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DIGITAL HERITAGE LAB

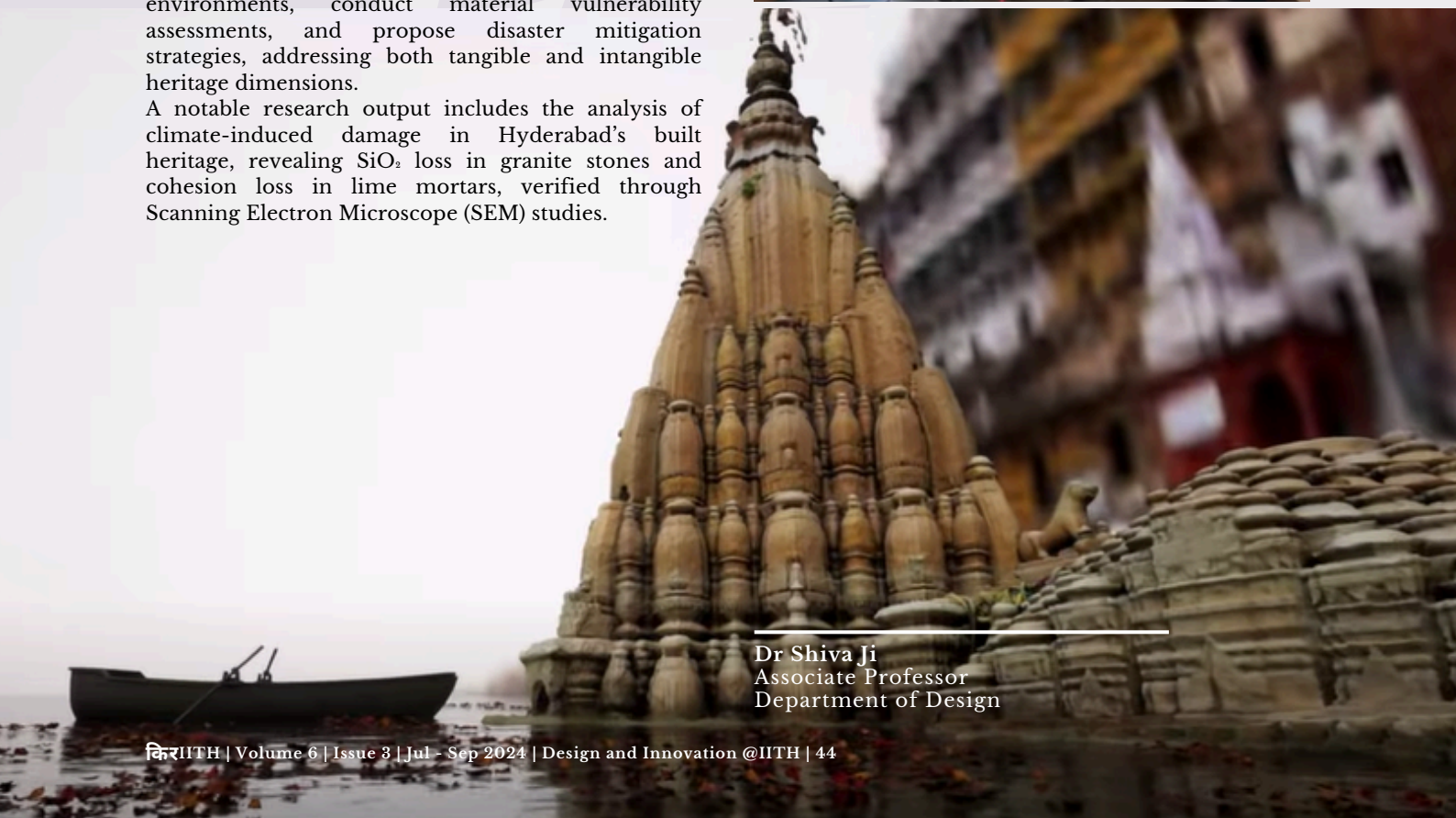
KID: 20240323

The Digital Heritage Lab at IIT Hyderabad, led by Principal Investigator Dr. Shiva Ji, is at the forefront of digitally preserving India's architectural and cultural heritage through advanced technologies. Aligned with the institute's motto, "Inventing & Innovating in Technology for Humanity," the lab focuses on integrating digital tools with traditional knowledge to make heritage conservation sustainable and accessible.

The lab has developed a robust digital ecosystem using LiDAR, drones, high-end computing, 3D printers, and media capture technologies, creating detailed 3D reconstructions, architectural drawings, and immersive AR/VR experiences. A key innovation is using Digital Twins and Artificial Intelligence to simulate environmental impacts and deterioration in heritage structures. AI is also employed in automating workflows, such as generating illustrated renderings from photogrammetric models using Blender and stable diffusion pipelines.

The lab has completed a major DST-IHDS-funded project on the indigenous architecture of Northeast India, digitally documenting significant structures from all seven states and showcasing climate-responsive and culturally rooted design features. Currently, it is undertaking another flagship initiative, the DST-SHRI project in Kashi (Varanasi), titled "Creating Digital Immersive Heritage Experience, Risk Assessment and Vernacular Architecture Analysis of Five Historically Significant Temple Marvels of Kashi". The project aims to build virtual reality environments, conduct material vulnerability assessments, and propose disaster mitigation strategies, addressing both tangible and intangible heritage dimensions.
A notable research output includes the analysis of climate-induced damage in Hyderabad's built heritage, revealing SiO_2 loss in granite stones and cohesion loss in lime mortars, verified through Scanning Electron Microscope (SEM) studies.

These findings support the lab's broader aim of integrating heritage science with climate adaptation. The Digital Heritage Lab is also a vibrant capacity-building centre, offering hands-on training and coursework in Heritage Building Information Modelling (HBIM), Extended Reality (XR), AI for Cultural Heritage, Visual Ethnography, and intangible heritage documentation. These efforts are embedded in teaching and research programmes across departments, benefiting students, researchers, and professionals.



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