From Heritage to Holograms: AI & LiDAR Powered 3D Reconstructions of India's Heritage

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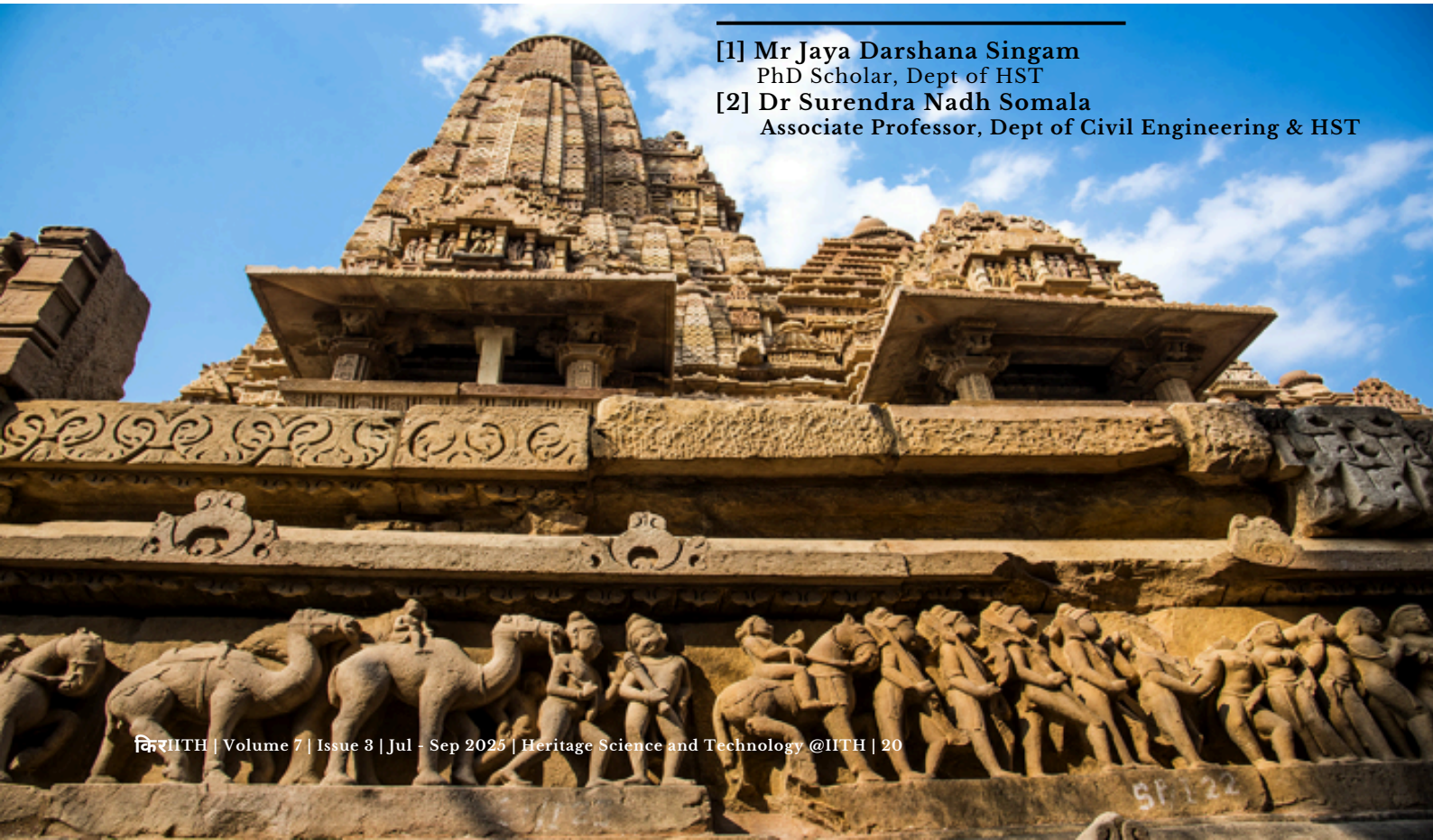
India's architectural heritage carries a gigantic and ravelled mosaic which are not just traces of antiquity but they reflect the eternity of art, religious and cultural expression also.From the embellished carvings of Khajuraho to the majestic walls of Hampi, each structure carries a memory, knowledge, identity and artistry.

Yet, the current scenario of our India's tangible heritage treasures are under accelerating threat from various conditions including climate stress, pollution and unregulated visitation. Safeguarding them is not only our cultural role but also a technological constraint.

This is where the concept of AI-driven 2D-to-3D reconstruction becomes meaningful. At its core, the system takes an input of a flat 2D image and by using deep-learning and computer vision methods it transforms into an interactive 3D model involving steps including depth estimation, point cloud generation, adds texture and color and finally reconstruct the mesh that can be viewed in any axis and angles to for in-depth study or even export the data.

While 2D-3D image conversion offers accessibility, the inclusion of LiDAR(Light Detection And Ranging) makes the preservation more stronger as LiDar uses lasers to capture the point cloud geometry with higher precision, complementing the image-based models which provide texture and color. The stitching of camera and LiDAR create detailed and accurate digital twins of any heritage sites/monuments.

Globally, LiDAR scans support the restoration not only theoretically but also practically like the restoration of Notre-Dame(billions of laser scans) after the 2019 fire.



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