

INTERACTIVE 3D VIRTUAL TOURISM SYSTEM: DESIGN AND IMPLEMENTATION FOR SRI LANKA'S HERITAGE SITES

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Sri Lanka's tourism industry still relies largely on passive promotional methods that provide little opportunity for interactive pre-travel experiences, limiting tourist motivation to visit heritage sites. While virtual tourism is expanding globally, Sri Lanka has used minimal adoption of VR-based applications, with prior studies focusing mainly on hospitality contexts, such as experiential marketing in hotels. No research has examined VR in relation to cultural tourism and heritage attractions, leaving a significant gap in immersive pre-travel experiences. This study addresses that gap by developing and testing an interactive 3D virtual environment for heritage sites such as Thuparamaya and Kuttam Pokuna, with the aim of exploring the impact of immersion on user engagement, cultural learning, and visit intention. A systematic approach was used: on-site capture through photography and 360° content; 3D geometry generation in Blender; implementation in Unity for navigation, interaction, and visualisation; and the development of an online platform providing contextual history. Technical performance was evaluated using metrics such as memory usage and loading time, while usability was assessed through a survey ($n = 200$) measuring ease of navigation, immersion, satisfaction, and cultural learning. Findings indicated that 72% participants found the system easy to navigate, 68% reported enhanced cultural knowledge, and over 80% expressed greater curiosity and intention to visit the destinations after using the platform. Statistical analysis confirmed significant correlations between immersion, satisfaction ($p < 0.05$), and travel intention ($p < 0.05$), demonstrating that VR can outperform traditional websites as a destination marketing tool. This research provides empirical evidence of VR's effectiveness in enhancing user experience and destination attractiveness. Future directions include expanding the platform to other heritage sites, integrating VR headsets, and examining issues of accessibility, sustainable tourism, and cultural learning in virtual environments.

Keywords: 3D modelling, Destination marketing, Virtual reality, Virtual tourism