity Engine.
2. Programming scripts in C# language.
3. Project setup in AR & VR mode.
4. Project deployment in VR & AR.





REQUIREMENTS:

Hardware: OS: Windows, 11th Gen Intel(R) Core (TM) i3-1115G4 CPU: 3.00GHz RAM: 8.00 GB System type: 64-bit operating system, x64-based processor.

Software: Unity Hub: Version 3.4.1, Unity Editor: 2021.3.9f1, Microsoft Visual Studio, Steam VR, Blender

CONCLUSION:

The digital twin college model, augmented by AR/VR technology, revolutionizes campus management. Integrating real-time data from IoT sensors and administrative systems, it optimizes resource allocation and enhances operational efficiency. AR/VR interfaces provide immersive experiences for students and faculty, offering interactive campus maps, virtual tours, and personalized notifications. This fusion of digital twins with AR/VR technologies empowers users with lifelike simulations and seamless access to academic resources. As higher education embraces innovation, the digital twin college model augmented by AR/VR stands at the forefront, promising a transformative and immersive educational experience for all stakeholders.

FUTURE SCOPE:

The future scope for the digital twin college model augmented by AR/VR technology is promising the advancement which include predictive analytics for proactive resource management, AI-driven personalized learning experiences, and enhanced virtual collaboration spaces. Furthermore, the model could facilitate global education initiatives by offering virtual exchange programs and cross-cultural simulations.

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