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Initial Roots of Artificial Intelligence (AI) In Early Islamic Era

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Abstract: Islam accepts all forms of advancement, including progress in artificial intelligence. Technology requires Muslims to be proactive concerning their impacts, whether positive or negative. AI technologies are gradually overtaking older forms of work, yet the author claims that there is no existing barrier within Islam that hinders the use of AI in the workplace. In fact, there is significant evidence supporting the notion that modern AI's foundational concepts were present in early Islamic and Arab traditions.

In Quran Allah SWT says:

وَعَلَّمَ ءَادَمَ ٱلْأَسْمَآءَ كُلَّهَا

He taught Adam the names of all things (Quran 2:31)

Allah SWT declares in the Quran that he gives all the knowledge to Adam. Qualitative methodology was chosen for this study. Secondary data was collected and analyzed to answer all the questions. The findings of the study revealed that the initial roots of AI were developed and properly implemented in the early Islamic era. This study has significant implications for the Muslim community.

Keywords: Artificial Intelligence, early Islamic traditions, AI, Muslim community

Introduction:

Artificial Intelligence (AI) is a modern invention, but its conceptual roots can be traced back to the Early Muslim scholars and Arab Mathematicians. During the Islamic golden Era, which reach over from 8th to 14th century. Muslim scholars from all over the world made critical contributions to the scientific field such as Mathematics, Probability and Statistics during this period which provide basis for contemporary AI. This era of Islam was distinguished by the merger of knowledge from diversifying cultures, comprising Greek, Indian, Chinese and Persian inspirations. This combination of ideas fostered a thriving atmosphere for scientific analysis and invention. Caliph Al-Mamun established the house of Wisdom in Baghdad which becomes the hub of knowledge for Islamic scholars to translate and build upon preexisting knowledge.

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Islamic philosophers served as a link between classical intellectual traditions, the European Resurgence, and the Insight. Islamic Arabic work has been translated into Latin between the 12th and 13th centuries. The conveying of knowledge to Europe has a significant impact on the course of the Renaissance and Scientific Revolution.

Methodology:

This review article adopts a qualitative research approach, using a systematic review of the existing literature on the account of AI and Muslim scholarship. The methodology includes:

Literature Search:

A wide-ranging search of academic databases, including JSTOR, Google Scholar, and Islamic studies journals, was conducted about the history of AI, Arabic Muslim Scholars and Muslim academicians work and Muslim Arab Mathematicians work.

Inclusion Criteria:

Those studies were included in which they:

1. Reflected the contributions of Muslim scholars to AI-Linked fields (mathematics, astronomy, medicine, philosophy) during the early Islamic era (8th-14th centuries).
2. Observed the historical context and impact of Islamic scholarship on modern AI development.

Data Analysis:

The selected literature and data were analyzed thoroughly aiming on the key contributions, concepts and ideas of Muslim Scholars, linked with AI. The analysis marked to recognize patterns, themes and insights on the initial roots of AI (Artificial Intelligence) in Islamic scholarship.

Study Limitations:

In this review article only English language literature has been search and added in the literature review. Other languages sources could be added for future researches to further expand the research. This article proposes to offer a complete understanding of the contribution of Muslims from the early era of Islam for the foundation of AI (Artificial Intelligence), highlighting the work of Muslim scholar in the development of AI linked concepts and ideas.

Discovery of Zero:

A Muslim Mathematician introduced the concept of Zero, which stands for 'nothing'. It has had a significant impact on the development of science. Aram Muslim Mathematician and traders brought the number zero from India to Europe and modern civilization, making it a vital component of our digital and AI- driven age. This is a remarkable historical revolution in Islamic academics, and the credit goes to Muhammad Ibn e Musa Al-Khuwarizmi to upgrade the mathematics to unprecedented levels. Moreover, the translation of Arabic numerals into Latin makes the easy adoption of number zero in Europe, this networking from Arab to west eventually contribute to the western renaissance and scientific revolution.

Al-Khwārizmī & Algorithm:

Al- Khuwarzmi made significant contributions to the basis of AI. The term 'Algorithm' originating from his name. He restructured mathematics through his advances in Algebra and Set of rules (Algorithm). Al-Khuearzmi's works laid the foundations for algebra and introduced the concept of the algorithm, which provides the basis for AI (Al- Kuwarzmi, 1981). His book, "Al Kitab al Mukhtasar fil Hisab al Jabr wal

Muqabala" offered structured approaches for explaining Linear equations as well as Quadratic calculations. These were crucial for the improvement of arithmetical methods, numeric statistics handling and conclusively AI (O'Connor & Robbertson).

Statistics as the Basis of AI:

Statistics provide the basis of both Science and AI. It began to emerge during the Golden Age of Islam. Ibn ul Haytham, frequently known as the "first True Scientist", emphasized the implication of empirical reflection and investigation. Ibn ul Haytham has done the groundwork for logical progression, which depends on systematic observation, investigation and inquiry to make a strong hypothesis. Another renowned scholar, Al-Kindi contributes significantly to cryptography and frequency investigation, both components are crucial to statistical implications. He wrote "Risalah Fi Istakhraj Al Mu'amma" which regarded as the first acknowledged documentation of frequency examination. It is a technique used to decrypt encrypted information by inspecting the frequency of letters or codes (statistics).

Arab Mathematician & the Concept of Probability:

Probability is the basic notion in neural networks and Artificail Intelligence. It is mainly the Muslim mathematicians' research work. Ibn ul Farabi, Ibn e Sina (Avicenna) and Ibn -e-Rushd (Averroes) using logic and Epistemology for calculating probability. They scrutinized the ideas of certainty and ambiguity, typically discussing Aristotle's logic to assess different levels of certainty and the reliability of statements. Scholars such as Al Razi and Ibn e Sina established a primary awareness of statistical procedures and the application of probability in scientific contexts.

Logic & Reasoning:

Muslim philosophers such as Al-Farabi, Ibn -e- Sina & Ibn-e-Rushd advanced Aristotelian logic, with Avicenna introducing modal logic (Gutas, 2001). Al-Kindi's early work in cryptanalysis and pattern recognition contributed to foundational algorithmic thinking (Al Kindi, 1992).

Avicenna & Virtuality

A Muslim Philosopher Avicenna is a key character who initiated an early examination into the concept of virtuality. This concept is still relevant in today's talks concerning the metaverse and robotics.

His "flying man" thought experiment enables us to imagine a human developed in mid-air, free of sensory stimuli. Even in the absence of physical inputs, this "Flying man" keep mindfulness, indicating that the mind or soul exists independently from the body (Adamson, 2018). This experiment of Avicenna is critical to the modern debates about individuality and the likely dangers of Artificail Intelligence and Robots replacing People. He questioned materialist beliefs by arguing that the soul is not dependent on human perception, and that our physical form is not the primary factor defining our humanity. According to Avicenna, the belief that the soul is separate from the body is central to what distinguishes humanity. He expanded on a long-standing custom of dualism. It is a philosophical concept that divides the mind and physique. On the contrary, Descartes established a clearer boundary in dualism. Avicenna's perspective is more complex, considering the soul's function in self-awareness and its independence from physical perception. Within this philosophical framework, Islamic scholars have questioned whether intellectual states are part of physical conditions or independent entities. They investigated the relationship between mental and physical states and how each can influence the other.

Islam, Knowledge & AI:

Islam teaches its followers to seek knowledge, emphasizing the importance of intellectual development to improve society. This approach aligns with the crucial role that knowledge plays in the development of AI. The philosophy of Islam is notable for its thorough examination into epistemology, or the nature of knowledge. Influential Islamic scholars including Al Farabi, Avicenna (Ibn-e-Sina), and Al Ghazali have made significant contributions to the epistemic examination. For example, Al Farabi emphasized the importance of thinking and intelligence in the pursuit of knowledge, portrayed on Greek philosophical traditions and Islamic principles. He suggested grading of knowledge, with godly comprehension at the top, which can be attained by both intellectual and spiritual development (Albertini 2005). Al-Ghazali and Ibn-e-Sina discussed cognition, knowledge acquisition, structure of thought, concepts that resonate with modern AI and cognitive science. (Nasr, 2006; Gutas, 2001).

Avicenna built on these notions by developing the idea of "essential knowledge," which is obvious and ensures no practical verification. He distinguished between hypothetical and practical information, claiming that accurate knowledge should result in righteous behavior. Islamic ethical norms foster the proper application of knowledge, encouraging AI advancements that benefit humanity while prohibiting individual exploitation or manipulation. Furthermore, throughout the Islamic Golden Age, Islamic academics translated Greek intellectual books into Arabic, thereby preserving and enriching ancient knowledge.

Mechanical Automata & Robotics:

The Banu Musa brothers invented more than 100 mechanical devices, many of which operate feedback and control systems. (Banu Musa ibn-e- Shakir, 1979). Al Jazari designed programmable automata, including a musical robot and hand wasing devices with feedback mechanisms. (Al Jazari, 1974).

In the current debate regarding AI, a key concern is its impact on human independence in thought and decision making. Within the framework of Islamic theology, the notion of probability intertwines with the concepts of godly power and man's choice. The principle of "Qadar" (God's verdict) signifies that God eventually has planned all procedures, while human still possess the right to make their own decisions. This religious belief requires a complete considerate of probability, observing human activities as possible conclusions within the godly strategy.

Muslim engineers and roboticists raised many Questions, especially in the case where creation of human like robots is considered same as creating human like idols and therefore regarded as unlawful in terms of religion. (Jazarī, al-. 1974). Some religious scholars from Hanafi school of thought, challenged making of sculptures, which pertain to living beings is just unacceptable and considered unlawful religiously (Sarakhsī 1993: 1/210–211).

A prominent Muslim scholar, Shāfiʿī jurist, Abū Saʿīd al-Iṣṭakhrī argued that generally the restriction in creating statues was for a limited time plus a conditional ruling. He conferred that, the restriction was only untill the Prophet Muhammad SAW was alive, as the worshipping of idols was still fresh and it was conceivable that people will resort to their old practices. Though, such a peril is non-existent these days and it can be said with certainty that masses would avoid worshiping sculptures. He added if reigning been perpetual and non-time-bound or context-specific, there should be a restriction in creation of idols of all kinds, which people regard and love, but not limited to ensouled beings. He recapped to the public that

individuals in early times of islam showed their devotion towards many things they respected, like trees and stones (Māwardī 1999: 9/564; Ibn Ḥajar 1959: 1/525; Mīlād 2004: 304–305).

Some fatwas through renowned website Islamweb.net opposed based on fact that resemblance is related therefore Muslim engineers refrain from making robots which looks like living things, especially humans and animals. Stern sentence in the end awaits those who are involved in making sculptures as stressed upon in some fatwas pointing towards prophet guidance and suggest that the same is applicable to those involved in making robots, which look like humans. The common guidance given in these fatawas was that no robots should be made, which look like humans or any other living being. In case there is absolute need of making robots like this, their making should such that necessary fragments, which ensouled beings permanently have, e.g., head should not be part of these robots (Islamweb 2002, 2003, 2009, 2013).

Moreover, work done by religious scholars and eminent work written by the Muslim engineer, Badīʿ al-Zamān al-Jazarī (d. 1206), too associates the thesis that robots resembling humans should not be a part of group pertaining to ensouled beings.

Artificial Intelligence can be helpful for Muslims in numerous ways. One can search the specific quranic text, its translation & interpretation from authentic source through natural language processing. One can search & verify the source of Authentic Hadith.one can use Zakaat calculator, prayer time & Qibla direction through AI technology. In the modern world we cannot deny the importance and significance of AI in every human race.

Ethical Teachings of Islam:

Islamic ethics is founded on the teachings of the Quran and Sunnah, which emphasize principles such as righteousness, kindness, compassion and the search of knowledge. These religious and everyday principles influence Muslims in their normal relations and behavior.

Justice is a crucial principle of Islamic morals, promoting for justice and equality in all facets of life. In the framework of AI, this attitude can contribute to the advancement and implementation of technologies that are impartial and unbiased. Kindness and sympathy are another significant element of Islamic ethics, highlighting the importance of understanding and kindness towards other human beings. We can integrate this attitude into AI by creating technologies that develop human welfare and prevent damage to society.

There are no impossible barriers in the muslim religious belief against the implementation of AI technologies in professional environment. Though, essential safety measures should be measured to ensure that implementing AI will not affect work-related ethical values. It is important to learn the lessons from the positive past experience of technologies that flourished in the Islamic evolution. (Ghaly, M.2024)

Islam emphasizes strong ethical and moral values in every race of life. Addressing AI's ethical uncertainties and engaging a strong emphasis on the concept of "good" or "maṣlaḥa" as a regulating guide for AI's ethical assessment. (Elmahjub, E.2023)

Maṣlaḥa, is frequently interpreted as public interest or public well-being, is a crucial theory in contemporary on Islamic learning. (Opwis, F. 2010). The concept of maṣlaḥa suggests that the basic objective of the commands, rulings, and exclusions present in the Qurʾānic texts is to support adoptions that take about righteous (jalb al manfaa) and prevent damage (dafʿ al ḍarar). (al-Raysuni, A, 2005) Felicitas Opwis categorizes a regular theme among authentic scholars correlating maṣlaḥa with encouraging well-

being, advantage, righteousness, and evading harm and crime. (Opwis, F. 2010). In the context of AI, maṣlaḥa can be used as an assessing framework to measure the compatibility of AI with Islamic belief of good (ḥasan) and evil (qabīḥ) and right (ḥaqq) and wrong (batīl).

Privacy Issues Using AI:

The idea of privacy in Islam is fundamentally connected to the dignity of individuals. The privacy of every person is regarded as upholding its dignity and respect. In Islam the term "satr," defined as concealing faults and personal issues, illustrates this concept. The moral need to maintain privacy is a common duty, both individual and societal, that ensures individuals can live exclusively without fear of unnecessary interference. AI systems often require vast amounts of personal data from web browsing habits to voice recordings and facial recognition images. Companies collect and monetize user data without transparent consent. These things should be avoided to maintain an individual's privacy.

The following steps should be taken to protect an individual's privacy:

- Strong data protection laws with forceable rights.
- Explainable AI:AI systems should provide reasons for their decisions.
- Privacy by Design: Build those systems with the core system of Privacy so that personal data cannot be leaked.
- Empower users to understand and control data, because users usually don't understand the technical language of the system and they often do not fully understand what they agree to. This may lead to data leakage and privacy issues.

AI in Medical Field:

AI in healthcare's capacity to quickly analyze massive amounts of clinical documents assists medical practitioners in diagnosis disease indicators and trends that would then go overlooked. AI and healthcare have an extensive range of possible practices, including visualizing radiological examinations for early diagnosis and analyzing conclusions from electronic health info. Healthcare organizations and their systems may become smarter, faster, and more effective in caring for millions of people around the world by integrating AI (artificial intelligence) into hospital systems and clinics. AI (Artificial intelligence) is undoubtedly the future of healthcare, transforming how patients receive exceptional handling while reducing provider budgets and supportive health outcomes.

The likely applications of AI (artificial intelligence) in healthcare domain are purely astonishing. AI in healthcare is expected to have a noteworthy impact on how we examine healthcare data, diagnose diseases, advance therapies, and ultimately evade them completely. Medical practitioners can make improved educated findings based on more accurate info by utilizing artificial intelligence in healthcare, saving time, lowering expenses, and improving overall medical record management. From detecting new cancer treatments to improving patient experiences, AI in healthcare potentials to be a game changer, paving the system for a future in which patients obtain better care and treatment quicker than ever before.

Conclusion

In Summary, the Islamic Golden age has been considered as a crucial bridge in conserving and developing scientific knowledge, later transmitted to Europe (Saliba, 2007; Turner, 1995). The rich heritage of Islamic and Arab intellectual traditions has had significant historical impacts on current science and technology, particularly in the field of artificial intelligence. Scholars from the Islamic civilization developed fundamental insights that continue to influence AI research and applications today. Al Khwārizmī, along with other Islamic thinkers, contributed significantly to the formation of algorithms by reviewing

probability and statistics. Muslim scholars' proper frameworks and logical discourses provide precious viewpoints on the proper use of AI, highlighting ideals such as justice, compassion, and knowledge-seeking. These customs are crucial to conversations about the future of artificial intelligence as we enter this era because they promote innovation that upholds privacy and human dignity while improving human kind. Artificial intelligence has tremendous opportunities and benefits for Muslims, and it is critical to determine whether Muslims are capable of controlling and applying AI efficiently. Artificial intelligence has the potential to open up new avenues for Islamic religion; nevertheless, it may also pose a threat to Islam if Muslims do not actively participate in and incorporate it into Islamic outreach efforts. AI has the potential to significantly aid in meeting the needs of Muslim society if it is properly developed and applied.

References

1. Albertini, T. (2005). Crisis and Certainty of Knowledge in Al-Ghazālī (1058–1111) and Descartes (1596–1650). Philosophy East and West, 55, 1–14. https://philpapers.org/rec/ALBCAC
2. Al-Jazari. (1974). *The book of knowledge of ingenious mechanical devices* (D. R. Hill, Trans.). D. Reidel Publishing Company. (Original work published 1206)
3. Al-Khwarizmi. (1981). *The algebra of al-Khwarizmi: Algebra and arithmetics from the Islamic golden age* (F. Rosen, Trans.). Bibliotheca Islamica. (Original work ca. 820 CE) https://archive.org/details/algebraofmohamme00khuwuoft/page/n9/mode/2up
4. Ibraham A. "Al-Kindi: The origins of cryptology: The Arab contributions", Crypto logia, vol.16, no 2 (April 1992) pp. 97-126.
5. Al-Raysuni, A. (2005). *Imam Al-Shatibi's theory of the higher objectives and intents of Islamic law*. International Institute of Islamic Thought. https://iiit.org/en/book/imam-al-shatibis-theory-of-the-higher-objectives-and-intents-of-islamic-law/
6. Elmahjub, E. Artificial Intelligence (AI) in Islamic Ethics: Towards Pluralist Ethical Benchmarking for AI. Philos. Technol. 36, 73 (2023). https://doi.org/10.1007/s13347-023-00668-x
7. Ghaly, M. What Makes Work "Good" in the Age of Artificial Intelligence (AI)? Islamic Perspectives on AI-Mediated Work Ethics. J Ethics 28, 429–453 (2024). https://doi.org/10.1007/s10892-023-09456-3
8. Gutas, D. (2001). *Avicenna and the Aristotelian tradition: Introduction to reading Avicenna's philosophical works*. Brill.
9. Druart, Therese-Anne, "al-Farabi", *The Stanford Encyclopedia of Philosophy* (Fall 2024 Edition), Edward N. Zalta & Uri Nodelman (eds.).https://plato.stanford.edu/entries/al-farabi/
10. Ibn Ḥajar. 1959. *Fatḥ al-Bārī sharḥ Ṣaḥīḥ al-Bukhārī*. Beirut: Dār al-Maʿrifa.
11. Islamweb. 2013. Ḍawābṭ jawāz taṣnīʿ al-rūbūtāt. Online fatwa issued on 11 March 2013. Available at shorturl.at/EGHOZ (accessed 23 August 2022).
12. Islamweb. 2009. Ḥukm rasm al-rūbūt. Online fatwa issued on 15 November 2009. https://www.islamweb.net/ar/fatwa/129139/ (accessed 23 August 2022).
13. Islamweb. 2002. Al-Insān al-ālī (al-rubūt) bayna al-ḥaẓr wa al-ibāḥa. Online fatwa issued on 26 July 2002. https://www.islamweb.net/ar/fatwa/20017/ (accessed 23 August 2022).
14. Islamweb. 2003. Working with and using robots. Online fatwa issued on 11 May 2003. http://www.islamweb.net/en/fatwa/85827/wor%20king-with-and-using-robots (accessed 23 August 2022).
15. Jazarī, al-. 1974. *The Book of knowledge of ingenious mechanical devices*. Translated by Donald Hill. D. Reidel Publishing Company.
16. Māwardī, al-. 1999. *Al-Ḥāwī al-kabīr*. Beirut: Dār al-Kutub al-ʿIlmiyya. https://www.scribd.com/document/121149085/Al-Hawi-Al-Kabir-Al-Imam-Al-Mawardi-20-of-26
17. Mīlād, ʿA. A.-F. A.-S. (2004). *Al-buyūʿ al-muḥarrama wa al-manhiyy ʿanhā (Forbidden sales and prohibited transactions)*. Dār al-Hady al-Nabawī. https://doi.org/10.1007/s10892-023-09456-3
18. Nasr, S. H. (2006). *Science and civilization in Islam*. Harvard University Press. https://archive.org/details/sciencecivilizat0000nasr/page/n5/mode/2up
19. Opwis, F. (2010). *Maṣlaḥa and the Purpose of the Law*. Brill Quran 49:12. (https://quran.com/49/12)
20. Quran 2:31 (https://quran.com/2/31)
21. Sahih Bukhari, Book 73, Hadith 90.
22. https://sunnah.com/bukhari/78/90)
23. Saliba, G. (2007). *Islamic science and the making of the European Renaissance*. MIT Press.
24. Sarakhsī, al-. 1993. *Al-Mabsūṭ*. Beirut: Dār al-Maʿrifa.
25. Stanford Encyclopedia of Philosophy. (n.d.). Al-Fārābī. https://plato.stanford.edu/entries/al-farabi/
26. Stanford Encyclopedia of Philosophy. (n.d.). The Analysis of Knowledge. (https://plato.stanford.edu/entries/knowledge-analysis/)

27. Turner, H. (1995). *Science in medieval Islam: An illustrated introduction*. University of Texas Press. https://books.google.com.pk/books/about/Science_in_Medieval_Islam.html?id=nVcSnwEACAAJ&redir_esc=y
28. Zuboff, S. (2018). *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. PublicAffairs. https://www.publicaffairsbooks.com/titles/shoshana-zuboff/the-age-of-surveillance-capitalism/9781610395694/