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Bridging Revelation and Algorithm

Integrating Artificial Intelligence and *Malakah* in the Epistemology of Ḥadīth Criticism

Inna A'thoina, Farah Hasballah, and Nur Aisyah Fadillah
Email: inna.athoina@uiii.ac.id
Faculty of Islamic Studies, Universitas Islam Internasional Indonesia, Indonesia

Abstract

This study explores the epistemological and methodological integration of Artificial Intelligence (AI) within ḥadīth criticism, focusing on its relationship with the classical Islamic concept of *malakah*—the intellectual and spiritual faculty enabling a *muḥaddith* to discern authenticity and hidden defects (*ʿillah*) within prophetic narrations. Employing a qualitative descriptive approach and library research method, the study analyses both classical Islamic scholarship and contemporary AI research to construct an integrative framework for AI-assisted ḥadīth analysis. The research demonstrates that AI, particularly through Natural Language Processing (NLP) and Machine learning (ML), offers significant potential to enhance the analytical precision, scalability, and efficiency of ḥadīth authentication. However, it contends that AI must be situated as an epistemological instrument rather than an autonomous interpretive authority. The study argues that while AI can replicate heuristic and linguistic reasoning, it cannot emulate the moral and spiritual intuition inherent in *malakah*. Consequently, it proposes a hybrid epistemic model where AI serves as a supportive analytical tool, guided by Islamic epistemological principles rooted in tawḥīd, *ʿadl*, and scholarly ethics. This integration reaffirms the role of human interpretive authority while ensuring that technological innovation in ḥadīth studies remains consistent with the ethical and intellectual heritage of Islamic scholarship.

Keywords: Artificial Intelligence (AI), Islamic epistemology, *malakah* in Ḥadīth criticism, Natural Language Processing (NLP), digital Islamic scholarship

Introduction

The development of *hadith* scholarship from the Prophetic era to the modern age has long been a central concern among Muslim scholars. As the second principal source of Islamic law after the Qur'an, *hadith* has undergone a meticulous process of authentication, verification, and classification spanning many centuries. Yet, amidst the rapid advancement of digital technology and artificial intelligence (AI), new opportunities have emerged to revolutionise the study of *hadith*—from data collection and *isnād* validation to *matn* (content) analysis.

For nearly fourteen centuries, Islamic intellectual traditions evolved through conventional means that relied heavily on memorisation, oral transmission, and manual documentation. However, since the early twentieth century, following the emergence of the idea of "thinking machines," scholars began to explore the intersection of technology and religious studies. A major milestone occurred in 1956 with the Dartmouth Workshop, where John McCarthy formally introduced the term artificial intelligence. Since then, AI has developed into an interdisciplinary field encompassing machine learning, natural language processing (NLP), computer vision, and knowledge reasoning (Azmi & Hussain, 2019). Today, AI not only constitutes a foundational pillar of major global technology companies such as Google, Amazon, and Microsoft, but it has also expanded into the humanities and religious studies, including Islamic scholarship.

The utilisation of AI in Islamic studies marks a new phase in a long-standing textual tradition. According to Azmi, Al-Qabbany, and Hussain (2019) the application of computational and NLP techniques to *hadith* literature has opened innovative avenues for the understanding, classification, and evaluation of *hadith*. Their research identifies various approaches—such as data mining, machine learning, sentiment analysis, and named entity recognition—that enable large-scale analysis of *hadith* texts, a task that would have been nearly impossible through manual means.

Prayogi (2023) observes that research on AI in *hadith* studies has grown significantly over the past two decades. Nevertheless, he also highlights a persistent methodological gap concerning the integration of AI with Islamic epistemology—particularly in addressing the validity of textual interpretation and the ethical foundations that underpin the use of technology in the study of religion.

Azwar, Usman, and Abdullah (2025) categorise the integration of AI into *hadith* studies into three main approaches: (1) linguistic analysis of *hadith* through NLP, (2) *hadith* classification using machine learning, and (3) error detection in *isnād* and *matn* through deep learning. These approaches extend the traditional boundaries of ʿUlūm *al*-ḥadīth by enabling the efficient and accurate processing of thousands of narrations from canonical collections such as Ṣaḥīḥ al-Bukhārī, Ṣaḥīḥ Muslim, and Sunan Abī Dāwūd.

In classical tradition, the authentication of *hadith* rests upon two primary components: the *isnād* (chain of transmission) and the *matn* (textual content). One of the most intricate aspects of *hadith* criticism is the identification of ʿ*illah*—a hidden defect not readily

apparent in either the chain or the text. Classical scholars such as Ibn al-Ṣalāḥ, al-Khaṭīb al-Baghdādī, and Ibn Ḥajar al-ʿAsqalānī maintained that the ability to discern *ʿillah* was exclusive to scholars possessing *malakah*—an epistemic competence acquired through profound expertise and refined scholarly intuition.

Aba al-Khail (2003), in his seminal study *Malakah in Hadith Inquiry*, describes *malakah* as an intellectual instrument enabling a *hadith* critic to detect hidden flaws by analysing patterns of narration, the credibility of transmitters, and textual consistency. Similarly, Saʿid (2010) links *malakah* to a unique blend of cognitive and spiritual capacity formed through continuous interaction with the Qur'an and *hadith*, rendering it a faculty difficult, if not impossible, to replicate within computational systems.

The convergence of AI and *malakah* thus presents both an epistemological challenge and an opportunity. While AI can replicate aspects of human reasoning and textual analysis, the depth of interpretive judgement embedded in *malakah* underscores the enduring necessity of human intellectual and spiritual discernment within the modern study of *hadith*.

Recent advancements in artificial intelligence (AI) have made it increasingly possible to simulate certain analytical aspects of *malakah* through machine learning and deep learning models. Altammami (2023), in his doctoral dissertation at the University of Leeds, explores how AI systems can be trained to comprehend *hadith* meanings by integrating linguistic and semantic contexts using transformer-based architectures. This approach enables the system to recognise relational patterns among *hadith* concepts, such as thematic parallels between specific *hadith* and relevant Qur'anic verses, thereby creating a more interconnected understanding of Islamic textual traditions.

Natural Language Processing (NLP) plays a crucial role in automating textual analysis in *hadith* studies. Saloot, Idris, Mahmud, and Ja'afar (2016) conducted a comparative study on *hadith* data-mining methodologies, focusing on the classification of ṣaḥīḥ, *ḥasan*, and ḍaʿīf traditions based on parameters derived from both *isnād* and *matn*. Their research demonstrates that NLP techniques can extract linguistic and semantic features from *hadith* texts to detect narrative patterns and assess authenticity levels, thereby streamlining the evaluative processes traditionally conducted by scholars.

Building upon this foundation, Bashir, Azmi, Nawaz, and Zaghouani (2023) highlight that processing classical Arabic through NLP remains a formidable challenge due to the language's intricate morphology and syntax. They advocate for the development of semantically annotated *hadith* corpora that would enable AI systems to learn contextual nuances more accurately. Such corpora could enhance the precision of machine-assisted *hadith* classification and cross-referencing, facilitating computational models that more closely reflect the interpretive depth of traditional scholarship.

In a broader context, Ramadhan, Abdurachman, and Sulistio (2024) conducted a systematic review of the application of machine learning in *hadith* studies. Their findings reveal a marked increase in scientific publications employing computational methods for *hadith* classification, *isnād* identification, and the detection of textual redundancy among

multiple narrations. This trend indicates that the integration of AI into ʿUlūm *al*-ḥadīth represents not merely a technological innovation but a paradigmatic shift in Islamic research methodology.

Despite these promising developments, ethical and epistemological concerns remain central to the discourse. Nazir, Ithnin, and Suliaman (2025) stress that any AI-mediated engagement with sacred texts such as the Qur'an and *hadith* must adhere strictly to Islamic ethical principles, given the inherent risks of misinterpretation or distortion of meaning. Similarly, Azhar, Bakri, and Ahmad (2025) underscore the importance of preserving the epistemological integrity of Islamic thought, as AI—rooted in secular rationality—may operate within frameworks that diverge from the revelatory foundations of Islamic knowledge.

Within this discourse, Yaakob, Abdullah, and Muhamad (2025) propose an NLP-based AI model designed to generate lessons from Qur'anic chapters through an interactive *tafsīr* approach that remains faithful to Islamic ethical norms. Their model exemplifies how AI can serve not as a replacement for scholars but as an auxiliary instrument to expand access to Islamic knowledge while maintaining the authority and integrity of traditional scholarship.

To date, however, studies explicitly linking *malakah* in *hadith* criticism with AI systems remain limited. Most existing research focuses on computational *hadith* classification, semantic search, or linguistic analysis, often neglecting the epistemological dimension of the *muḥaddith's* critical competence. Consequently, the present study seeks to bridge this gap by examining how AI can assist in the identification of *ʿillah*—the subtle hidden defects within *hadith*—through the interpretive and cognitive principles underlying *malakah*.

The key questions this research raises are: Can an AI system emulate the intuitive discernment of a *hadith* expert in detecting hidden flaws within a narration? How might computational models comprehend the subtle interplay between *isnād* and *matn* that determines the authenticity of a ṣaḥīḥ report? Employing a qualitative analytical-descriptive methodology, this study critically engages classical and contemporary literature to explore the potential for integrating AI and *malakah* in advancing the epistemological foundations of *hadith* criticism.

In addition to contributing to the development of digital methodologies in ḥadīth studies, this research is expected to enrich the discourse on Islamic epistemology in the digital era. As Alnefaie (2024) asserts, the application of Artificial Intelligence (AI) in the study of the Qur'an and ḥadīth should not be regarded as a form of secularisation of knowledge, but rather as an opportunity to strengthen religious understanding through the responsible use of technology.

The advancement of artificial intelligence marks a new phase in Islamic scholarship, particularly in the field of ḥadīth sciences. From Natural Language Processing (NLP)-based linguistic analyses to the simulation of *malakah* through machine learning, AI offers substantial potential to accelerate, broaden, and deepen our understanding of the ḥadīth. Nevertheless, the integration of AI into religious studies necessitates epistemological and

ethical vigilance to ensure that such efforts remain firmly rooted in the values of revelation and the scholarly tradition of Islam. This study seeks to offer both theoretical and methodological contributions in this direction, positioning AI not as a substitute for the ʻulamāʾ, but rather as an intellectual partner in the exploration of ḥadīth and their underlying *ʿillah* (causal factors).

Against this backdrop, it becomes evident that the application of Artificial Intelligence (AI) within Islamic studies—particularly ḥadīth research—has witnessed remarkable progress in recent years. The study conducted by Azmi, Al-Qabbany, and Hussain (2019) demonstrates that NLP and Machine learning approaches can substantially contribute to ḥadīth classification, *isnād* (chain of transmission) and *matn* (textual) analysis, as well as to the assessment of authenticity through linguistic and semantic patterns. These findings are reinforced by Ramadhan, Abdurachman, and Sulistio (2024), whose systematic review identifies a growing trend in the utilisation of machine learning algorithms to automate the verification of ḥadīth, encompassing both data mining and text modelling dimensions.

However, while these advancements offer greater analytical efficiency and precision, critical questions arise regarding the extent to which AI can be relied upon to analyse and detect the authenticity of ḥadīth—including the identification of *ʿillah* (hidden defects) and *shādh* (anomalous narrations)—without disregarding the established epistemological principles of Islamic scholarship. The principal challenge lies in whether AI systems are capable of replicating the scholarly sensitivity and epistemic intuition of a *muḥaddith* (ḥadīth expert) in recognising subtle defects that cannot be detected solely through textual data. This constitutes the first scientific problem at the heart of the present study: how the potential application of AI—through NLP and machine learning approaches—can be employed to analyse, classify, and detect ḥadīth authenticity, including the identification of *ʿillah* and *shādh* elements.

Furthermore, a more fundamental challenge concerns the epistemological integration of artificial intelligence with the concept of *malakah* in the methodology of ḥadīth criticism. Within the Islamic scholarly tradition, *malakah* is understood as the intellectual and spiritual faculty possessed by a *muḥaddith*, enabling them to distinguish authentic narrations from weak ones through deep comprehension of the *isnād*, *matn*, and historical context of transmission (Aba al-Khail, 2003). Saʿid (2010) emphasises that *malakah* is not merely a technical skill, but also a reflection of epistemological awareness and prolonged scholarly experience—dimensions that are exceedingly difficult to imitate by computational systems. In the context of technological development, however, Altammami (2023) has shown that AI systems employing transformer-based semantic models hold potential for mimicking certain rational aspects of ḥadīth reasoning, though they have yet to replicate *malakah* in its entirety.

From this emerges the second central research question of this study: how can the epistemological concept of *malakah* within ḥadīth criticism methodology be integrated with artificial intelligence systems without undermining the scholarly authority of the ʻulamāʾ or the epistemic principles of Islamic knowledge? This question extends beyond techno-

logical concerns to encompass the philosophical and ethical dimensions of AI application in Islamic studies. Nazir, Ithnin, and Suliaman (2025) have even cautioned that the employment of AI in interpreting sacred texts requires an ethical framework grounded in the discipline of ḥadīth, to prevent semantic reduction or epistemic distortion.

Accordingly, these two central issues—namely, the application of Artificial Intelligence (AI) for detecting the authenticity of ḥadīth and its integration with the concept of *malakah* within Islamic epistemology—constitute the core focus of this research. This study seeks to contribute on two distinct yet interrelated levels: first, at the methodological level, by examining the potential and limitations of AI-based approaches in ḥadīth analysis; and second, at the epistemological level, by exploring how technology may be integrated into the paradigm of ḥadīth studies without undermining the traditional scholarly authority rooted in *malakah*.

Within the context of modern ḥadīth scholarship, two principal questions emerge as focal points of this research. The first concerns the potential application of Artificial Intelligence—particularly through Natural Language Processing (NLP) and Machine learning techniques—in the analysis and classification of ḥadīth, including the detection of textual authenticity, *ʿillah* (hidden defects), and *shādh* (anomalous narrations). Previous studies have indicated that these technologies open vast opportunities for enhancing the efficiency and precision of ḥadīth analysis. For instance, Azmi, Al-Qabbany, and Hussain (2019) affirm that NLP methods are capable of extracting linguistic features from thousands of narrations and systematically assessing the correlations between *isnād* and *matn*. Similarly, the research of Ramadhan, Abdurachman, and Sulistio (2024) reveals a significant increase in the use of machine learning algorithms to identify inconsistencies within *isnād* patterns. Yet, such advancements introduce a new epistemic challenge: to what extent can intelligent systems emulate the analytical acuity of a ḥadīth expert in discerning *ʿillah* concealed beneath ostensibly authentic texts?

The second issue pertains to the epistemological integration of artificial intelligence with the concept of *malakah* in the methodology of ḥadīth criticism. In the classical tradition, *malakah* denotes the intellectual and spiritual capacity developed through rigorous scholarly training, enabling a *muḥaddith* to distinguish between authentic and weak narrations with an inner precision that is both rational and intuitive. Aba al-Khail (2003) describes *malakah* as an epistemic competence constituting the very essence of ḥadīth criticism, while Saʿid (2010) emphasises that this capacity arises from the interplay of knowledge, experience, and faith. The challenge, therefore, lies in how computational systems can be integrated with this epistemological concept without diminishing the spiritual significance and scholarly authority of the ʿulamāʾ as the custodians of ḥadīth authenticity. Altammami (2023) observes that although transformer-based semantic models within AI can imitate certain logical aspects of human reasoning, such systems still require epistemic guidance to avoid mechanical or contextually detached interpretations of sacred texts. Nazir, Ithnin, and Suliaman (2025) further contend that the application of AI in the study of the Qurʾan and ḥadīth must be accompanied by an ethical framework grounded in the Islamic schol-

arly tradition to prevent the reduction or distortion of revealed meanings.

Based on these two focal concerns, this research aims to examine in depth how artificial intelligence can be employed in the analysis and classification of ḥadīth, while simultaneously exploring the possibility of integrating it with the principles of *malakah* as the epistemological foundation of ḥadīth criticism. This study endeavours to bridge the technological and theological dimensions by investigating the extent to which AI may function as an auxiliary scholarly instrument without supplanting the role of the ʻulamāʾ in assessing ḥadīth authenticity. The proposed approach aspires to yield a conceptual model that not only highlights algorithmic efficiency but also safeguards the intellectual and spiritual integrity of Islamic scholarship developed over centuries.

Theoretically, this research seeks to enrich the corpus of ḥadīth studies with a novel perspective that interconnects the Islamic scholarly tradition with modern technological paradigms. Conceptually, it contributes to Islamic epistemology by offering an integrative framework that harmonises *malakah* with artificial intelligence. Practically, the findings of this research may serve as a reference for academics, educational institutions, and Islamic technology developers in designing AI-based ḥadīth analysis systems that are ethical, precise, and aligned with Islamic scholarly principles. Thus, this study not only introduces methodological innovation within ḥadīth studies but also reinforces the spiritual and intellectual relevance of Islam amid the ongoing digital transformation.

The Integration of Artificial Intelligence (AI) and *Malakah* in Ḥadīth Criticism

The study of artificial intelligence (AI) applications within ḥadīth scholarship cannot be detached from two principal theoretical foundations: first, the epistemological framework of Islam; and second, the technological framework of AI, particularly that based on Natural Language Processing (NLP). Together, these frameworks establish the foundation for understanding how traditional Islamic knowledge can interact with digital technological developments without compromising its normative and theological integrity.

From an epistemological standpoint, Islam possesses a distinctive structure of knowledge that differs fundamentally from Western epistemology. In Islam, knowledge is not conceived merely as the product of human rationality, but as something rooted in revelation (*naql*), reason (*ʿaql*), and spiritual intuition (*dhawq*). Waqas (2025), in the *Pakistan Journal of Islamic Philosophy*, elucidates that Islamic epistemology situates revelation as the supreme source of knowledge, while reason functions as an interpretative tool that actualises the meanings of revelation within empirical contexts. This stands in contrast to the modern scientific paradigm, which privileges objectivity and empirical observation alone. Consequently, the integration of AI into Islamic studies—including ḥadīth scholarship—must be framed within an epistemological paradigm that upholds tawḥīd*ic* values and the ethics of knowledge.

Within this epistemic context, the concept of *malakah* in ḥadīth sciences assumes a pivotal role as a representation of the human capacity to discern both the textual and contextual truths of the ḥadīth. Purnamawati (2025), in the *Journal of Qur'anic and Hadith Studies*, asserts that *malakah* is not merely a technical skill but a synthetic capability combining knowledge, experiential depth, and spirituality, enabling a *muḥaddith* to recognise truth beyond textual form. Thus, *malakah* may be understood as a manifestation of human epistemic intelligence that is functionally comparable to artificial intelligence at the heuristic level, though ontologically distinct. While AI can emulate rational and linguistic patterns, it cannot replicate the epistemological intuition that emanates from *malakah*.

From a technological perspective, AI systems developed for ḥadīth studies commonly employ NLP and machine learning models. Altammami (2023), in his doctoral dissertation at the University of Leeds, demonstrates how transformer-based models such as BERT and GPT can identify semantic patterns within ḥadīth texts, although a comprehensive grasp of Islamic scholarly context remains a major limitation. His findings indicate that AI's analytical capacity in ḥadīth studies is associative—deriving meaning through linguistic data and correlations—rather than interpretive in the manner of a *muḥaddith* who apprehends both textual intent and spiritual value through *malakah*.

A further theoretical framework highlights an integrative approach between AI and Islamic epistemology. Mustapha, Senik, and Haron (2025), in the *Journal of Research in Islamic Studies*, contend that the incorporation of modern technology into Islamic studies can only be legitimately realised if Islamic epistemology serves as the principal framework. They argue that AI must be perceived as a *wasīlah* (instrument) rather than as an independent source of knowledge, and thus its use must conform to the principles of *maqāṣid al-*sharīʿah and Islamic scholarly ethics. Similarly, Siddique and Butt (2025), writing in the *Contemporary Journal of Social Sciences*, caution that AI may blur the boundary between data and revelation if not governed by an Islamic normative framework that affirms the unity of intellect (*ʿaql*), faith (*īmān*), and ethics (*akhlāq*).

Another influential theoretical contribution arises from Niam (2025) in his article *From Sanad to Syntax: The Disruption of Islamic Hermeneutics by Qur'anGPT*, published in the *Basmala Journal of Qur'an and Hadith*. Niam explains that the shift of scholarly authority from *sanad* (human transmission) to *syntax* (algorithmic analysis) introduces a new epistemological dilemma, wherein traditional ḥadīth authority risks being displaced by automated systems. Therefore, the integration of AI into ḥadīth scholarship must adopt a hybrid model that synthesises data-driven reasoning with value-based scholarship, ensuring that technological precision is harmonised with the ethical and spiritual essence of Islamic knowledge.

Conceptually, the theoretical framework of this research rests upon the premise that Artificial Intelligence (AI) can function as a supportive epistemological instrument, rather than a substi-tute, in the process of ḥadīth criticism. This aligns with the argument put forward by Ab-delnour (2025) in Religions, who asserts that within the Islamic theological perspective, AI must be positioned as a "means to meaning" rather than as "a reason

that rivals revelation." In other words, AI may enhance the rational dimension of ḥadīth scholarship through data processing and linguistic pattern recognition; yet, the ultimate validation of ḥadīth authentici-ty remains firmly within the epistemic domain of human *malakah*.

Accordingly, the theoretical framework of this study connects two interrelated axes: The Is-lamic Epistemological Axis, which situates *malakah* as a form of divinely inspired human intelligence arising from the synthesis of knowledge, experience, and spirituality; and The Artificial Intelligence Axis, which operates through probabilistic analysis based on linguistic algorithms.

Rather than standing in opposition, these two axes are conceived as complementary. AI pro-vides expansive analytical capacity over large-scale ḥadīth datasets, while *malakah* safeguards the epistemic integrity and scholarly values of Islam, ensuring that the digitalisation of ḥadīth remains within the ethical and theological bounds of the faith.

Thus, this theoretical framework establishes a dialectical relationship between traditional knowledge and modern technology, positioning AI as an epistemological partner that extends the analytical reach of ḥadīth studies without displacing the authority of the ʻulamāʼ. This integrative paradigm forms the foundation for the formulation of a conceptual model of AI-assisted ḥadīth criticism that remains grounded in the principles of *malakah* and the enduring intellectual and spiritual values of Islamic scholarship.

Methodology

This research employs a qualitative descriptive approach using the library research method (dirāah maktabiyyah) to examine the relationship between Artificial Intelligence (AI) and Islamic epistemology within the context of ḥadīth criticism. This approach was chosen be-cause the focus of the study is not empirical but rather conceptual and philosophical—specifically, to explore how the integration of AI and the concept of *malakah* can be devel-oped within the framework of Islamic scholarship.

All data were collected through an extensive review of both classical and contemporary litera-ture relevant to the topic, encompassing canonical ḥadīth compilations, seminal works of clas-sical scholars such as Ibn al-Ṣalāḥ and al-Khaṭīb al-Baghdādī, as well as modern academic publications addressing the application of AI in Islamic and ḥadīth studies.

The primary sources for this study include reputable international journals such as Artificial Intelligence Review, Religions, and the Journal of Research in Islamic Studies, which provide essential theoretical and methodological insights into the utilisation of AI in Islamic scholar-ship. Data collection was conducted through systematic searches of academic databases in-cluding Scopus, SpringerLink, and Google Scholar, using keywords such as *'*AI in Ḥadīth Studies," *'*Islamic epistemology," and *'malakah*." The selected literature was filtered based on thematic relevance, publication year (2015–2025), and academic credibility of the source.

Data analysis was carried out using content analysis to identify recurring themes, conceptual linkages, and correlations between theories of AI and Islamic epistemology. The analytical process involved three stages: data reduction, in which only the most relevant materials were retained; thematic synthesis, which structured interconnections among ideas; and integrative interpretation, aimed at understanding how *malakah* and AI could be epistemologically aligned in the domain of ḥadīth criticism.

To ensure the validity and reliability of findings, the study employed source triangulation, comparing perspectives from classical Islamic scholars, modern scientific research, and contemporary reflections. This methodological triangulation ensures that the analysis remains faithful to the intellectual principles of Islamic scholarship while maintaining relevance within the context of contemporary technological development.

The Spread and Transmission of Hadith in Historical Perspective

The transmission of ḥadīth represents one of the most intricate and enduring traditions of Islamic intellectual history. The process of ḥadīth circulation and authentication spans multiple historical phases, beginning with the Prophetic period (ʿAṣr al-Waḥy wa al-Takwīn) and continuing through the era of codification and systematization that shaped the classical corpus of ʿUlūm al-ḥadīth. During the lifetime of the Prophet Muhammad, transmission occurred primarily through oral communication, written records by a few literate Companions, and embodied demonstration (*taʿlīm bi al-fiʿl*) (Brown, 2009). The Companions' response to the Prophet's teachings manifested through memorization, transcription, and imitation of prophetic acts, forming the foundation of an early hadith culture centered in Medina and the broader Arabian Peninsula (Motzki, 2010).

In the early Islamic period, the methodology of ʿUlūm al-ḥadīth developed a rigorous framework for validating both sanad (chain of transmission) and matn (textual content). This dual approach combined *riwāyah* (historical transmission) and *dirāyah* (critical understanding), ensuring that reports were transmitted with accuracy and fidelity (Lucas, 2006). The Companions and the Khulafā' al-Rāshidūn adopted a cautious attitude toward hadith transmission, aware that its preservation required the same level of integrity as the Qur'an. Figures such as ʿUmar ibn al-Khaṭṭāb and ʿAlī ibn Abī Ṭālib even limited narration to avoid distortion or exaggeration (Schoe-ler, 2009).

By the late second and early third Islamic centuries, under the Umayyad and early ʿAbbāsid caliphates, the codification of hadith became institutionalized. Caliph ʿUmar ibn ʿAbd al-ʿAzīz (r. 717–720 CE) initiated the systematic collection of prophetic reports (Melchert, 2014). This era witnessed the production of monumental compilations such as Ṣaḥīḥ al-Bukhārī, Ṣaḥīḥ Muslim, and Sunan Abī Dāwūd, marking the culmination of the age of hadith selection (ʿAṣr al-Tamyīz). During this period, scholars established the principles of *jarḥ wa taʿdīl* (narrator evaluation), ena-bling the separation of ṣaḥīḥ (sound) from ḍaʿīf (weak) traditions (Motzki, 2010).

Subsequently, during the period of refinement and expansion (*ʿAṣr al-Taḥdhīb wa*

al-Istidrāk), scholars produced supplementary works—such as al-Mustadrak and al-Mustakhraj—that reor-ganized and verified earlier compilations (Brown, 2009). Although the Islamic world at that time faced severe political disruptions, including the Crusades and the Mongol invasions, scholarly activity persisted, sustaining the intellectual continuity of hadith sciences (Schoeler, 2009). By the 4th/10th century, hadith transmission had achieved textual stability and institutional authori-ty. Oral instruction continued alongside manuscript circulation, and scholars verified narrations through public readings (*samāʿ*) and certifications (*ijāzah*), ensuring continuity across generations (Melchert, 2014).

In the modern period, the study and transmission of hadith entered a new phase marked by dig-ital transformation. The emergence of online repositories such as Maktabah al-Shāmilah, Al-Maktabah al-Waqfiyyah, and academic databases has revolutionized access to classical Islamic sources (Muhanna, 2018). This shift coincides with broader developments in the digital humani-ties, which combine computational techniques with historical and linguistic analysis (Terras et al., 2018). Projects like the Sirat Bani Hilal Digital Archive demonstrate how digitization can pre-serve oral and textual traditions, making them more widely accessible to scholars and the public (Sahle, 2017).

The advent of Artificial Intelligence (AI) represents an even more transformative development in the transmission and study of hadith. Originating with John McCarthy's formulation in 1956, AI now encompasses advanced techniques in machine learning, natural language processing (NLP), and knowledge reasoning. These tools have begun to be applied in the field of Islamic studies—particularly in hadith classification, semantic search, and narrator analysis (Azmi et al., 2019). Nevertheless, as Abdelnour (2025) and Mustapha et al. (2025) emphasize, AI should func-tion as an auxiliary epistemological tool rather than an interpretive authority, preserving the hu-man and ethical dimensions of religious scholarship.

This evolving trajectory—from oral transmission to digital codification—reflects a profound shift in the epistemology of hadith studies. The integration of AI and computational linguistics marks not merely a technological advancement but a paradigmatic transformation in the modes of knowledge production and validation within the Islamic scholarly tradition. Thus, understanding this transition is critical for assessing how modern technologies can support, rather than supplant, the human-centered epistemic framework represented by the concept of *malakah* in hadith criticism. The next section, therefore, explores how artificial intelligence can be aligned with clas-sical epistemological principles to enhance the precision, accessibility, and authenticity of hadith scholarship in the digital age.

Artificial Intelligence (AI) in Classifying Hadiths

Artificial Intelligence (AI) has emerged as a transformative tool in the digital humanities, allowing researchers to process, classify, and analyze vast corpora of textual data with unprecedented precision. In the context of Islamic studies, AI has become increasingly

relevant to the classification and authentication of ḥadīth literature, providing computational assistance to a field traditionally grounded in human expertise and epistemological rigor. Among the subfields of AI, Natural Language Processing (NLP) represents the most crucial technique for textual analysis, as it enables computers to interpret, process, and generate human language (Cambria & White, 2014). NLP-based systems are designed to interact with human languages through text and speech, performing tasks such as language detection, contextual analysis, and semantic generation (Hirschberg & Manning, 2015).

In recent years, Arabic NLP has received significant scholarly attention, with applications extending across linguistic modeling, sentiment analysis, and religious text processing (Bashir, Azmi, Nawaz, & Zaghouani, 2023). Within Islamic studies, this linguistic advancement has facilitated new computational approaches to understanding classical Arabic sources, including Qur'anic exegesis and ḥadīth classification (Azmi, Al-Qabbany, & Hussain, 2019). The classification of ḥadīth, however, remains deeply intertwined with traditional methodologies of ʿUlūm al-ḥadīth, particularly the dual criteria of sanad (chain of transmission) and matn (content).

Classical hadith scholars have long defined ṣaḥīḥ (sound) traditions through precise epistemic and moral conditions. Shubḥī al-Ṣāliḥ (1986) and Ibn al-Ṣalāḥ (2000) note that a ḥadīth is ṣaḥīḥ when its chain of transmission is uninterrupted (ittiṣāl al-sanad), its narrators are both morally upright (ʿadl) and accurate (ḍābiṭ), and it contains neither *shādh* (anomalies) nor ʿillah (hidden defects). Imām al-Shāfiʿī was among the earliest scholars to articulate methodological criteria for determining authenticity, emphasizing reliability, integrity, and the absence of contradiction in narration (Brown, 2009).

Recent computational research has sought to translate these traditional criteria into AI-based classification systems. Studies such as those by Alqahtani et al. (2023) and Ramadhan, Abdurachman, and Sulistio (2024) propose machine learning and deep learning algorithms for automated hadith classification, distinguishing categories such as ṣaḥīḥ, ḥasan, ḍaʿīf, and mawḍūʿ based on features derived from narrator reliability, chain consistency, and textual similarity. Deep learning—an advanced form of machine learning using artificial neural networks (ANNs)—is particularly effective in recognizing complex patterns in unstructured data, including linguistic nuances and contextual relationships within hadith corpora (LeCun, Bengio, & Hinton, 2015). By employing multi-layered neural networks, these systems can approximate human reasoning in evaluating textual coherence and historical linkage among narrators, offering new pathways for *takhrīj al-ḥadīth* analysis.

However, while computational methods can identify structural irregularities, the deeper epistemological dimension of hadith evaluation—particularly the identification of ʿillah (hidden defect)—remains a domain of *malakah*, a form of intuitive scholarly competence cultivated through deep immersion and spiritual insight (Aba al-Khail, 2003; Sa'id, 2010). Classical scholars such as ʿAbd al-Raḥmān ibn Mahdī described ʿillah as a concealed imperfection imperceptible to all but the most skilled experts, who discern inconsistencies not merely through logic but through *malakah*—a refined intellectual faculty. As Mahmud al-Ṭaḥḥān (1987) and Ibn al-Ṣalāḥ (2000) emphasize, a hadith may appear authentic on the

surface but become invalid once its hidden flaws are unveiled.

The pressing question, then, is whether an AI system can emulate the *malakah*-based discernment that underpins the detection of ʿillah and *shādh* in hadith criticism. Current cognitive and computational models remain inadequate for replicating human creative intuition or the epistemic sensitivity of a trained scholar (Abdelnour, 2025). As Alqahtani et al. (2023) suggest, while AI can approximate rule-based reasoning and probabilistic evaluation, it cannot internalize the spiritual, contextual, and ethical dimensions that inform Islamic epistemology. Thus, the role of AI in hadith classification must be understood as complementary, not substitutive—a technological extension of human scholarship rather than its replacement.

In this light, the integration of AI in hadith classification invites a re-examination of epistemological boundaries between algorithmic precision and human intuition. The challenge lies in designing AI systems that respect the *malakah*-based reasoning embedded in Islamic knowledge production, ensuring that the automation of hadith analysis enhances rather than undermines the authenticity, integrity, and moral depth of the tradition.

Ulūm al-Ḥadīth between *Malakah* and *Qawāʿid*

The discipline of ʿUlūm al-ḥadīth stands at the intersection of rigorous methodological structure (*Qawāʿid*) and cultivated intellectual intuition (*malakah*). These two dimensions repre-sent complementary but distinct epistemic foundations within the Islamic tradition: *Qawāʿid* pro-vides the systematic principles that regulate the authentication and transmission of hadith, while *malakah* embodies the internalized competence and critical acumen that enable a scholar to per-ceive subtle textual and historical nuances beyond the reach of explicit rules (Aba al-Khail, 2003; Sa'id, 2010).

Etymologically, *malakah* derives from the Arabic root malaka, meaning ʻto possess" or ʻto master." Ibn Manẓūr, in Lisān al-ʿArab, defines it as a deeply ingrained disposition or habitual capacity (*ṣifah rasīkhah*) that enables an individual to perform actions with precision and instinc-tive ease. In the context of hadith studies, Aba al-Khail (2003) conceptualizes *malakah* as a form of epistemic mastery—the ʻdeep, internalized understanding of the methodological system of transmission and criticism possessed by expert hadith scholars." It is not merely theoretical knowledge but an embodied episteme developed through sustained practice, extensive compari-son, and engagement with other experts. This intellectual disposition cannot be achieved through rote learning or conventional pedagogy (*ṭuruq taqlīdiyyah*) alone; rather, it emerges from *mujāha-dah ʿilmiyyah*—prolonged intellectual struggle and apprenticeship within the hadith tradition (Sa'id, 2010; Brown, 2009).

In contrast, *Qawāʿid* (singular: *qāʿidah*) refers to the formal methodological principles gov-erning all branches of Islamic knowledge, including jurisprudence, grammar, and hadith. Linguis-tically, *qāʿidah* means a ʻfoundation" or ʻrule." In hadith sciences, *Qawāʿid*

establish the general criteria for acceptance or rejection of reports—such as continuity of transmission (ittiṣāl al-sanad), narrator reliability (*ʿadālah*), precision (ḍabṭ), and freedom from *shudhūdh* (anomalies) and ʿillah (hidden defects) (al-Qattan, 2009; Ibn al-Ṣalāḥ, 2000). These rules form the epistemo-logical scaffolding of ʿilm al-*dirāyah*, which, together with ʿilm al-*riwāyah*, constitutes the twin foundations of hadith sciences. While *riwāyah* focuses on accurate transmission of the Prophet's sayings and actions, *dirāyah* deals with the critical examination of narrators, textual coherence, and the interpretive reasoning necessary to evaluate authenticity (Lucas, 2006; Melchert, 2014).

Yet, classical scholars consistently emphasize that mastery of *Qawāʿid* alone does not suffice for profound hadith criticism. Al-Qattan (2009) asserts that understanding the science of ʿilal al-ḥadīth—the detection of subtle hidden defects—requires a degree of *malakah* that trans-cends codified methodology. The term ʿillah (lit. ʻdefect" or ʻdisease") refers to an obscure fac-tor that undermines the authenticity of a hadith despite its apparent soundness (Mahmud al-Ṭaḥḥān, 1987). Ibn al-Ṣalāḥ (2000) and al-Nawawī (1991) explain that a report afflicted with ʿillah may appear ṣaḥīḥ outwardly but becomes invalid upon deeper scrutiny. Two defining con-ditions characterize ʿillah: it must be both subtle (khafiyyah) and detrimental to authenticity (*muṭʿinah fī al-ṣiḥḥah*).

The science of ʿilal al-ḥadīth thus occupies the highest intellectual tier within hadith stud-ies, demanding a unique synthesis of vast memorization, comparative analysis, and refined epis-temic sensitivity. Only a select cadre of early scholars—such as ʿAlī ibn al-Madīnī, Aḥmad ibn Ḥanbal, al-Bukhārī, Abū Ḥātim al-Rāzī, and al-Dāraquṭnī—were recognized as aṣḥāb al-ʿilal, masters of this subtle discipline (Brown, 2009). Their expertise was not reducible to formulaic rules but stemmed from an intuitive grasp cultivated through constant exposure to variant narra-tions (*mutābaʿāt* and *shawāhid*) and a holistic awareness of the hadith corpus (Nūr al-Dīn ʿIṭr, 1997).

ʿIṭr (1997) outlines several methodological pathways through which *malakah* operates in detecting ʿillah. First, experts collate all existing transmissions of a single hadith, then compare variations in sanad and matn to locate inconsistencies or rare patterns (tafarrud). Second, they evaluate narrators' relational dynamics and placement within broader *isnād* networks to identify potential isolation or weakness. Third, mastery of narrator profiles enables recognition of recur-rent narrative tendencies or stylistic anomalies. Finally, authoritative critics may articulate explicit judgments regarding a report's ʿillah, based on their accumulated experiential insight. These heu-ristic techniques exemplify the depth of reasoning that *malakah* affords—reasoning not easily codified within algorithmic systems.

The relevance of *malakah* to contemporary hadith scholarship becomes increasingly appar-ent in the digital and AI-assisted era. While computational models can process large datasets and detect overt textual or structural irregularities, the discernment of hidden ʿilal continues to de-pend on human epistemic intuition. As Abdelnour (2025) argues, algorithmic cognition lacks the ontological grounding necessary for ethical and metaphysical judgment. Therefore, *malakah* serves as an epistemological safeguard, ensuring that technological automation in hadith analysis remains anchored in the values of ʿadl, amanah,

and *taḥqīq*—the triad of moral integrity, intellec-tual trustworthiness, and methodological rigor.

Ultimately, the relationship between *malakah* and *Qawāʿid* within ʿUlūm al-ḥadīth encapsu-lates the tension—and the harmony—between structured knowledge and intuitive wisdom. *Qawāʿid* provides the logical architecture of hadith verification, but *malakah* breathes interpre-tive life into that structure, enabling scholars to perceive what lies beyond formal rules. In inte-grating Artificial Intelligence into hadith criticism, preserving this duality is paramount: while AI can extend the reach and efficiency of *Qawāʿid*, the irreplaceable dimension of *malakah* remains the hallmark of human interpretive authority within the sacred science of prophetic transmission.

Conclusion

The findings of this study underscore that the integration of Artificial Intelligence (AI) into ḥadīth scholarship represents not merely a technological advancement but a profound epistemological negotiation between traditional and modern modes of knowing. AI, through its computational capabilities in Natural Language Processing (NLP) and Machine learning, can facilitate the large-scale classification, analysis, and verification of ḥadīth texts—tasks that historically demanded extensive human effort. Yet, its efficacy remains contingent upon a framework that respects the epistemic hierarchy of Islamic knowledge, wherein revelation (*waḥy*), reason (*ʿaql*), and spiritual intuition (*dhawq*) coexist harmoniously.

The study concludes that *malakah*—as the moral-intellectual disposition of the *muḥaddith*—cannot be replaced by algorithmic logic. Instead, AI should serve as a *wasīlah* (instrument) that amplifies human scholarship while preserving the ethical, theological, and spiritual dimensions of ḥadīth criticism. A hybrid epistemological model, combining algorithmic reasoning with value-based scholarship, is thus essential to maintain the integrity of Islamic knowledge in the digital age. Ultimately, this study affirms that technological innovation, when guided by *maqāṣid al-*sharīʿah and Islamic epistemology, can strengthen rather than secularise the intellectual tradition of Islam, ensuring that the science of ḥadīth continues to evolve without compromising its divine and humanistic essence.

References

Ab Halim Tamuri, Mohd Faiz Mohd Yaakob, Chua Chy Ren, Nor Yazi Khamis, and Aliff Nawi. A Preliminary Survey of Muslim Experts' Views on Artificial Intelligence. *Islamiyyat 43*, no. 2 (December 1, 2021): 3–16.

Aba al-Khail, S. A. (2003). *Malakah in hadith inquiry: Importance and ways of acquisition*. Riyadh: Imam Muhammad bin Saud Islamic University.

Abdelnour, M. G. (2025). Artificial Intelligence and the Islamic theology of technology: From "means" to "meanings" and from "minds" to "hearts." *Religions, 16*(6), 796. https://doi.org/10.3390/rel16060796

Abdul Jabbar Ahmad Sa'id. Al Malakah an Naqdiyyah 'Inda al Muhaddithin Wa Kayfiyah Binā'iha. *Majallat Az Zarqā Li al Buhuth Wa al Dirāsāt 8*, no. 1 (2006).

Abū Zakariya Yaḥyā ibn Syaraf Al-Nawawī. *Al-Taqrib wa al-taisir : li ma'rifah sunan al-basyir al-nadir*. 1st ed. Beirut: Dār al-Kutub al-Arabi, 1985.

Alqahtani, F., Alotaibi, F., & Alzahrani, A. (2023). Hadith Classification Using Deep learning Approaches. *Journal of King Saud University – Computer and Information Sciences, 35*(8), 101254. https://doi.org/10.1016/j.jksuci.2022.101254

Al-Qattan, M. (2009). *Mabāḥith fī ʿUlūm al-Ḥadīth*. Beirut: Dār al-Maʿrifah.

Al-Qattan, M. K. (1987). *Mabāḥith fī ʿUlūm al-Ḥadīth*. Cairo: Maktabat Wahbah.

Al-Taḥānawī, Muḥammad ʿAlī. (1996). *Al-Kashāf: An Encyclopedia of Artistic and Scientific Terminology*. Beirut: Maktabah Lubnān.

Al-Ṭaḥḥān, Maḥmūd. (1987). *Taysīr Muṣṭalaḥ al-Ḥadīth.* Beirut: Dār al-Maʿārif.

Altammami, S. H. (2023). *Artificial intelligence for understanding the hadith* (Doctoral disser-tation, University of Leeds). https://etheses.whiterose.ac.uk/32802/

Al-Tirmidhī, M. ibn ʿĪ. ibn S. (2014). *Sunan al-Tirmidhī*. Cairo: Markaz al-Buḥūth wa Taqniyat al-Maʿlūmāt, Dār al-Ta'ṣīl.

Anees, M. A., & Athar, A. N. (1986). *Guide to Sira and Hadith literature in Western languages*. London & New York: Mansell.

A'ẓamī, M. M. (1992). *Studies in Hadīth methodology and literature*. Indianapolis: American Trust Publications.

Azmi, A. M., Al-Qabbany, A., & Hussain, A. (2019). Computational and natural language processing based studies of hadith literature: A survey. *Artificial Intelligence Review, 52*(4), 2859–2894. https://doi.org/10.1007/s10462-019-09692-w

Azwar, A., Usman, A. H., & Abdullah, M. F. R. (2025). The Integration of Artificial Intelligence in Hadith Scholarship: A Bibliometric Perspective on Emerging Research Directions. *Nukhbah Journal of Islamic Studies, 12*(1), 1–19.

Bashir, M. H., Azmi, A. M., Nawaz, H., & Zaghouani, W. (2023). Arabic natural language processing for Qur'anic research: A systematic review. *Artificial Intelligence Review, 56*(3), 2743–2771. https://doi.org/10.1007/s10462-022-10313-2

Bolter, J. David. (1984).Artificial Intelligence. *Daedalus 113*(3): 1–18.

Brown, J. A. C. (2009). *Hadith: Muhammad's Legacy in the Medieval and Modern World.* Oneworld Publications.

Cambria, E., & White, B. (2014). Jumping NLP curves: A review of natural language processing research. *IEEE Computational Intelligence Magazine, 9*(2), 48–57. https://doi.org/10.1109/MCI.2014.2307227

Davidson, G. A. (2020). *Carrying on the tradition: A social and intellectual history of hadith transmission across a thousand years*. Leiden & Boston: Brill.

Hirschberg, J., & Manning, C. D. (2015). Advances in natural language processing. *Science, 349*(6245), 261–266. https://doi.org/10.1126/science.aaa8685

Ibn al-Ṣalāḥ, U. (2000). *Muqaddimah Ibn al-Ṣalāḥ fī ʿUlūm al-Ḥadīth*. Cairo: Dār al-Maʿārif.

Ibn hajar al-Asqalāni. (2001). *Nuzḥatun naẓar fī tawḍih nukhbah al-fikr*. Riyadh: Fahrasah Maktabah al Mulk Fahd al Wathaniyah Atsna` al Nasyr.

Ibn Manzur. (1955). *Lisān Al-'Arab*. Beirut: Dār al Ma'ārif.

Ismail, M. Syuhudi. (2005). *Kaedah kesahihan sanad hadis telaah kritis dan tinjauan dengan pendekatan ilmu sejarah*. Jakarta, Indonesia: Bulan Bintang.

Iṭr, Nūr al-Dīn. (1979). *Manhāj al-naqd fī ʿulūm al-hadīth*. Damascus: Dār al-Fikr.

Kamali, M. H. (2009). *A textbook of ḥadīth studies: Authenticity, compilation, classification and criticism of ḥadīth* (2nd ed.). Markfield: The Islamic Foundation.

Aba al-Khail, K. A. A. (2015). *Al malakah al ḥadīthiyyah: Al aḥammiyah wa al wasāil*. Majallat Dirāsat al Islāmiyyah, 28(1).

LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. *Nature, 521*(7553), 436–444. https://doi.org/10.1038/nature14539

Lucas, S. C. (2006). *Constructive critics, ḥadīth literature, and the articulation of Sunnī Islam*. Leiden & Boston: Brill.

Al-Ṭaḥḥān, M. (1987). *Taysīr muṣṭalaḥ al-ḥadīth*. Beirut: Dār al-Maʿārif.

Al-Fairūz Ābādī, M. al-D. (n.d.). *Al-qāmūs al-muḥīṭ.* Cairo: Dār al-Ḥadīth al-Qāhirah.

Majmaʿ al-Lughah al-ʿArabiyyah. (2005). *Al-muʿjam al-wasīṭ.* Cairo: Maktabah al-Shurūq al-Duwaliyyah.

Maulana, I. (2018, October 16). *Hadis ṣaḥīḥ dan syarat-syaratnya*.

Melchert, C. (2014). *Hadith, piety, and law: Selected studies*. London & New York: Routledge.

Motzki, H. (2010). *Analyzing Muslim traditions: Studies in legal, exegetical, and maghāzī ḥadīth*. Leiden & Boston: Brill.

Abū Zahw, M. (1987). *Al-ḥadīth wa al-muḥaddithūn*. Egypt: al-Sharikah al-Sāhimah al-Miṣriyyah.

Al-Khaṭīb, M. ʿA. (1981). *Al-sunnah qabla al-tadwīn* (5th ed.). Beirut: Dār al-Fikr.

Muhanna, E. (2016). *The digital humanities and Islamic & Middle East studies*. Berlin & Boston: De Gruyter.

Muhanna, E. (2018). *The world in a book: Al-Nuwayrī and the Islamic encyclopedic tradition.* Princeton: Princeton University Press.

Mustapha, A., Senik, Z., & Haron, S. C. (2025). An overview of artificial intelligence (AI) issues from the perspective of Islamic jurisprudence. *Journal of Research in Islamic Studies, 25*(1), 45–62. https://jati.um.edu.my

Najeeb, M. M. A. (2021). Towards a deep learning-based approach for hadith classification. *European Journal of Engineering and Technology Research, 6*(3), 9–15. https://doi.org/10.24018/ejeng.2021.6.3.2544

Nazir, A. N., Ithnin, N. K. M., & Suliaman, I. (2025). Challenges in AI-mediated engagement with Quranic verses: An ethical framework based on hadith methodology. *QURANICA: International Journal of Quranic Research, 17*(1), 1–20.

Niam, M. F. (2025). From sanad to syntax: The disruption of Islamic hermeneutics by Qur'anGPT. *Basmala: Journal of Qur'an and Hadith, 3*(1), 33–55. https://e-journal.elkuator.com/index.php/bjqh/article/view/19

Purnamawati, N. W. (2025). Artificial intelligence in Qur'anic studies: Opportunities and ethical challenges of AI-based tafsir. *Journal of Qur'anic and Hadith Studies, 7*(2), 112–134. https://journal.islamicateinstitute.co.id

Ramadhan, A., Abdurachman, E., & Sulistio, B. (2024). The utilization of machine learning on studying hadith in Islam: A systematic literature review. *Education and Information Technologies, 29*(2), 1415–1435. https://doi.org/10.1007/s10639-023-12008-9

Sahle, P. (2017). What is a scholarly digital edition? *Digital Scholarship in the Humanities, 32*(1), 1–21. https://doi.org/10.1093/llc/fqt063

Saʿīd, A. (2010). *The Role of Malakah in Hadith Criticism and Its Relation to the Qur'an*. Cairo: Dār al-Salām.

Saloot, M. A., Idris, N., Mahmud, R., & Ja'afar, S. (2016). Hadith data mining and classification: A comparative analysis. *Artificial Intelligence Review, 46*(2), 195–217. https://doi.org/10.1007/s10462-015-9413-8

Schoeler, G. (2009). *The oral and the written in early Islam*. Routledge.

Al-Ṣāliḥ, S. (1986). *ʿUlūm al-ḥadīth wa muṣṭalaḥuh.* Beirut: Dār al-ʿIlm li al-Malāyīn.

Siddique, B., & Butt, N. (2025). Islamic legal and mystical thought in the age of artificial intelligence: Between data, deen, and dignity. *Contemporary Journal of Social Sciences, 11*(4), 77–95. https://contemporaryjournal.com

Terras, M., Nyhan, J., & Vanhoutte, E. (2018). *Defining digital humanities: A reader.* Routledge.

Waqas, M. (2025). Exploring the ethical framework of science: A critical study from the Islamic perspective. *Pakistan Journal of Islamic Philosophy, 2*(1), 25–44. https://pakjip.com

Yaakob, M. A., Abdullah, M. R., & Muhamad, F. N. (2025). Artificial intelligent model for generating lessons of Quranic chapters through an interactive tafsir approach. *QURANICA: Journal of Quranic Research, 17*(1), 45–67.