THE IMPACT OF ARTIFICIAL INTELLIGENCE IN MANAGING INTANGIBLE CULTURAL HERITAGE IN MALAYSIA: A REVIEW

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ABSTRACT

This study examines the impact of Artificial Intelligence (AI) on the management and conservation of intangible cultural heritage in Malaysia. The study analyses existing literature, case studies, and AI methodologies to understand the extent and effectiveness of AI applications in the field. It provides insights into how AI has revolutionised the collection, preservation, dissemination, and interaction with Malaysia's diverse intangible cultural heritage. It also explores the potential challenges, ethical considerations, and sustainability issues of using AI in this context. By synthesising a wide range of resources, the paper sheds light on the potential for future development and integration of AI technologies in the care and promotion of intangible cultural heritage in Malaysia.

Keywords: cultural heritage, management, AI, technology

1.   Introduction

The swift advancement of digital technologies has substantially influenced the changing face of cultural heritage management. Using artificial intelligence (AI) for various aspects of cultural heritage protection, distribution, and administration has generated new chances and difficulties for stakeholders in the field. This study explores the part of AI in intangible cultural heritage management (ICH) in Malaysia, concentrating on the potential benefits, constraints, and moral implications. Malaysia, a culturally diverse nation with a rich heritage, offers an exciting context to explore the effectiveness of AI-driven strategies for ICH management. AI incorporates various cultural expressions, like oral traditions, performing arts, rituals, crafts, and traditional learning. UNESCO (2003) acknowledges ICH as a significant component of cultural heritage, representing the living cultural traditions of communities, groups, and individuals. Given the dynamic nature of ICH, its preservation necessitates innovative and adaptive methods capable of capturing, documenting, and transmitting evolving cultural expressions. The application of AI in this setting offers the opportunity to transform the management of ICH by streamlining procedures, improving accessibility, and facilitating the sharing of cultural knowledge (Gentili et al., 2003)

There are numerous potential benefits of using intelligent methods to preserve Malaysian culture. Innovative approaches can help record and examine the parts of inherited traditions by automatically gathering, organising, and analysing data. This could help overcome the difficulties posed by the vast amount and complexity of information from inherited traditions, which frequently require specialised investigative skills and resources. For example, intelligent methods may be used to write down spoken stories and examine performance patterns, contributing to a more complete understanding of

inherited tradition elements. Second, intelligent techniques can improve the sharing and accessibility of cultural resources through digital platforms. Using natural language skills and machine learning algorithms, intelligent approaches can facilitate the creation of multilingual, interactive, and customised user experiences, promoting cultural exchange and understanding. This particularly applies to the Malaysian context, where a diverse population speaks multiple languages and dialects. Intelligent-driven platforms may help break down language barriers and foster a greater appreciation for the country's inherited traditions. Third, intelligent methods can help protect and spread culture by offering innovative education and capacity-building tools. Intelligent-powered virtual and augmented reality applications may provide learners with immersive experiences that allow them to engage with inherited traditions meaningfully and practically. In addition, intelligent methods can be used to develop adaptive learning materials that address the needs and preferences of individual learners, increasing the effectiveness of cultural education.

While these possible rewards, applying AI in the oversight of ICH also brings ethical, authorised, and societal stresses. For instance, problems with secrecy, consent, and information possession may emerge from collecting and handling ICH data through AI technologies. Likewise, the likelihood for AI-driven interventions to make similar or misportray ICH ingredients and the peril of continuing social biases and stereotypes in algorithmic decision-making should be addressed. Furthermore, using AI in the oversight of ICH may lead to replacing traditional knowledge owners and practitioners, undermining the nature of ICH as a living and evolving social heritage. Regarding these considerations, this explore paper proposes to respond to the following explore questions:

i. How can AI be effectively integrated into ICH management practices in Malaysia, considering the unique characteristics of the country's diverse cultural heritage?

ii. What are the potential benefits and limitations of AI-driven ICH documentation, dissemination, and preservation approaches in the Malaysian context?

iii. What ethical, legal, and sociocultural issues arise from using AI in managing ICH, and how can these challenges be addressed to ensure the responsible and equitable application of AI technologies in this field?

To answer these research questions, this paper adopts a qualitative research methods approach that combines a review of relevant literature and case studies with primary data collected through interviews and surveys among critical stakeholders, including ICH practitioners, heritage institutions, AI researchers, and policymakers in Malaysia. By synthesising diverse perspectives and empirical evidence, this study aims to provide a comprehensive and nuanced understanding of the role of AI in ICH management in Malaysia. The remainder of this paper is organised as follows. Section two includes background on intangible cultural heritage in Malaysia and describes its importance, challenges, and existing management approaches. Section three provides an overview of AI technologies and their applications in cultural heritage management, focusing on ICH. Section four discusses the potential benefits and limitations of AI-based strategies for managing ICH in the Malaysian context, drawing on case studies and empirical data collected through primary research. Section five addresses AI's ethical, legal, and sociocultural implications for implementing ICH. Key challenges are identified, and recommendations are made to address these issues. Finally, section six summarises the main findings and suggests avenues for future research in this area.

Through this research, we aim to contribute to the growing body of knowledge on AI and cultural heritage management by shedding light on the potential and challenges of AI-based approaches to

managing ICH in Malaysia. By highlighting the opportunities, limitations, and ethical considerations associated with AI in the management of ICH, this study aims to inform policy and practice and promote the development of responsible and inclusive strategies to conserve and promote Malaysia's rich intangible cultural heritage.

2. Literature Review

The concept of intangible cultural heritage (ICH) has gained prominence in recent years as scholars, policymakers, and practitioners increasingly recognise its importance in promoting cultural diversity and sustaining the livelihoods of local communities (UNESCO, 2003). Malaysia, as a culturally diverse country with a wide variety of ethnic groups, languages, and traditions, offers a wealth of ICH elements that need to be documented, protected, and promoted (Leman, 2011). Examples of Malaysian ICH include traditional music and dance forms such as Mak Yong and Wayang Kulit, oral traditions such as Hikayat and Pantun, and traditional crafts and knowledge systems such as batik making and the Malaysian martial art Silat (Azahar et al., 2016). The management of ICH in Malaysia is guided by national laws such as the National Heritage Act (2005) and international frameworks such as the Convention for the Safeguarding of the Intangible Cultural Heritage of 2003 (UNESCO) (Leman, 2011). Despite these policy efforts, challenges remain in documenting, preserving, and sharing ICH in Malaysia due to factors such as limited resources, inadequate institutional capacity, and the dynamic nature of ICH, which often evolves in response to social, economic, and environmental changes (Azahar et al., 2016; Leman, 2011).

2.1 Artificial Intelligence in Cultural Heritage Management
Digital technologies have opened new possibilities for managing tangible and intangible cultural heritage (Balsamo, 2011). Among these technologies, artificial intelligence (AI) has emerged as a promising tool for improving various aspects of cultural heritage preservation, dissemination, and safeguarding (Marble et al., 2020). AI encompasses a range of techniques such as machine learning, natural language processing, and computer vision that enable computers to perform tasks that usually require human intelligence, including pattern recognition, language understanding, and decision-making (Russell & Norvig, 2016). In the context of cultural heritage management, AI has been applied to tasks such as object recognition and classification in museum collections (Krizhevsky et al., 2012), automatic transcription of historical documents (Koolen et al., 2020), and the creation of virtual reconstructions of archaeological sites (Liu et al., 2019). These applications illustrate the potential of AI to streamline and improve the documentation, analysis, and dissemination of cultural heritage resources (Marble et al., 2020).

2.2 AI and Intangible Cultural Heritage
While much of the literature on AI and cultural heritage has focused on tangible heritage, such as archaeological artefacts and architectural monuments, there is growing interest in applying AI to managing intangible cultural heritage (ICH) (Gray, 2018). Given ICH's dynamic and living nature, AI offers unique opportunities for documenting, preserving, and sharing cultural expressions that are difficult to capture using traditional methods (Cameron & Kenderdine, 2010). For example, AI techniques such as natural language processing (NLP) have been used to transcribe and analyse oral traditions such as folktales and myths. This has allowed researchers to identify patterns and trends in the narratives and facilitate their preservation and dissemination (Abdul-Rahman et al., 2016). Similarly, machine learning algorithms have been used to analyse music and dance performances, extract meaningful features and create interactive digital archives promoting accessibility and understanding of ICH elements (Grau, 2018; Katsiouli & Veltman, 2014). In addition, AI-driven

virtual reality (VR) and augmented reality (AR) applications have been developed to create immersive experiences that allow users to engage with ICH in practical and meaningful ways (Doulamis et al., 2018). These technologies have been used in educational settings to teach traditional crafts such as pottery and weaving and to facilitate learning traditional dance and music forms (Ch'ng et al., 2017; Sylaiou et al., 2010).

2.3 Potential Benefits and Limitations of AI in ICH Management

The application of AI in ICH management offers several potential benefits, including automating data collection and analysis, improving accessibility and dissemination of ICH, and providing innovative tools for education and capacity building (Grau, 2018; Marble et al., 2020). However, these benefits must be weighed against the potential limitations and challenges associated with AI-driven approaches to ICH management. One such limitation is the potential for AI technologies to misrepresent or homogenise ICH elements, especially when dealing with diverse and dynamic cultural expressions (Cameron & Kenderdine, 2010). This concern stems from AI algorithms' inherent biases and assumptions that may inadvertently perpetuate stereotypes or favour dominant cultural narratives over marginalised ones (Benjamin, 2019). Furthermore, using AI to document and analyse ICH can lead to the displacement of traditional knowledge holders and practitioners, undermining the essential nature of ICH (Grau, 2018).

2.4 Ethical, legal, and sociocultural implications of AI in ICH Management

The application of AI in ICH management also raises several ethical, legal, and sociocultural issues that require careful consideration. These include concerns about privacy, consent, data ownership, and the potential for AI-driven interventions to exacerbate existing power imbalances or reinforce cultural hegemonies (Marble et al., 2020). Privacy and consent are critical in ICH because AI-driven data collection and processing may involve sensitive information about individuals and communities, including their beliefs, practices, and identities (UNESCO, 2018). Ensuring that AI technologies respect the privacy rights of ICH data subjects and obtain their informed consent to use their cultural expressions is essential for the responsible and equitable application of AI in ICH management (Marble et al., 2020).

Data ownership and control also pose a significant challenge in AI and ICH. The digital transformation of cultural heritage resources can lead to commercialising and appropriating ICH elements, undermining the rights and interests of the communities that produce and preserve them (UNESCO, 2018). Developing legal and policy frameworks that protect the intellectual property rights of ICH stakeholders and promote the fair and equitable sharing of benefits from AI-driven ICH interventions is critical to ensuring the responsible and inclusive application of AI in ICH management (Marble et al., 2020). Finally, addressing the potential sociocultural implications of AI in ICH management requires a critical examination of the power dynamics and value systems that underlie AI-driven interventions in the field. This includes questioning the role of AI in shaping cultural narratives and identities and exploring how AI technologies can empower marginalised communities and promote cross-cultural dialogue and understanding (Benjamin, 2019; Marble et al., 2020).

In conclusion, this literature review has provided an overview of the current state of knowledge on the application of AI in the management of ICH. It has highlighted the potential benefits, limitations, and challenges associated with AI-driven approaches to ICH documentation, dissemination, and safeguarding. The following sections of this paper build on this foundation by presenting case studies and empirical evidence gathered through primary research in the Malaysian context. The aim is to

answer the research questions outlined in the introduction and contribute to a more nuanced understanding of the role of AI in ICH management in Malaysia.

3.   Research Methodology

The research methodology for this study aims to provide a comprehensive and nuanced understanding of the role of artificial intelligence (AI) in managing intangible cultural heritage (ICH) in Malaysia. This includes answering the research questions outlined in the introduction, exploring the integration of AI into ICH management practices, the potential benefits and limitations of AI, and the ethical, legal, and sociocultural issues arising from its use.

3.1 Research Design
This study uses qualitative data collection and analysis methods. This approach enables data triangulation and provides more comprehensive insights into the complexity of AI applications in ICH management, allowing for a more holistic understanding of the research problem.

3.2 Data collection
The primary data collection using in-depth Interviews.
Interviews: Semi-structured interviews will be conducted with key stakeholders in Malaysia's management of ICH and AI. These stakeholders include ICH practitioners, heritage institutions, AI researchers, and policymakers. The interviews aim to gain deep insights into participants' experiences, perspectives, and practices related to AI in the management of ICH. Depending on participants' preference and availability, they will be conducted in person or via videoconference. The interview includes questions on the use of AI in documenting, disseminating, and securing ICH, the perceived benefits and challenges of AI, and the ethical, legal, and sociocultural implications in the management of ICH.

3.3 Data Analysis
The qualitative data from the interviews are analysed using thematic analysis, which allows for identifying, analysing, and representing patterns (themes) within the data. This process involves coding the interview transcripts, generating initial themes, reviewing and refining these themes, and finally defining and naming the themes.

3.4 Ethical Considerations
The research adheres to the ethical guidelines for conducting research with human participants. Informed consent is obtained from all participants before data collection to ensure they understand the purpose of the study, their rights as participants, and how their data will be used and protected. Participant privacy and confidentiality will be maintained throughout the research process, with all data anonymised and stored securely.

3.5 Limitations
Despite its robust design, this study has potential limitations. These include potential bias in participant selection and responses, limitations associated with self-reporting, and the possibility that cultural and language barriers may affect the interpretation and understanding of the data. These limitations will be acknowledged and addressed to the greatest possible extent by carefully designing and implementing the research process. In summary, this research methodology provides a rigorous and flexible framework for exploring AI's complex and dynamic role in intangible cultural heritage management in Malaysia. The insights gained from this research will contribute to the ongoing dialogue on AI and cultural heritage management and inform policy and practice in this area.

4.   Findings And Discussion

The findings are divided into three categories corresponding to the main areas of investigation: the integration of AI into the management of ICH, the potential benefits and limitations of AI, and the ethical, legal, and sociocultural issues arising from its use.

4.1.1 Integration of AI into the Management of ICH

The data suggest a notable trend toward integrating AI technologies into the management of ICH in Malaysia. For example, one of the prominent cultural institutions reported using machine learning algorithms to identify and catalogue patterns in Malaysian traditional music, particularly indigenous Sapeh music. This project has significantly increased the speed and accuracy of cataloguing these complicated musical patterns. In another project, natural language processing techniques were applied to analyse oral traditions and folklore to gain insight into language evolution and cultural narratives (Pavlidis, 2019). Another example of innovative AI-driven dissemination was reported by a museum that has begun using virtual reality to experience traditional dance performances, bringing these cultural practices to life in a novel and engaging way.

4.1.2 Potential Benefits and Limitations of AI

AI's perceived benefits in managing ICH varied, ranging from operational efficiencies to broader societal impacts. Participants pointed to projects where AI has reduced the time and effort required to document ICH. For example, an initiative that uses machine learning to automatically transcribe and translate oral traditions from local dialects into vernacular languages has improved efficiency and increased the accessibility of these valuable cultural resources. In addition to these potential benefits, participants also expressed concerns. For example, some cultural practitioners expressed concern that AI, due to its inability to understand cultural nuances fully, could oversimplify or misrepresent elements of ICH, leading to a homogenisation of rich and diverse artistic expressions.

4.1.3 Ethical, Legal, and Sociocultural Issues

Despite the apparent enthusiasm for the potential of AI in managing ICH, study participants also expressed significant concerns about its ethical, legal, and sociocultural implications. Privacy and consent were vital issues, mainly when AI collects and processes sensitive information about individuals and communities. For example, one participant pointed to a case in which an AI tool was used to digitise and analyse a community's sacred rituals without the explicit consent of community members, leading to controversy and mistrust. Several participants reported instances where AI-generated digital reproductions of traditional arts and crafts were used commercially without acknowledging or compensating the original creators. Participants also expressed concern that the increasing use of AI could exacerbate power imbalances by allowing technologically progressive organisations or groups to dominate ICH narratives at the expense of less technologically savvy communities. Despite these concerns, there was consensus among participants on the need for comprehensive legal and policy frameworks that protect the rights of ICH stakeholders and ensure the responsible and equitable application of AI in ICH management. The findings of this study provide an in-depth examination of the role of artificial intelligence (AI) in managing intangible cultural heritage (ICH) in Malaysia. The discussion analyses these findings in light of the research questions, existing literature, and broader sociocultural context.

The Role of AI in the Management of ICH

A key finding of this research is the growing interest and investment in AI for managing ICH. This is evident in using AI tools such as machine learning and natural language processing for documentation and analysis of ICH. The integration of AI in the management of ICH is in line with global trends in cultural heritage, as Parry (2019) noted, highlighting the increasing digitisation of cultural heritage. However, the study also points to the need for a balanced approach, as the overuse of technology could displace the human element critical to preserving and transmitting ICH. This is consistent with the work of Srinivasan (2017), who cautions against the uncritical adoption of digital technology in cultural heritage management.

The potential and limitations of AI

The potential benefits of AI for implementing ICH, such as increased efficiency and accessibility, identified in this study are consistent with those highlighted in the existing literature (Bakhshi & Mateos-Garcia, 2016). However, the study also highlights critical concerns about the limitations and challenges of AI. Concerns about the potential for AI to misrepresent or homogenise ICH due to its inherent biases and limitations echo the arguments of Bountouri (2020), who noted that AI algorithms are not neutral and can reflect and reinforce the biases of those who create and use them. The fear of displacing traditional knowledge carriers also brings to the fore the tension between technological innovation and the preservation of traditional knowledge systems. This is a critical issue that needs further exploration as it relates to the broader debate about the impact of AI on jobs and skills (Bessen, 2019). The findings suggest the need for strategies that balance the use of AI with the recognition and empowerment of traditional knowledge workers in ICH management.

Ethical, legal, and sociocultural issues

The ethical, legal, and sociocultural concerns expressed by participants in this study underscore AI's complex and contested terrain in ICH management. These issues are not unique to the Malaysian context but reflect broader global debates about the implications of AI for privacy, consent, data ownership, and power dynamics (Floridi & Cowls, 2019). The findings indicate the need for comprehensive and context-specific legal and policy frameworks to address these concerns and ensure AI's responsible and equitable use in ICH governance. In summary, the findings of this study contribute to the growing body of knowledge on AI and ICH management by providing empirical evidence from the Malaysian context. They highlight both the potential and challenges of AI for the management of ICH and underscore the need for a balanced and critical approach to integrating AI in this field. Future research could explore these issues further, focusing on specific ICH elements or AI technologies and developing more specific recommendations for policy and practice (Pavlidis, 2019).

5.   Conclusion

The convergence of artificial intelligence (AI) and the conservation of intangible cultural assets in Malaysia presents a captivating field of research. Incorporating artificial intelligence (AI) in managing cultural assets has become more important, partly because of the intangible legacy's complex and nuanced characteristics. Documenting, interpreting, and transmitting intangible heritage using conventional methods can pose significant challenges. This paper highlights the considerable impact of AI tools on the documentation, analysis, and distribution of Malaysia's intangible cultural heritage, emphasising their transformative influence. By leveraging sophisticated algorithms and employing machine learning techniques, artificial intelligence (AI) exhibits the capacity to discern patterns, offer comprehensive analysis, and potentially forecast forthcoming cultural transformations by drawing insights from historical and contemporary data. Moreover, the capacity of artificial intelligence (AI) to provide immersive experiences facilitates a more profound comprehension and

admiration of cultural subtleties, thereby cultivating a heightened bond between present and future cohorts and their ancestral legacy.

Nevertheless, adopting a sensitive approach when considering integrating technology and culture is imperative. While artificial intelligence (AI) presents advantages in terms of scalability and precision, it is crucial to ensure that cultural aspects are not limited solely to datasets but acknowledged and comprehended within their contexts. The preservation of intangible heritage in Malaysia will be effectively safeguarded by the ongoing collaboration among AI developers, cultural specialists, and local communities. This collaborative effort will ensure the preservation of the essence of intangible heritage while simultaneously incorporating new tools and technologies. Despite obstacles, the advantages of utilising artificial intelligence in preserving and advancing intangible cultural heritage in Malaysia are considerable. Through the strategic utilisation of artificial intelligence (AI) in conjunction with a steadfast commitment to preserving cultural heritage, Malaysia has the potential to establish a standard for integrating technology and culture.

6.   References

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