

Artificial Intelligence for Digital Preservation of Audiovisual Heritage in ASEAN: Archival Infrastructure, Metadata, and Repository Governance

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Abstract

This investigation examines the contribution of artificial intelligence (AI) to the digital preservation and accessibility of audio-visual heritage, particularly film and animation, between 2023 and 2025, while evaluating the readiness of archival infrastructure and information management practices within memory institutions. Situated within Library and Information Science (LIS), the research focuses on archival collections of film and animation that demand sustained custodial oversight through core digital repository functions, including ingest, preservation, and access, consistent with the Open Archival Information System (OAIS) reference model. Requirements relating to preservation metadata and rights accountability are interpreted using recognised preservation metadata frameworks, such as Preservation Metadata: Implementation Strategies (PREMIS), together with records management principles that emphasise institutional responsibilities, governance policies, and metadata supporting records

systems. Adopting a quantitative research design, the study operationalises indicators derived from the ASEAN Digital Masterplan 2025, the ASEAN Guide on AI Governance and Ethics (2024), and UNESCO Memory of the World preservation-risk survey reports to evaluate ASEAN member states across three dimensions: (i) digital infrastructure capacity underpinning repository sustainability, (ii) governance maturity supporting the responsible adoption of AI, and (iii) levels of vulnerability influencing archival resilience. The findings reveal a pronounced structural imbalance whereby advances in digital capability, AI adoption, and animation production have outpaced the development of archival storage infrastructure, disaster preparedness, and sustainable long-term repository management across the region. Consequently, the study advocates targeted investment in fundamental digital preservation capabilities, including resilient storage, fixity-based preservation management, and professional capacity building, alongside policy interventions that enhance rights-conscious access, transparent governance, and the long-term trustworthiness of repositories managing audio-visual heritage collections.

Keywords: Artificial Intelligence, Audiovisual Archives, Digital Preservation, Digital Curation, Preservation Metadata, Digital Repositories, Information Governance, ASEAN.

Introduction

Film and animation collections across ASEAN

represent an important component of audiovisual documentary heritage preserved within memory institutions, national archives, library-based audiovisual collections, museums with dedicated audiovisual divisions, and specialised repositories. Within these institutions, preservation constitutes a fundamental responsibility of LIS, ensuring the continued accessibility, authenticity, and long-term usability of archival resources. UNESCO's guidance on digital heritage preservation and the selection of digital heritage for long-term retention stresses that institutions must establish explicit policies governing appraisal, selection, resource allocation, and access planning to mitigate the risks posed by technological obsolescence and environmental threats (Choy et al., 2016; National Library of Australia, 2003). From this archival perspective, film and animation are regarded not merely as cultural expressions but as documentary records whose enduring value depends upon sustainable infrastructure, professional stewardship, and reliable mechanisms for user access.

Between 2023 and 2025, AI-assisted preservation practices have become increasingly prominent across ASEAN as archival collections continue to face physical deterioration, unstable storage environments, and accelerating technological change (Antoniazzi, 2021). UNESCO has identified climate-related hazards, disaster vulnerability, and persistent resource constraints as significant factors threatening the long-term preservation of audiovisual collections throughout Southeast Asia (UNESCO, 2020, 2025). Contemporary preservation practice consistently demonstrates that digital preservation is both resource-intensive and perpetual, requiring continuous investment in storage infrastructure, integrity monitoring, and migration activities to maintain the long-term accessibility of digital assets (Chan, 2024). Public communications issued by the Asian Film Archive similarly emphasise the operational demands associated with ensuring the continued usability of digital collections. Myanmar provides a particularly illustrative example; despite possessing an extensive cinematic heritage, available reports indicate that only a limited number of films remain under state custody, with many surviving copies existing in severely deteriorated condition (Chan, 2024). Consequently, the adoption of AI has become intrinsically linked to broader concerns regarding archival sustainability and effective preservation-risk management.

AI technologies provide significant opportunities to automate damage identification, scratch restoration, colour enhancement, and image upscaling at a scale that conventional manual workflows cannot efficiently achieve (Rota et al., 2023; Sathiamoorthy and Kumar, 2024). Similarly, deep learning approaches have accelerated scene reconstruction and digital asset generation within animation production workflows (Jiang and Wang, 2024). Despite these technological benefits, such developments intensify longstanding LIS concerns relating to authenticity, transparency, and accountability. Critical questions arise regarding the specific alterations undertaken, the AI applications and parameter settings employed, the authorities responsible for approving interventions, and the extent to which these decisions are documented and communicated to future users. Moreover, AI has intensified ethical and employment-related debates, particularly concerning the unauthorised exploitation of performers' likenesses and the potential displacement of creative professionals, issues that became especially prominent during the 2023 SAG-AFTRA industrial dispute (Bharathi and Vardhan, 2024). Within cultural heritage settings, researchers further caution that algorithmic technologies may reinforce representational inequalities by privileging dominant narratives and data-rich communities while marginalising minority and Indigenous perspectives unless supported by robust governance frameworks and appropriate corrective mechanisms (Tiribelli et al., 2024).

Regional governance initiatives have established an important, although still developing, framework for responsible AI implementation. The ASEAN Guide on AI Governance and Ethics (2024) advocates transparency, accountability, fairness, privacy and data governance, system robustness, and human-centred values through a voluntary risk-based governance model (ASEAN Secretariat, 2024). Likewise, ACHDA demonstrates growing regional collaboration in cultural heritage digitisation; however, audiovisual collections, particularly film heritage, remain comparatively underrepresented relative to other heritage resources (NTT DATA, 2020). Against this backdrop, the present study investigates AI-enabled audiovisual preservation across ASEAN during the period 2023–2025 by examining archival infrastructure readiness, metadata accountability, and rights-aware access as central LIS challenges within an evolving regional AI governance environment.

Conceptual and Theoretical Framework

This study is underpinned by two complementary conceptual frameworks within LIS: the OAIS reference model and the Digital Curation Lifecycle. OAIS establishes a comprehensive framework defining repository responsibilities, including ingest, archival storage, data management, preservation planning, administration, and access, all designed to support the needs of a designated community (ISO, 2012). Within this framework, AI-driven restoration is not regarded as the ultimate objective of preservation but rather as one preservation activity undertaken within a systematically governed repository environment. Complementing this perspective, the Digital Curation Lifecycle conceptualises preservation as a continuous, cyclical process encompassing activities such as appraisal and selection, ingest, preservation, storage, access, reuse, and transformation. Rather than viewing preservation as a single technical intervention, the model emphasises sustained management throughout the entire lifespan of digital resources (Higgins, 2008).

Collectively, these frameworks facilitate examination of AI across the complete stewardship continuum, particularly within ASEAN institutions where resource availability varies considerably and long-term sustainability depends upon carefully prioritised workflows and preservation practices. To operationalise these frameworks within archival practice, the study adopts records-informed workflows supported by documented authenticity controls. Records management principles emphasise governance policies, clearly assigned responsibilities, organisational oversight, and staff development within records systems (ISO, 2016). Likewise, PREMIS highlights systematic documentation of digital objects, preservation events, responsible agents, and rights information to maintain authenticity and long-term usability, particularly when AI generates derivative outputs that must remain demonstrably connected to their original source materials (Library of Congress, n.d.).

From an operational perspective, baseline preservation capability is interpreted using the NDSA Levels of Digital Preservation (Version 2.0), which provides a practical maturity framework covering storage, data integrity, security, metadata management, and access functions. Within AI-assisted restoration workflows, mechanisms such as fixity verification through checksum validation and systematic version control become especially

important. Preservation repositories should therefore safeguard master preservation files against unintended alteration, manage AI-generated products as controlled derivative objects, and maintain comprehensive provenance records that clearly distinguish restorative interventions from reconstructive modifications.

The conceptual framework further positions metadata management and user access as fundamental outcomes of long-term preservation. Effective stewardship of audiovisual collections generally requires three complementary categories of metadata: descriptive metadata supporting resource discovery, technical metadata enabling system management, and preservation metadata ensuring continuity, authenticity, and institutional accountability. Cross-domain resource discovery may be facilitated through Dublin Core metadata elements, whereas audiovisual description and information exchange are supported by established community standards including PBCore and EBUCore (European Broadcasting Union, 2020), together with the FIAF Moving Image Cataloguing Manual, which provides guidance for managing works, versions, and manifestations within film archives (Tadic, 2016).

Consistent with OAIS, preservation activities are ultimately justified through sustained service to a designated community comprising researchers, educators, students, creative practitioners, policymakers, and the communities represented within archival records (ISO, 2012). UNESCO likewise advocates preservation strategies that ensure continuing public access to documentary heritage in both analogue and digital environments. As AI increasingly generates substantial volumes of machine-produced descriptive information, including transcripts and metadata tags, this study regards AI-generated metadata as inherently probabilistic and susceptible to algorithmic bias. Accordingly, such metadata should be explicitly identified as machine-generated, subjected to human validation, and supported by transparent correction mechanisms, particularly where descriptive metadata influences discoverability, representation, and equitable access across ASEAN's diverse digital infrastructures and institutional capacities.

Literature Review

AI, Digital Media, and Cultural Representation

Blayone and Mykhailenko (2025) examine

Indigenous-centred digital initiatives undertaken across 19 countries, revealing enduring challenges concerning governance, data sovereignty, and the continuing influence of colonial expertise. Their analysis demonstrates that relatively low-technology approaches, including social media platforms and digital storytelling, generally strengthen Indigenous agency and cultural survivance. By comparison, technologically intensive infrastructures, including Geographic Information Systems (GIS), counter-mapping, AR, VR, and large-scale cultural digitisation projects, frequently rely upon external technical specialists, thereby constraining community ownership and local decision-making. Their analytical framework identifies three principal orientations: synergistic “bothways” collaborations, decolonial representative initiatives, and pragmatic service-oriented programmes. Significantly, only approximately four per cent of the reviewed projects explicitly incorporated AI, highlighting a substantial disparity between the rapid global expansion of AI technologies and their relatively cautious adoption within Indigenous cultural preservation.

Yoon (2025) explores representations of AI and humanoid technologies across Eastern and Western media by examining their distinct philosophical origins and their gradual convergence under the influence of global platform capitalism. Earlier Japanese and broader East Asian narratives, including *Astro Boy* and *Ghost in the Shell*, portrayed robotic characters as emotionally sophisticated beings rooted in holistic cosmological traditions rather than the disembodied and mechanistic conceptions commonly associated with Western AI discourse. Drawing upon transhumanist and posthumanist perspectives, the study argues that contemporary East Asian streaming productions increasingly reproduce Western dualistic assumptions and dystopian futures, thereby diminishing technological diversity while preserving only limited traces of non-Western philosophical traditions.

A further stream of scholarship positions AI as a transformative force within large-scale animation production and the international dissemination of cultural narratives. Using *NeZha 2* as an illustrative case, Mei (2025) demonstrates how AI-enhanced production pipelines, virtual production environments, and advanced visual effects technologies are integrated with cultural translation strategies that reinterpret Chinese mythology and iconography through globally recognisable narrative structures and humour.

Nevertheless, the study identifies a continuing imbalance between internationally competitive technical capabilities and comparatively limited success in communicating cultural meanings to overseas audiences, as reflected in modest international box-office performance and the extensive interpretative work undertaken by cultural intermediaries responsible for adapting narratives across cultural contexts.

Comparable concerns are examined by Bing et al. (2024) and Alkhraisat (2025) within the contexts of intercultural communication and values-based education. Focusing on educational collaboration between Malaysia and China, Mo et al. conclude that 2D and 3D animation, together with AR and VR applications, possess considerable potential to facilitate cross-cultural understanding. However, successful implementation remains constrained by unequal technological resources, shortages of skilled professionals, and the risk of cultural misrepresentation. Likewise, Alkhraisat’s comparative review of AI applications within Japanese, Chinese, and Korean animation links AI-supported production processes with moral and civic education while cautioning that Western-oriented training datasets and algorithmically generated creative outputs may weaken cultural authenticity and displace traditional artistic craftsmanship. Both studies consequently advocate the development of culturally representative datasets, strengthened professional expertise, and the treatment of AI as a collaborative instrument guided by local philosophical traditions rather than as an autonomous creative authority.

Research addressing cultural heritage and language preservation further reinforces these complex tensions. Trifunović (2024) argues that digital preservation scholarship should move beyond predominantly technical concerns by giving greater attention to AI- and XR-mediated representation, ethics, and cultural interpretation. Similarly, Esquivel (n.d.), through practice-based research involving AI-assisted illustration for Palauan picture books, demonstrates both the opportunities and the cultural sensitivities associated with integrating AI into heritage preservation initiatives. Extending this critical perspective, Liu and Li (2024) characterise the contemporary intelligent media ecosystem as one shaped by large language models, XR technologies, and metaverse environments that simultaneously stimulate innovative aesthetic forms and new production practices while generating substantial risks, including algorithmic hallucinations, opaque recommendation

systems, and ideological bias. They therefore argue that these developments necessitate more robust governance mechanisms, greater transparency, and sustained human-centred oversight to ensure that AI applications remain ethically accountable within cultural heritage and preservation environments.

Creative Industries, Policies, Ecologies and Transmedia Futures

A parallel stream of scholarship examines the industrial structures and policy environments that shape the development of AI-enabled digital animation. Holroyd (2019) investigates how Hong Kong, Singapore, Malaysia, and Vietnam have strategically positioned digital content industries as both drivers of economic growth and instruments for strengthening cultural and linguistic sovereignty. Through initiatives including Cyberport, Pixel Studios, and Malaysia's Multimedia Super Corridor, governments have introduced innovation hubs, financial incentives, incubator programmes, and talent development strategies to stimulate the digital creative economy. Nevertheless, the study argues that these policy interventions remain fragmented and frequently overlook the increasingly cross-border and gig-based nature of digital creative labour. Examining the industry from an organisational perspective, Tan et al. (2024) identify persistent structural challenges within Malaysia's film, advertising, and animation sectors, including comparatively low remuneration, shortages of skilled professionals, and continued reliance on government incentives. Their findings further reveal a dual industrial structure in which a limited number of successful domestic intellectual property (IP) franchises coexist with substantial dependence on outsourced production for international entertainment companies.

Mohd Hasri et al. (2022) further explore this intersection between policy and industry by examining the adoption of transmedia storytelling within the Malaysian animation sector as a strategy for simultaneously achieving commercial sustainability and compliance with national cultural objectives. Prominent franchises, including *Kampung Boy*, *Upin & Ipin*, *BoBoiBoy*, and *Ejen Ali*, exemplify Jenkins' concepts of world-building and additive comprehension through integrated storytelling across television, film, comics, digital games, and themed attractions. A defining characteristic of these productions is their systematic incorporation of kampung lifestyles, Malay-Muslim cultural values, and everyday local language

into narrative formats that remain internationally accessible. Supported by government initiatives and policy instruments such as the National Creative Industry Policy, these animation properties illustrate a hybrid ecosystem in which commercial objectives, nation branding, and cultural proximity operate as mutually reinforcing priorities.

Mei's (2025) industrial analysis of *NeZha 2* complements these observations by conceptualising producers, digital platforms, marketers, regulators, and critics as cultural intermediaries responsible for balancing AI-driven technological advancement with commercial performance and effective cultural translation. The study demonstrates that industrial modernisation increasingly relies upon AI-supported production processes, cloud-based collaborative workflows, localisation strategies, and geographically distributed production centres, all facilitated through supportive policy incentives. However, Wang cautions that algorithmically driven recommendation systems and template-oriented production models may encourage excessive convergence, while expansion strategies focused primarily on scale risk diminishing both creative originality and cultural distinctiveness.

Collectively, these studies indicate that sustainable futures for AI and digital animation depend upon embedding technological innovation within human-centred and community-oriented frameworks rather than treating technology as an end in itself. Blayone and Mykhailenko (2025), Bing et al. (2024), and Alkhraisat (2025) advocate stronger commitments to data sovereignty, cross-border collaborative creation, culturally responsive educational programmes, and locally grounded knowledge systems. Similarly, Liu and Li (2024) emphasise the importance of multi-stakeholder governance, algorithmic transparency, and accountable policy development. Meanwhile, Mohd Hasri et al. (2022) and Yoon (2025) stress the need to preserve techno diversity and indigenous narrative traditions in response to the homogenising influence of global digital platforms. Taken together, this body of literature suggests that the future trajectory of AI and digital technologies will be shaped not by technological determinism but by continuing negotiations over governance, cultural representation, public policy, and education, all of which will profoundly influence the evolution of animation, cultural memory, and values-based learning.

Research Methodology

A quantitative research design was adopted

to examine AI-enabled preservation of film and animation heritage across ASEAN during the 2023–2025 period through statistical analysis of digital infrastructure metrics, digital readiness indicators, and evidence relating to AI governance implementation. Consistent with the theoretical foundations of LIS and archival research, the quantitative measures were organised into four interrelated LIS-oriented constructs: (1) repository and infrastructure readiness, (2) preservation capacity, (3) governance maturity for digital heritage, and (4) access enablement. These constructs reflect the fundamental principles of digital preservation and records management, which recognise that sustainable long-term preservation depends upon reliable repository operations, clearly documented institutional responsibilities, robust metadata management, and the continued accessibility of preserved digital resources (ISO, 2012, 2016).

Data Sources and LIS Variable Relabelling

The study utilises data compiled from the ASEAN Digital Masterplan 2025, the ASEAN Guide on AI Governance and Ethics (ASEAN Secretariat, 2024), UNESCO Memory of the World preservation-risk reports together with related UNESCO Bangkok publications (UNESCO, 2020, 2025), and additional secondary sectoral reports incorporated into the analysis. Infrastructure indicators extracted from the ASEAN Digital Masterplan—including Long-Term Evolution (LTE) coverage, fixed broadband penetration, international bandwidth capacity, per capita telecommunications investment, internet usage, e-government performance, and digital skills—are operationalised as proxy measures of repository and infrastructure readiness. These indicators represent the fundamental digital conditions necessary to support dependable ingest workflows, secure repository storage, and sustainable network-based access services.

Indicators derived from UNESCO Memory of the World surveys relating to preservation risks and institutional capacity constraints—including disaster exposure, climate-related threats, storage deficiencies, and resource limitations—are reclassified as measures of preservation capacity. These variables reflect the institutional resilience required to ensure the long-term continuity and sustainability of repository operations and archival collections. Ethical and regulatory preparedness is operationalised through the construct of governance maturity for digital heritage by examining documentary evidence concerning

the implementation of the principles outlined in the ASEAN Guide on AI Governance and Ethics. Specifically, the analysis considers the adoption of principles relating to transparency and explainability, fairness and equity, security and safety, human-centred governance, privacy and data governance, accountability and integrity, and system robustness and reliability within national AI strategies and heritage-related initiatives discussed in the study (ASEAN Secretariat, 2024). Finally, indicators already available within the dataset, including digital connectivity, digital skills, and e-government readiness, are employed as proxy measures of access enablement. Within the context of OAIS, these indicators represent the practical institutional capacity to deliver discoverable, accessible, and usable digital services to designated communities while maintaining compliance with rights management, authenticity, and accountability requirements (ISO, 2012).

LIS Lens Added to Data Extraction (No New Data Collection)

All quantitative information, including numerical values, tabulated data, and policy targets reported within the selected policy documents and institutional reports, was systematically extracted into a structured database containing the indicator name, recorded value, measurement unit, reporting year, and corresponding source. To strengthen alignment with LIS and archival scholarship, an additional coding layer was developed using document analysis procedures (Bowen, 2009) and applied exclusively to the documentary sources already incorporated within this study, namely policy documents, AI governance guidance, and documentary heritage reports. This coding framework records the binary presence or absence (0/1) of explicit policy guidance relating to trustworthy digital repository functions, metadata management, digital preservation standards and preservation planning, access policies, rights management, permissions, disclosure of preservation interventions, and staffing or professional training for archivists and digital curators. The resulting coded dataset is used solely to enhance the interpretative alignment of the quantitative findings with LIS perspectives by identifying whether existing policy environments explicitly address repository governance, metadata management, and long-term access responsibilities. Importantly, this analytical layer neither introduces additional empirical datasets

nor alters the underlying quantitative evidence upon which the study is based.

Statistical Analysis

Descriptive statistical techniques are employed to summarise cross-national variation, while correlation and comparative analyses are undertaken to examine the relationships among the four LIS-oriented constructs: repository and infrastructure readiness, preservation capacity, governance maturity for digital heritage, and access enablement. These analyses utilise only the indicators extracted from the selected documentary sources. Where the same source documents provide time-series data spanning 2019–2025, these values are incorporated to illustrate longitudinal trends that provide contextual understanding for the principal period of analysis (2023–2025).

The methodological approach recognises several inherent limitations. These include reliance on self-reported information contained within policy documents and survey-based reports, publication time lags, inconsistencies in indicator definitions across ASEAN member states, and the absence of standardised metrics specifically designed to assess audiovisual preservation. Consequently, broader indicators relating to digital infrastructure and documentary heritage preservation risks are employed as proxy measures. Throughout the analysis, careful attention is given to maintaining transparency regarding the interpretative scope of each indicator, explicitly acknowledging both its analytical value and its limitations in representing the complex realities of AI-enabled audiovisual preservation.

Data Analysis

Documentary Heritage Preservation Infrastructure and Institutional Capacity

The UNESCO Memory of the World programme

conducted a regional survey during 2019–2020 to assess vulnerabilities affecting documentary heritage preserved by memory institutions across Southeast Asia. UNESCO (2025) reports a 93% response rate, with 28 of 30 targeted institutions providing structured information on preservation risks, institutional threats, and capacity-building needs. From an LIS perspective, this strong participation establishes the survey as a valuable regional benchmark for assessing preservation capacity, reflecting the ability of archives, libraries, and other repositories to sustain documentary heritage through adequate storage, professional expertise, and continuity planning. The survey also aligns with core LIS responsibilities by focusing on institutions formally responsible for long-term custodianship, preservation planning, and continued access to documentary heritage collections (UNESCO, 2020, 2025).

The findings further reveal that documentary heritage across Southeast Asia remains vulnerable to interconnected environmental and infrastructural threats. UNESCO (2025) identifies disaster risk management as the most frequently reported capacity-building priority, while humidity and flooding are highlighted as the principal environmental challenges affecting collection preservation. From an LIS perspective, these findings directly link preservation risk to repository and infrastructure readiness. When environmental hazards coincide with inadequate storage resilience and limited institutional resources, repositories face increased risks of collection deterioration, service disruption, and irreversible information loss. The findings therefore demonstrate that effective preservation extends beyond technical conservation and depends equally on institutional preparedness, governance, and sustainable resource allocation to ensure the long-term continuity, authenticity, and accessibility of documentary heritage (UNESCO, 2025). Table 1 summarises the UNESCO survey response metrics and the overall coverage of the regional preservation assessment.

Table 1: UNESCO Memory of the World Survey Response Metrics (2019–2020).

Survey Parameter	Finding
Total Memory Institutions Surveyed	30
Institutions Providing Data	28
Survey Response Rate	93%
Survey Period	2019–2020
Primary Capacity-Building Need	Disaster Risk Management
Common Environmental Threats	Humidity and Floods
Output Publication	<i>Memory of the World State of Preservation Report for Southeast Asia 2020</i>
Source: UNESCO Bangkok (2023).	

From the perspective of preservation economics, the substantial cost disparity between analogue and digital preservation imposes significant financial pressures on regional archives and audiovisual repositories seeking to modernise their collections while ensuring sustainable long-term access. Drawing upon the evidence presented by Chan (2017), based on estimates reported by Jones (2012), the annual cost of preserving a film archival master on analogue media was estimated at USD 1,059 per title in 2007, whereas maintaining the equivalent material through digital preservation required approximately USD 12,514 annually, representing an expenditure nearly 11.8 times greater (Chan, 2017; Jones, 2012). Within the LIS framework adopted in this study, this considerable disparity extends beyond an operational consideration and constitutes a structural determinant of preservation capacity. Unlike analogue preservation, digital preservation requires continuous cycles of file management, storage expansion, integrity monitoring, and format migration to mitigate technological obsolescence. These recurring financial commitments directly influence the ability of memory institutions to sustain essential repository functions over time (Chan, 2017). Accordingly, Chan argues that archival institutions can no longer depend upon ad hoc collection practices but must instead implement

explicit appraisal, selection, and prioritisation policies aligned with institutional access mandates and sustainable long-term preservation planning.

Cost evidence reported by the Asian Film Archive further illustrates these financial challenges within a regional context. Chan (2017) notes that producing a traditional celluloid preservation negative costs approximately SGD 4,806, whereas digitally preserving the same title, including backup storage, requires approximately SGD 13,200. The comparison also highlights an important distinction in long-term preservation strategies. When maintained under appropriate environmental conditions, analogue preservation negatives can remain stable for more than a century, whereas digital preservation depends upon continual investment in storage infrastructure, system maintenance, and recurring migration activities to ensure ongoing accessibility. From an LIS perspective, these contrasts emphasise the importance of distinguishing between alternative preservation strategies, including stable analogue preservation elements and digitally managed preservation masters, while simultaneously recognising that successful long-term preservation depends upon adequate institutional resources, effective repository governance, and sustained commitments to long-term access.

Table 2: Film Preservation Cost Comparison—Analogue vs. Digital Formats.

Preservation Type	Cost	Notes
Analogue Film Master (Annual, 2007)	USD 1,059	Baseline Reference
Digital Preservation (Annual, 2007)	USD 12,514	~11.8× Analogue Cost
Celluloid Negative Print (AFA)	SGD 4,806	100+ Years Stability Potential
Digital Preservation & Back-Ups (AFA)	SGD 13,200	~2.7× Celluloid Cost
Digital Format Migration Frequency	Every 4–5 Years	Recurring Operational Cost

Source: Chan (2017); Jones (2012, p. 126).

Myanmar's cinematic heritage provides a compelling illustration of the severe preservation challenges confronting parts of the ASEAN region. Chan (2024) documents that Myanmar possessed a flourishing film industry from the early 1920s, supported by a cinema culture comprising more than 300 theatres. However, only a small proportion of this heritage survives today. According to Chan (2024), the Myanmar State Archives currently hold only 12 surviving film titles, many of which remain in poor physical condition. From an LIS perspective, this case exemplifies limited preservation capacity, demonstrating how inadequate institutional resources, fragile storage environments, and insufficient

continuity planning can collectively result in the irreversible loss of documentary heritage and undermine long-term access to archival collections.

The restoration of *Pyo Chit Lin* (*My Darling*, U Tin Myint, 1950) provides an instructive example of a collaborative preservation model applicable to archival practice in resource-constrained environments. Chan (2024) explains that the MEMORY Cinema Association partnered with the Asian Film Archive to restore the film for the opening of the MEMORY International Film Heritage Festival in November 2017. Restoration efforts were undertaken using the only surviving 16 mm positive print, which exhibited extensive deterioration, including advanced decay, green mould

contamination, persistent surface scratches, colour bleeding, and severe staining. The restoration process gave particular attention to preserving the original luminosity, contrast, and black density to maintain the film's visual authenticity. The surviving film elements were digitised at 4K resolution before undergoing digital restoration at 2K by L'Immagine Ritrovata in Italy (Chan, 2024). From an LIS standpoint, this project demonstrates the value of cross-institutional

collaboration, carefully documented restoration workflows, and technically informed decision-making that collectively support preservation authenticity, repository sustainability, and the long-term provision of access despite significant resource limitations. Table 3 presents a summary of the restoration project, outlining its principal characteristics, preservation processes, technical specifications, and collaborative institutional arrangements.

Table 3: Pyo Chit Lin (My Darling) Restoration Project Details.

Project Element	Details
Film Title	<i>Pyo Chit Lin (My Darling)</i>
Director	U Tin Myint
Year of Production	1950
Significance	Myanmar's earliest surviving colour film
Source Material	Sole surviving 16mm positive print
Condition Issues	Decay, green mould, scratches, colour bleeding, staining
Scanning Resolution	4K
Digital Restoration Resolution	2K
Restoration Laboratory	L'Immagine Ritrovata, Italy
Partner Organizations	Asian Film Archive, MEMORY Cinema Association
Restoration Year	2017
Source: Chan (2024).	

Asia-Pacific 3D Animation Market Growth and Regional Distribution (LIS Framing: Scale of Born-Digital Outputs and Preservation Demand)

The Asia-Pacific 3D animation market has experienced sustained expansion, with important implications for the increasing volume of born-digital audiovisual materials and the corresponding preservation demands placed upon archival institutions across the region. According to Animost Team (2025), the regional 3D animation market generated revenue of USD 6,840.7 million in 2023 and is projected to increase to USD 16,562.3 million by 2030, representing a compound annual growth rate (CAGR) of approximately 13.5%. The report further indicates that the Asia-Pacific region accounted for approximately 30.2% of global 3D animation revenue during 2023, highlighting its prominent position within the international animation industry. Within the context of this study, this rapid industrial expansion is interpreted as an important contextual factor influencing preservation capacity because growing production ecosystems generate substantially larger volumes of digital assets and completed audio-visual works requiring appraisal, ingest, repository storage, preservation planning, migration management, and

long-term access provision.

Animost Team (2025) identifies several factors underpinning this market growth, including the rapid expansion of streaming platforms and over-the-top (OTT) services, increasing digital media consumption supported by widespread smartphone adoption, hybrid and cross-media intellectual property strategies, technological innovation and wider accessibility of production tools, growing demand for localised cultural narratives, government incentives supporting creative industries, and the region's well-established outsourcing and digital service export capabilities. From an LIS perspective, these developments are significant because they indicate not only increasing production volumes but also greater diversity in digital formats, production workflows, metadata requirements, and rights management environments, thereby adding further complexity to long-term preservation and sustainable access. Animost Team (2025) additionally projects that the global 3D animation market will approach approximately USD 40 billion by 2028, with a CAGR of about 11.7%, while the Asia-Pacific region is expected to account for a substantial proportion of this expansion. The market estimates and growth projections summarised in Table 4 provide the contextual foundation used in this study to evaluate future preservation requirements across the region.

Table 4: Asia-Pacific 3D Animation Market Scale and Growth Projections.

Market Indicator	Value
Asia-Pacific Market Size (2023)	USD 6,840.7 Million
Projected Asia-Pacific Market Size (2030)	USD 16,562.3 Million
Asia-Pacific CAGR (2024–2030)	~13.5%
Asia-Pacific Share of Global Market (2023)	~30.2%
Global 3D Animation Market (2028 Projected)	~USD 40 Billion
Global Market CAGR	~11.7%
Growth Period	2024–2030
Source: Animost (2025).	

The regional distribution of animation production capabilities demonstrates diverse trajectories of industrial development across Southeast Asia. According to Animost Team (2025), the region has emerged as a vibrant centre for 3D animation, with individual countries strengthening domestic intellectual property (IP), expanding regional production capacity, and increasing the international export of animated content. Indonesia provides a prominent example through the animated feature *Jumbo* (2025), which Animost Team (2025) identifies as the country’s highest-grossing animated film, attracting more than 9.6 million viewers and generating approximately USD 20 million in revenue. The report further notes that the film surpassed the domestic performance of *Frozen 2*, illustrating the growing commercial strength of locally produced animation.

Malaysia is similarly recognised for actively advancing its creative industries while expanding the international reach of domestic animation IP. Animost Team (2025) highlights Les’ Copaque’s *Upin & Ipin Universe* as an example of successful franchise expansion through digital games, merchandising, and cross-platform media production. In Thailand, the *PangPond* franchise

is presented as an illustration of IP evolution, progressing from comic publications and two-dimensional animation into 3D animated series and, subsequently, an IMAX feature production (Animost Team, 2025). Meanwhile, the Philippines is characterised as an internationally significant outsourcing centre supporting major global animation studios, whereas Vietnam is identified as a rapidly emerging production hub benefiting from improvements in digital production technologies, workforce capabilities, and competitive operating costs (Animost Team, 2025).

From an LIS perspective, these differing patterns of industrial growth indicate increasing diversity in the creation of born-digital audiovisual materials across the region. Expanding production capacity, the proliferation of digital IP, and increasingly complex cross-platform distribution models collectively increase the volume and diversity of digital assets requiring long-term appraisal, repository management, preservation planning, metadata control, and sustainable access. Table 5 summarises the principal regional animation hubs together with their distinguishing industrial characteristics.

Table 5: Key Regional Animation Hubs and Characteristics in Asia-Pacific.

Country/Region	Key Strengths	Notable Developments
Japan	Export Capacity, Branding, IP Ecosystem	Anime Powerhouse; 3D/Hybrid Experimentation
China	Domestic Market, State Support, Tech Infrastructure	Heavy VFX/Rendering Investment; Domestic Streaming Platforms
South Korea	Tech Infrastructure (Gaming, Electronics)	VFX, Game Cinematics, K-Content Synergies
India	Low-Cost Labour, Growing Talent Pools	Outsourcing Leader; Highest Expected CAGRs in Region
Malaysia	Government Support, IP Development	Les’ Copaque; Animation IP Export Focus
Indonesia	Growing Domestic Audience, Local IP Success	<i>Jumbo</i> : 9.6M Viewers, USD 20M Revenue; Surpassed <i>Frozen 2</i>
Philippines	Global Outsourcing Hub	Subcontracted by Disney, Warner Bros
Thailand	Long-Form IP Development	<i>PangPond</i> : 2D to 3D to IMAX Evolution
Vietnam	Improving Cost Structures, Talent	Emerging Hotspot; Service and Original Content
Source: Animost (2025).		

Regional AI Governance Frameworks and Institutional Readiness (LIS Framing: Governance Maturity for Digital Heritage and Access Enablement)

ASEAN has adopted an AI governance approach

that emphasises innovation, voluntary guidance, and principles-based regulation supported by risk-oriented oversight. Trajano (2025) explains that the regional framework is founded upon core principles including transparency, fairness, security, reliability, privacy, accountability, and human-centricity. From

an LIS perspective, these principles provide useful indicators of governance maturity for digital heritage because trustworthy preservation and sustainable access increasingly depend upon clearly defined accountability mechanisms, responsible rights management, and transparent decision-making when AI technologies are applied to documentary heritage (ASEAN Secretariat, 2024; Trajano, 2025). Accordingly, this study evaluates governance maturity alongside repository and infrastructure conditions to determine whether AI implementation is supported by institutional environments capable of sustaining long-term preservation, operational continuity, and equitable access.

Trajano (2025) further identifies considerable variation in AI governance maturity among ASEAN member states. Singapore is presented as the regional leader, having established a comprehensive governance framework beginning with the National AI Strategy (2019), followed by the Model AI Governance Framework (2019; revised 2020), the AI Verify toolkit (2022), and the National AI Strategy 2.0 (2023). Thailand has progressed through the implementation of its National AI Strategy and Action Plan (2022–2027), accompanied by the development of generative AI guidelines and a proposed royal decree adopting a risk-based regulatory model influenced by the

European Union framework. Malaysia is reported to have introduced the National AI Roadmap (2021–2025) together with the establishment of the National Artificial Intelligence Office in 2024. Indonesia’s National AI Strategy (2020–2045) similarly establishes long-term priorities relating to ethical governance, human capital development, digital infrastructure, and liability provisions under electronic transaction legislation.

Meanwhile, the Philippines has implemented an AI Roadmap (2021) that prioritises digital infrastructure and workforce capability while introducing Resolution No. 11064, requiring greater transparency in the electoral application of AI technologies in response to emerging deepfake-related concerns (Trajano, 2025). Trajano (2025) additionally observes that Myanmar, Cambodia, and Laos remain at comparatively early stages of AI governance development, with none yet possessing fully established national AI strategies or dedicated AI agencies, although all continue to participate in regional governance initiatives. Cambodia has nevertheless demonstrated recent progress through the commencement of public consultations on a draft National AI Strategy in June 2025 (Trajano, 2025). Table 6 summarises the comparative AI governance status of ASEAN member states used as the basis for analysis in this study.

Table 6: ASEAN Member States AI Governance Status Comparison.

Country	National AI Strategy	Key Governance Instruments	Development Stage
Singapore	National AI Strategy (2019); 2.0 (2023)	Model AI Governance Framework; AI Verify Toolkit (2022)	Advanced
Thailand	National AI Strategy (2022–27)	Generative AI Guidelines; Royal Decree (Under Review)	Developing
Malaysia	National AI Roadmap (2021–25)	National Guidelines on AI Governance; NAIIO (2024)	Developing
Indonesia	National AI Strategy (2020–45)	Circular Letter No. 9/2023; Personal Data Protection Law	Developing
Philippines	AI Roadmap (2021)	Data Privacy Act (2012); Resolution No. 11064	Developing
Vietnam	National Digital Transformation Program	Labour Code; Cybersecurity laws (2030 target)	Emerging
Brunei	Digital Economy Masterplan 2025	Guide on AI Governance and Ethics; PDPL (finalizing)	Emerging
Myanmar	No Dedicated Strategy	Cybersecurity Law No. 1/2025; e-Gov Master Plan 2030	Early Stage
Cambodia	Draft Strategy (Consultations June 2025)	Digital Government Policy (2022–35); AI Landscape Report 2023	Early Stage
Laos	No Dedicated AI Law	20-Year Digital Vision (2021–40)	Early Stage

Source: Trajano (2025).

The institutional landscape supporting audiovisual archiving in Southeast Asia has undergone notable transformation over the past decade. Chan (2017) reports that, as of 2017, only four countries—Indonesia, Laos, Vietnam, and Thailand—maintained dedicated national film archives. In most other ASEAN member states, responsibility for audiovisual heritage resided within national archives or specialised audiovisual divisions of larger institutions, including

the National Archives of Singapore and Arkib Negara Malaysia. Cambodia is described as maintaining a resource centre dedicated to Cambodian audiovisual materials, while the Philippines established its National Film Archive relatively recently in 2011. Chan (2017) further identifies the Asian Film Archive, established in 2005 and incorporated into the National Library Board of Singapore in 2014, as performing an important transnational preservation role by

safeguarding films that have not been retained by institutions in their countries of origin, particularly independently produced works lacking formal archival protection elsewhere. From an LIS perspective, these institutional arrangements reflect substantial variation in repository and infrastructure readiness as well as access enablement, since institutional mandates, organisational structures, and governance responsibilities directly influence collection development, preservation workflows, metadata management, descriptive practices, and the long-term sustainability of public access (Chan, 2017).

To strengthen the LIS interpretation of the findings, an additional coded analytical layer was incorporated using the same policy documents and documentary sources already examined in this study, without introducing new datasets or quantitative evidence. Alongside the extraction of numerical indicators, a binary presence-or-absence coding procedure was applied to determine whether national policy guidance explicitly addressed: (a) digital repository planning for documentary heritage; (b) metadata management and interoperability requirements; (c) digital preservation standards or preservation planning provisions; (d) access policies together with rights management frameworks; and (e) commitments relating to staffing, professional development, and workforce training for digital preservation activities.

Conclusion

This study demonstrates that AI-enabled preservation across ASEAN is evolving within the convergence of significant archival vulnerabilities, uneven digital development, and the rapid expansion of animation and digital content industries. Analysis of institutional vulnerability reports, preservation cost comparisons, market growth trends, and AI governance developments reveals a pronounced structural imbalance. Although AI capabilities and digital production ecosystems continue to advance rapidly, the institutional foundations required to sustain long-term preservation—including resilient storage infrastructure, disaster preparedness, and stable operational funding—remain unevenly distributed across the region. Consequently, the same technological and industrial developments that have accelerated content creation and broadened expectations for digital access are simultaneously increasing the responsibilities of memory institutions to appraise, ingest, preserve, manage, and provide discoverable

access to an expanding volume of audiovisual heritage over the long term.

Although AI technologies can substantially reduce restoration time and improve the usability of preserved materials, they cannot replace the institutional requirements of systematic preservation planning, controlled repository workflows, and accountable governance. Gains achieved through accelerated restoration processes are unlikely to remain sustainable unless supported by repository-oriented strategies, continuous organisational capacity building, and long-term investment in preservation infrastructure. Short-term improvements in access cannot be maintained where environmental risks persist and recurring costs associated with digital storage, integrity management, and format migration remain insufficiently addressed. Likewise, despite encouraging progress in regional and national AI governance initiatives, explicit guidance governing the responsible application of AI within memory institutions remains limited. There is therefore a continuing need for institutional policies that integrate AI implementation with preservation accountability, rights-aware access, transparent governance, and sustained workforce development to ensure the long-term stewardship of audio-visual heritage.

Recommendations

Memory institutions across ASEAN should prioritise repository strategies that clearly distinguish preservation master files from access copies, establish fundamental preservation controls—including storage resilience planning, fixity-based integrity management, and scheduled format migration—and implement comprehensive metadata policies that support resource discovery while ensuring transparent documentation of all preservation interventions. These institutional measures should be complemented by sustained policy support through long-term funding mechanisms and robust governance frameworks. Such an approach will help ensure that AI serves to strengthen, rather than replace, established archival practices, thereby enhancing responsible preservation management and promoting equitable, rights-aware access to audio-visual heritage over the long term.

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References

- Alkhraisat, S. (2025). The Role of Artificial Intelligence in Shaping Cultural Narratives and Values Education in Eastern Animation: Opportunities, Risks, and Future Directions. *Educational Process: International Journal (EDUPIJ)*, 17(4), article no. e2025302. <https://doi.org/10.22521/edupij.2025.17.302>
- Animost Team. (2025, October 23). *Asia 3D Animation Trend 2025: The Future of Digital Storytelling*. Animost Studio. <https://animost.com/ideas-inspirations/asia-3d-animation-trend>
- Antoniazzi, L. (2021). Digital preservation and the sustainability of film heritage. *Information, Communication & Society*, 24(11): 1658–1673. <https://doi.org/10.1080/1369118X.2020.1716042>
- ASEAN Secretariat. (2024). *ASEAN Guide on AI Governance and Ethics*. Association of Southeast Asian Nations (ASEAN). https://asean.org/wp-content/uploads/2024/02/ASEAN-Guide-on-AI-Governance-and-Ethics_beautified_201223_v2.pdf
- Bharathi, V. and Vardhan, V. (2024). Will AI Replace Human Jobs in Film Production? *ShodhKosh: Journal of Visual and Performing Arts*, 5(ICITAICT): 33–39. <https://doi.org/10.29121/shodhkosh.v5.iICITAICT.2024.1256>
- Bing, M., Subri, S., Alshehan, A. and Li, W. (2024). The application and innovation of animation technology in multicultural communication activities that involve Malaysia and China. *Cogent Arts & Humanities*, 11(1): 2425133. <https://doi.org/10.1080/23311983.2024.2425133>
- Blayone, T. J. B. and Mykhailenko, O. (2025). Using Digital Technologies for Indigenous Sociocultural Advancement in an Era of AI: A Systematic Critical Synthesis. *Preservation, Digital Technology & Culture*, 54(2): 135–157. <https://doi.org/10.1515/pdte-2024-0086>
- Bowen, G. A. (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*, 9(2): 27–40. <https://doi.org/10.3316/QRJ0902027>
- Chan, K. (2017, April 12). *Despatches from the Asian Film Archive: Curating Film and the Archives of the Future*. Asian Film Archive. <https://asianfilmarchive.org/despaches-asian-film-archive-curating-film-archives-future-karen-chan>
- Chan, K. (2024, September 16). *Asia-Europe Cultural Festival: Interview with the Asian Film Archive*. culture360 – Asia-Europe Foundation. <https://culture360.asef.org/insights/asia-europe-cultural-festival-interview-with-the-asian-film-archive>
- Choy, S. C. C., Crofts, N., Fisher, R., Lek Choh, N., Nickel, S., Oury, C. et al. (2016). *The UNESCO/PERSIST Guidelines for the selection of digital heritage for long-term preservation*. UNESCO. https://unescopersist.org/wp-content/uploads/2017/02/persist-content-guidelines_en.pdf
- Esquivel, O. J. (n.d.). *AI-illustrated picture books for language preservation: An initiative in Palauan*. University of Hawai‘i at Mānoa, USA.
- European Broadcasting Union. (2020). *EBUCore: Metadata specifications*. <https://tech.ebu.ch/metadata/ebucore>
- Higgins, S. (2008). The DCC Curation Lifecycle Model. *International Journal of Digital Curation*, 3(1): 134–140. <https://doi.org/10.2218/ijdc.v3i1.48>
- Holroyd, C. (2019). Digital content promotion in South East Asia: government strategies for a new economic sector. *Journal of Asian Public Policy*, 12(1): 15–33. <https://doi.org/10.1080/17516234.2018.1477029>
- ISO. (2012). *ISO 14721:2012 Space data and information transfer systems — Open archival information system (OAIS) — Reference model*. International Organization for Standardization. <https://www.iso.org/standard/57284.html>
- ISO. (2016). *ISO 15489-1:2016 Information and documentation — Records management — Part 1: Concepts and principles*. International Organization for Standardization. <https://www.iso.org/standard/62542.html>
- Jiang, J. and Wang, X. (2024). Animation Scene Generation Based on Deep Learning of CAD Data. *Computer-Aided Design and Applications*, 21(S19): 1–16. <https://doi.org/10.14733/cadaps.2024.S19.1-16>

- Jones, J. (2012). *The Past Is a Moving Picture: Preserving the Twentieth Century on Film*. University Press of Florida. <https://doi.org/10.5744/florida/9780813041926.001.0001>
- Library of Congress. (n.d.). *PREMIS: Preservation Metadata Maintenance Activity*. <https://www.loc.gov/standards/premis>
- Liu, Y. and Li, J. (2024). “Expansion” and “Obstacles”: The New Wave of Intelligent Media Empowering the Development of Film and Television Arts with Digital Technology. *Journal of Social Science Humanities and Literature*, 7(6): 57–66. [https://doi.org/10.53469/jsshl.2024.07\(06\).11](https://doi.org/10.53469/jsshl.2024.07(06).11)
- Mei, W. (2025). Efficacy Reconstruction of Cultural Intermediaries in the Digital Era: Examining Industrial Upgrading and Overseas Dissemination Paths of the Animation Film Industry through. *Academic Journal of Humanities & Social Sciences*, 8(6): 57–63. <https://doi.org/10.25236/AJHSS.2025.080608>
- Mohd Hasri, U. H., Md Syed, M. A. and Runnel, C. (2022). Transmedia storytelling in the Malaysian animation industry: embedding local culture into commercially developed products. *Atlantic Journal of Communication*, 30(2): 115–131. <https://doi.org/10.1080/15456870.2020.1835909>
- National Library of Australia. (2003). *Guidelines for the preservation of digital heritage*. UENSCO. <https://unesdoc.unesco.org/ark:/48223/pf00000130071>
- NTT DATA. (2020, February 27). *NTT DATA Creates and Makes Public a Digital Archive of the Historical Cultural Heritage of the ASEAN Region* [Press release]. NTT DATA Corporation. <https://www.nttdata.com/global/en/news/press-release/2020/february/ntt-data-creates-and-makes-public-a-digital-archive-of-the-historical-cultural-heritage>
- Rota, C., Buzzelli, M., Bianco, S. and Schettini, R. (2023). Video restoration based on deep learning: a comprehensive survey. *Artificial Intelligence Review*, 56(6): 5317–5364. <https://doi.org/10.1007/s10462-022-10302-5>
- Sathiamoorthy, R. and Kumar, B. S. (2024). AI-Powered Restoration of Vintage Films into New Cinema: Harmonizing Creation and Automation. *ShodhKosh: Journal of Visual and Performing Arts*, 5(2ICITAICT): 50–60. <https://doi.org/10.29121/shodhkosh.v5.iICITAICT.2024.1329>
- Tadic, L. (2016). *The FIAF Moving Image Cataloguing Manual*. International Federation of Film Archives. <https://www.fiafnet.org/pages/e-resources/cataloguing-manual.html>
- Tan, L. O., Balaya, S. a. p. and Aaron Goh, P. H. (2024). Creative struggle in Malaysia: a case study of the advertising, film, and animation industry sectors. *Creative Industries Journal*, 17(1): 75–87. <https://doi.org/10.1080/17510694.2022.2077530>
- Tiribelli, S., Pansoni, S., Frontoni, E. and Giovanola, B. (2024). Ethics of Artificial Intelligence for Cultural Heritage: Opportunities and Challenges. *IEEE Transactions on Technology and Society*, 5(3): 293–305. <https://doi.org/10.1109/TTS.2024.3432407>
- Trajano, K. K. S. (2025, September 4). *Charting ASEAN's Path to AI Governance: Uneven Yet Gaining Ground*. The National Bureau of Asian Research. <https://www.nbr.org/publication/charting-aseans-path-to-ai-governance-uneven-yet-gaining-ground>
- Trifunović, B. (2024). Going Beyond Digital Preservation. *Preservation, Digital Technology & Culture*, 53(3): 109–111. <https://doi.org/10.1515/pdtc-2024-2001>
- UNESCO. (2020). *Memory of the World (MoW): State of Preservation Report for Southeast Asia 2020*. <https://www.mowcapunesco.org/wp-content/uploads/2020-State-of-Preservation-Report-of-MoW-in-SEA-UNESCO-JFIT.pdf>
- UNESCO. (2025, May 28). *Building Capacity for the Monitoring and Preservation of Documentary Heritage at Risk in South-East Asia*. <https://www.unesco.org/en/articles/building-capacity-monitoring-and-preservation-documentary-heritage-risk-south-east-asia>
- Yoon, S. (2025). Imaginaries of humanoids and evolutions of technological visions of AI in Eastern and Western media. *AI & Society*, 40(5): 3663–3672. <https://doi.org/10.1007/s00146-024-02117-5>



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