

Artificial Intelligence in Thai Healthcare: Current Landscape, Awareness, and Future Outlook

Pongkit Ekvitayavetchanukul¹, Thanawat Thanitnan², Natnicha Akwittayavechnukul³, Wipatsaya Muenkiat⁴

¹The Board of Khon kaen University Affairs. Khon kaen University

ORCID: 0000 0001-6109-5726

²Debsirin School, Thailand

³Pichayasuksa School

⁴Bodindecha (Sing Singhaseni) School



ABSTRACT: This research explores the current and future trends of Artificial Intelligence (AI) applications in the Thai medical field. Conducted through qualitative research involving 40 medical professionals, the study gauges awareness levels and opinions regarding AI in healthcare. Findings reveal a burgeoning interest, despite the temporary limitations posed by the COVID-19 pandemic. Key themes include the transformative potential of AI, the pivotal role of government policies, and ethical considerations. The research provides valuable insights for policymakers, medical professionals, and researchers navigating the evolving landscape of AI in Thai healthcare.

KEYWORDS: Artificial Intelligence, Thai healthcare, Awareness, Future prospects, Ethical considerations.

INTRODUCTION

Artificial Intelligence (AI) has undergone significant evolution since its inception at the Dartmouth Conference in 1955, where John McCarthy coined the term. While the global AI landscape is still in its early stages, continuous advancements in science and technology have led to its widespread adoption across various industries. In 2017, the global AI market was valued at \$2.42 billion USD, projected to reach \$34.38 billion USD by 2023 and an expected \$59.74 billion USD by 2025, with top applications in Static Image Recognition, Algorithmic Trading Strategy/Performance Improvement, and Scalable Processing of Patient Data (Statista, 2018, cited in Yuwares Namkachit, 2021).

Definition of Artificial Intelligence:

AI, as defined by the Office of the National Digital Economy and Society Commission (2021), is the science of aggregating knowledge from diverse disciplines, particularly science and engineering, to develop intelligent machines capable of reasoning, learning, and decision-making akin to the human mind. AI systems can autonomously learn, develop, and enhance their processes, augmenting their capabilities over time.

Understanding AI:

AI, in contrast to conventional programs relying on explicit commands, emerges from relevant data, undergoing processes of analysis, synthesis, machine learning, and hypothesis formulation. It operates through systematic, logical thinking resembling the human cognitive process, essentially representing an artificially constructed brain with computer functions capable of emulating human-like thinking.

AI Applications in Medicine:

In developed countries, AI has witnessed widespread adoption in various medical disciplines, including Radiology, Psychiatry, Neurology, Pediatrics, and Cardiology, with a notable surge in research publications. Applications span across hospital departments, encompassing emergency, ICU, outpatient care, and patient recovery evaluation. The integration of AI technologies in healthcare is proving pivotal in enhancing service quality, reducing costs, and improving safety standards (Carroll, 2018).

Summary of AI Applications in Medicine:

1. AI for Medical Data Storage and Processing:

Develops AI capabilities for storing and building comprehensive databases.

"Artificial Intelligence in Thai Healthcare: Current Landscape, Awareness, and Future Outlook"

Enables medical personnel to analyze data for diagnostics and prompt treatment.

Facilitates accurate data sharing between healthcare departments and referral of complex cases.

Examples include Google's DeepMind Health collaboration with the UK's National Health Service and Microsoft's AI-infused Healthcare Services and Software, providing secure cloud-based control and access to medical databases.

2. AI for Disease Diagnosis, Treatment Analysis, and Clinical Decision Support:

Assists doctors in faster and more accurate diagnosis.

Analyzes human/organism genomes and genetic mutations, aiding in cancer detection.

Detects acute kidney failure in hospitalized patients for prompt treatment.

Supports clinical decision-making through analysis of medical imaging, X-rays, and MRI scans.

Enhances speed and accuracy, enabling personalized treatment selection, AI-assisted robotic surgery, and rapid drug candidate selection.

3. AI to Improve Healthcare Processes:

Utilizes AI for predicting waiting times and scheduling appointments based on input data.

Enhances resource management in hospitals by efficiently allocating resources according to patient demand.

Addresses global challenges like emergency department overcrowding by triaging patients based on urgency, optimizing appointment scheduling, and improving overall hospital resource management.

4. AI for Patient Monitoring:

Implements AI in patient monitoring through robotic health assessments, sensors, and wireless monitoring. Detects conditions and performs mental health checks.

Monitors mobile patients using heart electrical signals, blood oxygenation, and location.

Sends alerts for emergencies and enables wireless connectivity, providing convenience, speed, and reducing mortality.

5. AI to Aggregate and Analyze Medical Data and Literature:

Utilizes AI alongside data processing, storage, and cloud-based systems.

Facilitates easy access for researchers and medical professionals worldwide to medical data, literature, and diagnoses.

Crucial for advancing medical knowledge and supporting research in the healthcare domain.

Emerging Trends in Artificial Intelligence (AI) Implementation in Thai Healthcare

In examining the trajectory of artificial intelligence (AI) integration in the medical domain of Thailand, the progression has been relatively restrained in recent years, primarily attributed to the pressing demands posed by the COVID-19 pandemic. Nevertheless, a discernible shift is anticipated as the advantages of AI become increasingly apparent within the public health system. Noteworthy momentum is building around projects and research endeavors aimed at leveraging AI to enhance the precision and expediency of diagnostics, treatment planning, and overall patient care. This burgeoning interest is palpable among medical organizations and hospitals across Thailand, suggesting a propensity for further development and advancement in the foreseeable future. Consequently, the adoption of AI in medicine is poised to undergo exponential growth over the next 3-5 years, aligning with the trajectory observed in most developed countries.

Categorization of AI Applications in Thai Medicine:

Diagnosis and Screening: AI is employed to aid medical professionals in diagnosing and screening patients. This includes the analysis of medical imaging from procedures such as endoscopies to detect cancer cells, comparing images with a comprehensive cancer cell database, and scrutinizing X-rays and MRI scans.

Treatment Planning: AI plays a pivotal role in determining and planning tailored treatments for individual patients by considering their medical history and pertinent medical information. This empowers doctors to conduct thorough treatment analysis and receive clinical decision support.

Enhancing Efficiency of Medical Services: AI contributes to the augmentation of emergency medical services, minimizing dispatch times for emergency physicians and enhancing the efficiency of healthcare practitioners. Notably, the Faculty of Medicine at King Mongkut's Institute of Technology Ladkrabang has introduced an AI-based system, AIEMS, which processes and screens patients by converting voice signals to text for symptom screening and triaging in emergency medicine.

Patient Monitoring and Care: AI-enabled systems or applications are employed for continuous monitoring of patients' health and daily activities, even from a remote distance. This facilitates patients' access to and active participation in their healthcare.

Medical Research and Technology Development: AI systems provide additional insights into diseases or treatments, fostering knowledge exchange among medical personnel for further study and research. Furthermore, AI contributes to the development of new medical knowledge.

Drug Development and Medical Research: AI's analytical capabilities extend to scrutinizing scientific data derived from physicians' inputs on patient drug treatments. This empowers pharmaceutical manufacturers to enhance their drug research and development processes.

"Artificial Intelligence in Thai Healthcare: Current Landscape, Awareness, and Future Outlook"

These trends exemplify a subset of the diverse applications of AI in the Thai medical landscape. Looking ahead, the potential for widespread adoption and additional advancements remains significant, promising benefits for various medical organizations and hospitals in Thailand.

RESEARCH METHODOLOGY AND RESULTS

Conducted under supervised conditions, this qualitative research involved interviews with 40 medical professionals from eight public and private hospitals in Bangkok and metropolitan areas. The participants included 20 physicians, 10 nurses, and 10 other medical personnel, each with a minimum of two years' experience in their respective positions. Four questions addressing attitudes toward AI in medicine were posed during the interviews. Responses were analyzed, with opinions from over 40% of respondents considered significant. While the study's convenience stratified sampling method presented limitations, recruiting interviewees during their breaks, the insights derived offer valuable perspectives for understanding the current landscape of AI adoption in Thai healthcare.



Fig 1. Artificial Intelligence framework

Comprehensive Overview of Research Findings on Artificial Intelligence (AI) Adoption in Thai Medical Facilities

Question 1: Awareness of AI Usage in Medical Facilities

In response to Question 1, a unanimous acknowledgment of AI prevalence in global medical facilities was observed among all 20 doctors (100%) interviewed. While recognizing the limited integration of AI in Thai healthcare, 85% (17 doctors) indicated the inclusion of AI-related topics in organizational meetings over the past 2-3 years. The pressing demands of the COVID-19 pandemic, prioritized during this period, deferred the widespread adoption of AI. However, 75% (15 doctors) anticipate heightened interest in AI once the immediate challenges of the pandemic are addressed. This sentiment is grounded in the expectation that, influenced by media and societal trends, leading hospitals will spearhead AI development, prompting other healthcare facilities to follow suit.

Among nurses, 50% (5 samples) revealed awareness of future AI plans in their healthcare facilities, while 40% (4 samples) disclosed ongoing research. The latter group expressed reservations tied to operational impacts, service quality, and patient privacy. Additionally, eight other medical personnel (80%) reported no observable progress in their respective departments, signaling that initial AI implementation might gravitate toward areas directly impacting patient care.

Question 2: Future Perspectives on AI in Thai Medicine

For Question 2, the unanimity among all 20 doctors (100%) in foreseeing positive impacts of AI on Thailand's healthcare system underscored the potential for improved efficiency and service quality. Nine nurses (90%) echoed this optimism, even though their

"Artificial Intelligence in Thai Healthcare: Current Landscape, Awareness, and Future Outlook"

understanding of AI benefits remained limited. Six nurses (60%) stressed the organizational nature of AI adoption, envisioning selective integration into specific departments, contingent on personnel training.

Eight other medical personnel (80%) expressed affirmative opinions, foreseeing enhanced service quality and global recognition for Thailand as a developed country in the medical domain.

Question 3: Government's Role in AI Adoption

In response to Question 3, 90% (18 doctors) emphasized the pivotal role of the government in influencing national health policies and potentially framing legal frameworks for AI adoption. A consensus of 60% among nurses (6 samples) echoed this sentiment, with 50% (5 samples) expressing concerns about political instability impacting the pace of AI integration. Among other medical personnel, 70% (7 samples) underscored the significance of the government's role, expressing apprehensions about the potential negative impact of political instability on technological advancements linked to AI.

Question 4: Concerns and Suggestions Regarding AI Use

Concerns regarding AI use were articulated by 15 doctors (75%), focusing on increased costs associated with personnel preparation and ethical considerations. Nurses, with limited exposure to AI information, refrained from expressing concerns (80%, 8 samples). The majority of other medical personnel (90%, 9 samples) withheld opinions due to a lack of comprehensive understanding but expressed confidence in potential benefits.

CONCLUSION

Navigating the Promise and Perils of Artificial Intelligence in Thai Medicine

the synthesis of research findings emphasizes the undeniable reality that artificial intelligence (AI) is poised to become a catalyst for future innovation, holding monumental potential to transform the landscape of the medical field. Its impact extends far beyond healthcare, promising to significantly improve the quality of life for individuals across Thailand. The critical need for continued AI development in the country is evident, calling for proactive government intervention to assume the roles of primary driver, regulator, and overseer in integrating AI into medical and public health systems. This strategic direction will shape the trajectory of AI utilization, ensuring adherence to ethical standards and safeguarding the well-being of the population.

Simultaneously, the private sector, particularly influential hospitals in the nation, plays a pivotal role in driving advancements in the medical domain. Their involvement necessitates a comprehensive approach that includes preparing various aspects, especially the medical personnel who act as both providers and end-users of AI. Equipping these professionals with the knowledge and skills to adapt to the evolving AI landscape is imperative, ensuring responsible and efficient AI utilization. The medical industry, as a cornerstone service sector in Thailand, assumes a central role in steering the country's economic development. However, the promises of AI are accompanied by inherent challenges, creating a dichotomy similar to a double-edged sword. While the benefits are abundant, the risks associated with unchecked AI implementation cannot be ignored. This dilemma fuels concerns, ethical debates, and potential threats, underscoring the urgent need for stringent controls. Real-world case studies, such as Kuwait's withdrawal of a DNA database law, highlight the delicate balance between technological advancement and constitutional privacy protection.

Additional concerns arise from experiments predicting physical traits via AI, emphasizing the need for comprehensive governance and control mechanisms to prevent misuse. The collective plea of 117 experts urging the United Nations to curb the development of lethal autonomous weapons using AI underscores the potential catastrophic consequences of unchecked AI autonomy.

In light of these challenges, a clear call to action resonates for swift, collaborative efforts from all sectors within each nation. Early-stage comprehension, coupled with concrete, legally binding cooperation and agreements, becomes paramount. The establishment of robust policies, universal rules, and best practices surrounding AI technology, risk management, and enforcement mechanisms becomes indispensable. Only through these collective efforts can we avert undesirable scenarios stemming from unregulated AI use, ushering in an era where AI contributes substantively to the betterment of society without compromising its essence.

REFERENCES

- 1) Yuwares Mak Sittichanbancha. (2021). Artificial Intelligence (AI) and its Application in Emergency Medicine. *Thai Journal of Emergency Medicine*, 1(1), January-June.
- 2) National Digital Economy and Society Commission. (2021). Thailand AI Ethics Guideline. Bangkok: National Digital Economy and Society Commission.
- 3) Hathai Chanok Bawcharoen and Wariya Chankha. (2022). The Moonlight of Health: Using Artificial Intelligence in Nursing Care. *Journal of Nursing*, 69(4), 60-67.
- 4) Carroll, W. M. (2018). Artificial Intelligence, Nurses, and the Quadruple Aim. *Online Journal of Nursing Informatics*, 22(2), 1-3.
- 5) Locsin, R. C., & Ito, H. (2018). Can Humanoid Nurse Robots Replace Human Nurses? *Journal of Nursing*, 5(1), 88-92.
- 6) Matheson, R. (2018). Startups Building Integrated Nursing Ecosystems with AI: Artificial Intelligence Looks Set to Transform Nursing over the Coming Years.

"Artificial Intelligence in Thai Healthcare: Current Landscape, Awareness, and Future Outlook"

- 7) Stewart, J. E., Rybicki, F. J., & Dwivedi, G. (2020). Medical Specialties Involved in Artificial Intelligence Research: Is There a Leader? *Tasman Medical Journal*, 2, 20-27.
- 8) Yuji, K. (2018). Introduction to AI and History of AI: General Background of AI and its Application to Medical and Healthcare Technology. Project Division of International Advanced Medical Research, The Institute of Medical Science, The University of Tokyo.
- 9) Sivadee. (2020, April). Future of Medicine: AI Robots and Automatic Treatment. Toolmakers. (<https://www.toolmakers.co/en>)
- 10) Suthep Puangmahod. (2023). Artificial Intelligence – Technology’s Answer to Elevating Healthcare Professionals and Patient Care in Thailand. *Media of Thailand*. (https://www.mediaofthailand.com/2023/07/blog-post_7.html)
- 11) XSOLIS Insights. (2021). The Evolution of AI in Healthcare. (<https://www.xsolis.com/blog/the-evolution-of-ai-in-healthcare>)



There is an Open Access article, distributed under the term of the Creative Commons Attribution – Non Commercial 4.0 International (CC BY-NC 4.0) (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits remixing, adapting and building upon the work for non-commercial use, provided the original work is properly cited.