

Digitally Preserving the Legacy of Kakatiya Architecture: AR/VR, Virtual Exploration of Kakatiya Kala Thoranam and Ramappa Temple

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Monuments are more than just stone and structure—they are enduring symbols of identity, culture, and history. In Telangana, built heritage plays a crucial role in shaping the region's cultural narrative, especially through the architectural marvels left behind by the Kakatiya Dynasty (12th–14th century CE). These monuments not only reflect the engineering brilliance of their time but also embody the legacy and power of the rulers who commissioned them.

One such iconic structure is the Kakatiya Kala Thoranam, or the Warangal Gate, a majestic stone arch that once formed the gateway to the Warangal Fort. Its intricate carvings, symmetrical design, and historical importance have made it a cultural emblem—it even features in the official logo of the Telangana Government. Yet, like many heritage sites, it faces threats from environmental decay, urbanization, and neglect. Recognizing this, my thesis project focuses on the digital preservation of the Kakatiya Kala Thoranam through immersive technologies like Virtual Reality (VR) and Augmented Reality (AR).

Using photogrammetry, a method that stitches hundreds of photographs to reconstruct 3D models, I digitally recreated the Kala Thoranam in high detail. These models were then imported into Unreal Engine to create a VR experience, allowing users to virtually explore the monument as if they were standing before it in Warangal. Historical narratives, ambient sounds, and interactive navigation were incorporated to enhance immersion and understanding. An AR prototype was also developed for mobile devices, enabling users to visualize the monument in their surroundings, making cultural education both accessible and engaging.



Expanding the scope of digital preservation, the project also included the Ramappa Temple, a UNESCO World Heritage Site located in Palampet. Known for its earthquake-resistant sandbox foundation, floating bricks, and detailed carvings depicting mythological and cultural stories, the temple is a masterpiece of Kakatiya architecture.



A full-scale VR walkthrough of the Ramappa Temple was developed, where users can view sculptures up close, explore the mandapa, and learn about the stories etched into stone. This immersive experience bridges the gap between past and present, making cultural heritage tangible for future generations.

These digital reconstructions are not just about preserving architecture—they are about creating educational tools that bring history to life. Through this project, I aim to promote public awareness and appreciation of Telangana's rich cultural history, especially among youth who might otherwise be disconnected from it.



As the next step, I plan to integrate these virtual experiences into QR codes placed at educational institutions and tourist sites. By scanning these codes, students and visitors will be able to access the 3D models and VR/AR tours on their smartphones, offering an interactive way to learn about the monuments' significance and craftsmanship.

This project is a step toward building a bridge between cultural heritage and modern technology—ensuring that the stories of the Kakatiyas live on, not just in textbooks, but through meaningful, immersive experiences.

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