

Creating Digital Estampages of Sri Lankan stone inscriptions using Multispectral Imaging

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Stone inscriptions are of immense historical and cultural importance, but are progressively becoming illegible due to natural weathering, erosion and vandalism. This paper presents a novel approach to enhance the readability of stone inscriptions using multispectral imaging. Traditional methods such as estampages are weather-dependent and prone to human error. The proposed multispectral imaging-based system combines advanced techniques such as spectral enhancement based on Kubelka–Munk theory, multispectral band selection, and deep learning–based preprocessing models (U-Net, ResNet) to significantly improve legibility, providing a non-invasive and efficient method for documenting and preserving ancient inscriptions. Results demonstrate that our U-Net–based preprocessing pipeline achieved a Peak Signal-to-Noise Ratio (PSNR) of 15.33 dB and reduced Fréchet Inception Distance (FID) to 518, while expert evaluation showed a 58.7% preference for digital estampages over traditional methods. This demonstrates the system’s potential for integration into existing archaeological workflows, improving both accuracy and time efficiency in inscription documentation.

Keywords: *Multispectral imaging, Epigraphy, Stone inscriptions, Digital estampages, Archaeology, Archaeological documentation*