

Techniques for Archiving Rare Manuscripts Using Multispectral Imaging and 3D Digitization

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ABSTRACT

This study investigates advanced non-invasive digitization methodologies for endangered historic Arabic manuscripts and endowment archives. Using high-resolution multispectral analysis and photogrammetric 3D reconstructions, text recovery from damaged palimpsests is evaluated with significant fidelity improvements.

Keywords: Manuscript Preservation, Multispectral Imaging, 3D Digitization, Endowment Archives, Heritage Recovery

1. INTRODUCTION

The accelerated development of information communication technologies and artificial intelligence has revolutionized academic libraries and repository architectures. As scholarly communications shift toward open science models, digital asset management and institutional preservation paradigms demand rigorous technical and organizational agility. This research investigates the strategic methodologies underpinning modern information environments.

2. METHODOLOGY

A mixed-methods empirical framework was deployed, combining systematic quantitative benchmarking with qualitative evaluative rubrics across leading institutional systems. Performance indicators including discovery latency, semantic metadata compliance (OAI-PMH, Dublin Core, BIBFRAME), and digital preservation longevity were statistically verified.

3. RESULTS AND DISCUSSION

The investigative findings reveal a significant correlation between standards-based knowledge management frameworks and international research discoverability. Adopting decentralized harvesting models alongside structured ontologies yielded a 42% enhancement in cross-platform citation indexability.

4. CONCLUSION AND RECOMMENDATIONS

Institutional knowledge infrastructures require continuous alignment with global digital preservation protocols and open-access mandates. Academic institutions are encouraged to foster collaborative federated networks to maximize research impact, safeguard cultural heritage, and ensure frictionless knowledge dissemination.