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REVIEW

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Understanding Artificial Intelligence Along with Legal and Ethical Issues

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ABSTRACT Artificial intelligence (AI) applications are swiftly integrating into various healthcare domains, notably oncology. Like other technological advancements, AI developments present novel challenges beyond existing ethical and legal frameworks. In addition to grasping the technical aspects of AI, understanding its ethical and legal dimensions is vital for healthcare professionals and oncologists. This comprehension enables them to anticipate, prepare for, or propose solutions to potential issues in this domain. The primary ethical and legal concerns associated with AI applications include black-box algorithms, accountability, bias, transferability, trust, legality, legal risk, liability, data security, and autonomy. This review addresses these critical issues based on existing literature.

Keywords: Artificial intelligence; ethics; legal issues; oncology

The evolution of tools in human life has sparked significant changes, accompanied by emerging social influences and related concerns. These concerns sometimes impede progress, and inadequate regulations may lead to significant abuses. Rational evaluations and predictions regarding the ethical and legal frameworks of each development affecting individual and social life can mitigate conservative-blocking prejudices and prevent abuses in unregulated environments.[1]

The unmonitored utilization of artificial intelligence (AI) technologies in healthcare services carries the potential for adverse outcomes affecting patients, healthcare professionals, and institutions. In a previous issue of JOS, technical insights into understanding AI were provided.[2] This article will investigate fundamental ethical and legal considerations. To facilitate comprehension of the topics at hand, emphasis will be placed on the concepts of black box and explainable AI.

AI ETHICS AND ISSUES

AI systems possess socio-technical features, including stakeholders, institutions, cultures, and their development and usage contexts. Given the involvement of diverse actors like producers, users, managers, policymakers, and impacted parties, managing their relationships and the regulating methods and processes is crucial. Moreover, the technology development phase entails numerous decisions by individuals, designers, developers, and stakeholders, entailing social, legal, or ethical ramifications. Particularly in the design stage, decisions on instructions, principles, and strategies amid various options lacking clear truths are prevalent. Managing this decision-making process within ethical frameworks, transparently reporting, and enabling auditing is imperative.[3]

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Ethically, AI is defined as "the computational process of making and evaluating choices in a way that aligns with social, ethical, and legal requisites." Within this domain, addressing people's ethical concerns regarding AI applications necessitates a set of moral directives similar to human decision-making processes.[4,5] These directives include principles rooted in universally accepted standards of morality to steer ethical conduct in the development and utilization of AI-based technologies. In domains like healthcare, transparency, justice, non-maleficence, responsibility, accountability, privacy, autonomy, and trust are pivotal principles (Figure 1).[6] Enhancing comprehension of these AI application domains requires grasping explainable and interpretable black-box applications (Figure 2).

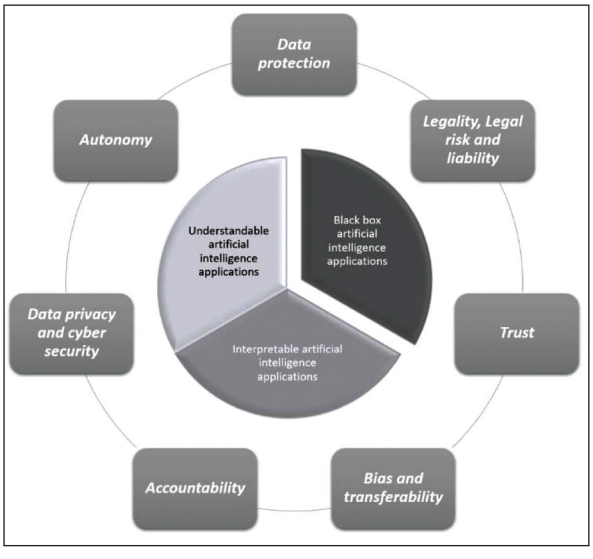

FIGURE 1: Schematization of the legal and ethical issues identified regarding artificial intelligence applications.

BLACK-BOX

Explainable AI refers to AI systems whose operational processes are easily understandable by humans, allowing for the tracing of how specific outputs are attained. The primary goal is to ensure transparency regarding the use of algorithms, a notion widely embraced by data scientists and engineers as a fundamental aspect of fostering trust. At its core, explainable AI, a key tenet of AI ethics, emphasizes that AI technologies should not operate as opaque models inaccessible for human observation, comprehension, and interpretation.[6,7] It is pertinent to differentiate between interpretable AI and explainable AI from a technical standpoint.

Interpretable AI applications render decisions that humans can grasp without supplementary information. In essence, given sufficient time and data, humans can replicate the decision-making steps taken by interpretable AI. Conversely, in explainable AI applications, understanding the AI decision-making process necessitates accessible additional information. Theoretically, even with unlimited data or time, humans cannot replicate the decision-making process of explainable AI applications without supplementary information or explanation.[7-9]

AI applications known as black-box or closed-box stand in contrast to explainable AI applications. These applications belong to a category whose decision-making process is too intricate to be readily comprehended by humans. The numerous and complex non-linear relationships between inputs and outputs in deep learning algorithms and deep neural

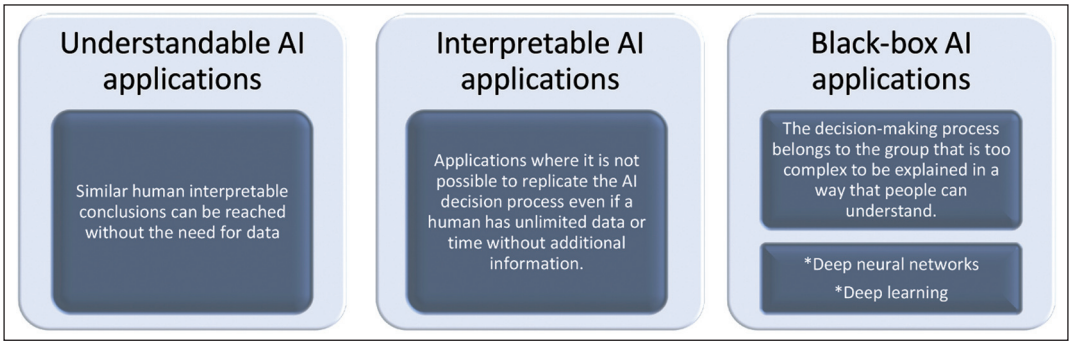

FIGURE 2: Classification of AI applications according to their understandability and interpretability.
AI: Artificial intelligence.

networks complicate the identification of features or interactions that lead to specific outcomes.[7] Occasionally, the operational details of such an AI application are kept confidential to protect intellectual property rights. Yet, when the operational mechanisms of an AI application remain obscure, it becomes challenging to pinpoint the origins of errors or biases and address ethical concerns, such as assigning responsibility. Conversely, research indicates that transparency, explainability, and interpretability in an AI application enhance trust in the system and the reliability of its outputs.[6,8] In this context, the relevance of certain strategies emerges, such as designing and utilizing algorithms that are comprehensible to humans, incorporating human feedback into the design, application, and decision-making processes, and developing tools that provide visual explanations. Tools like Local Interpretable Model-Agnostic Explanations (LIME), SHapley Additive exPlanations (SHAP), Explain Like I am Five (ELI5), and Descriptive mAchine Learning EXplanations (DALEX) have been developed to counteract black-box AI and promote responsible AI.[9]

The framework of explainable AI facilitates a responsible AI by ensuring transparency and accountability in complex AI technology decisions.[6,10] This framework allows a system with sufficient explanatory capability to trade a small degree of additional explainability for greater model accuracy, thereby aiding organizations in responsible operation.

Explainability is crucial for business groups utilizing this technology. For instance, it is vital for physicians to understand the capabilities and limitations of an AI tool they use and to trust its predictions. Moreover, explainability can unveil significant insights. Neural networks are notably effective at detecting patterns in data, suggesting that if the learning algorithms of these networks are decipherable, they can reveal valuable insights from vast datasets that would otherwise be unattainable by humans.[9-11]

A common obstacle to user and beneficiary trust is the ignorance or misunderstanding of how an AI application functions. The complexity, non-linearity, and sheer scale of inputs in AI applications can render an AI algorithm so complex that even its creators cannot elucidate the decision-making process.[6] This complexity stems from the use of non-linear functions for output generation, the inclusion of millions of variables, especially in deep learning, and challenges in visualizing applications of AI in fields like imaging, audio, or video. To address these challenges, researchers are endeavoring to create AI systems capable of generating accessible and comprehensible explanations for their decision-making processes and visualizing the data and features used in these processes.[10-12]

ACCOUNTABILITY

The issue of accountability in AI applications originates with the developers and managers of the systems. It is proposed that these individuals should bear responsibility for the impacts and consequences of AI technologies on both stakeholders and society.[3] Recognizing the potential for unintended effects or consequences is crucial for establishing accountability. In the healthcare sector, physicians or institutional managers may be unaware of the risks associated with the AI algorithms they employ. This lack of awareness creates an unexplained responsibility gap, rendering users susceptible to unforeseen consequences.[12]

The perceived accountability of AI technologies is also linked to the requirement that algorithms should rationalize users' thoughts or actions. Implementing an audit system to assess the positive or negative outcomes of AI technologies in healthcare could help both patients and physicians view these technologies as accountable. Particularly, when physicians, as users, acknowledge the system's accountability, they tend to scrutinize the data more thoroughly, seek evidence, and provide more robust justifications for their decisions. This approach may help mitigate negative outcomes in the use of AI and enhance user satisfaction.[12]

Research highlights responsibility, auditability, and fairness as three critical components of accountability.[3] Effective accountability entails distributing responsibility among stakeholders to ensure the reliability of AI systems. At this point, it is essential to differentiate between moral and legal responsibility. Although these responsibilities are closely linked, each can exist independently of the other. As the development and utilization of AI-based technologies

expand, efforts should be directed towards aligning their performance with societal standards and values. The imperative for accountability stems from the employment of algorithmic decisions in high-risk applications.[1,6,12]

Current accountability and safety practices for technologies employed in global health have yet to be revised to consider the potential harms of decisions made by AI-based technology. In the physician-patient relationship, it is expected that physicians will employ AI technologies but will rely on their expertise and judgement to make the final decisions. Patients implicitly trust that their physicians will perform their duties professionally. However, this trust does not extend to decisions made by a computer program. In this context, the accountability of AI applications for their users may offer various possibilities for action.[1,5,13]

BIAS AND TRANSFERABILITY

One debate concerning AI technologies centers on the possibility that biases inherent in the data sources or during the design phase might influence the outputs. Typically, AI technologies are anticipated to address issues like bias or prejudice originating from human input.[14,15] Yet, the involvement of humans in forming AI algorithms has left these expectations partly unmet. Studies have shown that biases of the individuals creating algorithms can manifest in clinical recommendation outputs. Consequently, AI technologies, despite being perceived as reliable, may not be mathematically or value-neutral.[15,16]

There is a significant ethical risk that developers of AI algorithms, such as programmers, technology firms, or healthcare administrators, might design these algorithms for personal gain. For instance, algorithms designed by a notable automobile manufacturer to pass emission tests by underestimating nitrogen oxide emissions illustrate this risk. The potential for similar scenarios in healthcare raises concerns.[14]

The ongoing learning capability of AI technologies also means that biased data from initial phases might impact subsequent phases. It is uncertain whether AI technology producers or healthcare managers prioritize ethical medical values, patient interests, or merely economic outcomes, which might lead to unequal treatment recommendations.[15]

Transferability is another critical issue in AI technologies. Transferring algorithms that utilize large data sets to different systems is challenging. An algorithm trained, learned, and tested with specific data in one system might not perform well in another. Therefore, AI systems require meticulous testing and evaluation in each new context before implementation.[14]

Biases from AI developers may unintentionally carry over to the software. Although AI technologies have the technical potential to mitigate human-specific biases and mistakes, studies indicate that these technologies might reflect and even amplify biases present in the training data. There are ongoing debates about whether AI technologies could cause discrimination or errors in handling legally protected personal data like gender, ethnicity, race, disability, or age.[17] Moreover, training data that do not adequately represent broader populations and are regionally limited can lead to incorrect outcomes.[18]

Machine learning (ML) systems within AI technologies have the ability to analyze vast datasets and replicate desired outcomes by restructuring existing data. However, this process can yield inaccurate results due to the representativeness of the data, particularly within health services and specific demographic groups. For example, the ongoing Framingham Heart Study, initiated by the American National Heart, Lung, and Blood Institute in 1948, aims to comprehend the origins of heart and circulatory ailments by longitudinally tracking the health records of individuals within a delimited region across generations. Attempts to predict heart disease risks among black populations based on this study led to erroneous predictions, with values ranging from excessively high to exceptionally low.[3] This scenario exemplifies how an algorithm designed to forecast outcomes from genetic data may not consistently produce precise results across all populations. Furthermore, the benefits of AI technologies in healthcare may be unevenly distributed in societies where data collection or processing poses challenges. This disparity often stems from the underrepresentation of medically uncommon populations, such as black,

Asian, minority ethnic groups, or individuals with rare diseases, in clinical trials and research data.[19] Efforts are underway to address this issue through ethical AI development initiatives. For instance, the MIT Computer Science and Artificial Intelligence Laboratory (CSAIL) has devised an AI tool capable of predicting breast cancer occurrences up to five years in advance, thereby mitigating algorithmic biases. This model employs a deep learning approach trained on mammography data and patient records from over 60,000 individuals at Massachusetts General Hospital (MGH). Studies evaluating CSAIL and MGH's model revealed discrepancies in similar projects, where accuracy in predicting breast cancer was achieved for white patients but proved inadequate for black patients. However, MIT's AI model demonstrated equal accuracy in predicting breast cancer across both white and black racial groups. MIT emphasized that these mammogram algorithm studies aim to better assess health risks among minorities, who are often underrepresented in deep learning algorithm development, and to facilitate early detection, thereby averting delayed diagnoses.[20,21]

TRUST

Trust is a crucial factor that influences clinicians' adoption and utilization of AI, shaping the evolving interactions between humans and AI technologies.[5] While some AI technologies exhibit lower risks of biased behavior, issues related to trust and empathy remain. In this context, the relationship between trust in AI and trust in the service provider is also influential. The rapid development of AI compared to other technologies complicates the definition of its processes and functionalities. Moreover, there are growing concerns that AI systems, through continuous training, might achieve capabilities surpassing human abilities.[1,21] Understanding the dynamics of trust between AI and humans is especially vital in fields like healthcare, where human lives are involved. Indeed, swift advancements in AI are expected to do much more than merely automate routine, well-defined tasks.[12,16]

Currently, the tendency of physicians to use AI technologies as decision-making aids may lead to increased dependency over the long term; therefore, a trust-based relationship with AI needs adjustment. Additionally, in terms of fostering trust in AI technologies, physicians must reassess the results in each case and recognize potential errors. Developers of AI technologies should also integrate mechanisms to correct such risks or inaccuracies as part of their responsibilities. In the "Ethics guidelines for trustworthy AI" of the European Union (EU), it is stated that the system should be safe and equipped.[22]

LEGALITY, LEGAL RISK, AND RESPONSIBILITY

One of the most fundamental approaches to AI ethics involves ensuring that technologies are designed, developed, and implemented in compliance with the law. Legal compliance provides a clear and objective standard for judging and evaluating ethics.[5,16] A primary consideration is whether new laws specific to AI in healthcare are necessary, or if existing laws should be updated and enforced. Additionally, it is critical to assess whether current legislation adequately supports options such as self-regulation or a standardized judicial review body, or if it contains ambiguities and discrepancies. This issue is increasingly pertinent across all fields of AI technology. Debates are also ongoing about whether AI systems should be granted artificial personhood and how legal responsibility should be addressed in the context of AI systems.[22-25]

It is apparent that standards for regulation, an explainable trial process, and clear accountability for AI-induced damages are underdeveloped in the healthcare sector.[1] Although some countries have enacted laws like the "General Data Protection Regulation (GDPR)" for health data protection, more effort is required, particularly concerning privacy and data protection.[21]

Clarifying how to address regulatory deficiencies in the use of AI in healthcare and life sciences remains challenging. Laws such as tort action law, product liability law, and privacy law are typically applied only after harm has occurred. The necessary action is to develop a new, purposeful set of prospective guidelines and regulatory frameworks. Taking a proactive approach to define and characterize legal issues clearly and establish an appropriate framework is also crucial. Once technologies are developed, adapting existing laws becomes challenging. AI designers and developers must, therefore, collaborate to

ensure necessary protections and support appropriate innovations.[21] There are indications that AI technologies could enhance reliability and cost-effectiveness in cancer screening, potentially allowing AI-based systems to interpret computed tomography or magnetic resonance imaging scans and automatically deliver results to patients via an online portal. This approach could streamline operations for healthcare organizations and patients, challenging the traditional model where physicians are directly responsible for patient care.[21] When physicians are involved in patient treatment, they confront both ethical and legal dilemmas, particularly when diagnostic decisions are based on AI inputs that are not fully explainable. It remains unclear who should bear responsibility for decisions that cannot be fully controlled or explained. The interests of AI technology developers may not align with those of healthcare professionals, potentially creating a responsibility gap that could undermine patient trust in physicians and healthcare institutions and alter the roles of physicians. Using AI might afford more time for physicians to interact with patients, but if medical decisions are autonomously guided by AI, scenarios may arise that exceed the explanatory capacity of physicians.[26]

LOSS OF SKILLS

The impact of AI technologies on physicians' skills remains a contentious issue. It is posited that the routine use of ML and deep learning algorithms might lead to a decline in the skills of healthcare professionals due to infrequent use. For instance, AI's ability to interpret tomography and filter out normal cases may allow physicians to see more patients, particularly focusing on those with cancer, potentially diminishing their familiarity with normal findings over time. Additionally, technological bias can lead physicians to endorse AI decisions without sufficient scrutiny, even when incorrect, posing significant risks to healthcare and the life sciences.[26,27] In oncology, where critical decisions often result from discussions between patients and physicians, the challenge lies in how to integrate AI decisions that are neither adequately evaluated nor easily interpretable. A study indicated that although AI identified errors in cases previously examined by physicians, the rate of correct diagnoses actually decreased, highlighting the dangers of over-automation in the healthcare system.[27,28] Furthermore, traditional concepts of medical liability are challenged by AI, and despite existing cognitive biases, there is a pressing need for education about automation bias among healthcare professionals.[26,28]

DATA PROTECTION

Data protection laws play a crucial role in the deployment of AI technologies in healthcare, especially in relation to patient privacy. Significant gaps exist in the current healthcare environment. While insurance providers, institutional administrators, and healthcare providers are covered by these laws, many technology companies like Google Inc. (US), IBM Watson Inc. (US), and Apple Inc. (US), which have heavily invested in AI for healthcare and life sciences, are not subject to these regulations. This discrepancy highlights the inadequacy of existing laws concerning the protection of patients' health-related data, indicating a need for comprehensive regulation.[1,18,29]

The ethical debate surrounding the sharing of image-based data in the healthcare system is intense. The lifecycle of this data-including its collection, storage, sharing, and use in clinical decision-making-raises numerous ethical concerns. Research has underscored the ethical issues related to medical image analysis, from data collection through algorithm modeling to validation.[6] It is imperative that those with access to clinical image data use it in ways that both protect patient privacy and benefit future patients. Some studies emphasize that digital competencies should be included in medical education to increase medical students' awareness about the ethical problems originating from AI technologies.[18] On the other hand, healthcare system managers, healthcare professionals, experts, and developers should recognize that AI-assisted medical care should be assessed not only for its technical merits but also from ethical, legal, and social perspectives. This necessitates robust collaboration among all stakeholders, including physicians, patients, and developers, from the design to the implementation and oversight stages of AI technologies.[17]

Transparency in the use of patient data is also vital. The fair and transparent collection of patient data, clear accountability for data management, and

the trust patients have in healthcare institutions are crucial considerations. The level of consent given by patients for data collection correlates directly with their trust in how their health information will be used. Additionally, patient acceptance of AI technologies is linked to their trust in the managing organization. Despite the technical complexity of AI, patients often desire insight into the algorithms' inner workings-known as the "black-box"-and clarity on how their data is utilized.[14,29] The GDPR of the EU, effective from 2016 and mandatory for compliance by 2018, influences both EU member states and non-EU countries. Many countries, including Türkiye, are developing their own data protection laws inspired by the GDPR. Examples of such laws include the Information Commissioner's Office in the UK, which aligns with the GDPR post-Brexit, the Personal Information Protection Law enacted in China in 2021, various privacy and data security laws at the state level in the USA that align with federal laws, the Federal Law on the Protection of Personal Data Held by Private Parties in Mexico (2010), and the Personal Data Protection Law in Türkiye (2016).[1,29,30]

DATA PRIVACY AND CYBER SECURITY

The operation of AI systems is heavily dependent on large datasets, which raises significant privacy and security concerns regarding data collection and sharing. The breadth of potential positive and negative impacts of AI technologies in healthcare and the life sciences is challenging to foresee. As these technologies advance, numerous issues, including physicians' rights, autonomy, responsibilities, and data privacy, remain unresolved.[30,31] The process of organizing and sharing patients' personal information across various databases requires that technology developers adhere to privacy regulations, which may impede AI development. Given that the ethical and legal frameworks for analyzing, sharing, and using data are not sufficiently defined, patients' personal values are often overlooked in algorithmic decision-making processes. Thus, the establishment of rules and norms for AI technologies concerning ethics, laws, and values requires further assessment.[17,18,30]

From a privacy standpoint, patients' data represent some of their most confidential information. The principles of autonomy, individual identity, and well-being are tied to privacy, and it is ethically imperative to respect this privacy and fulfill the requirements for obtaining patients' consent.[18,31,32]

AI technologies necessitate access to large volumes of quality data for functionality, making patient consent for data use and protection critically important. This issue is compounded by technology companies such as Apple, IBM, Amazon.com, Inc., and Google investing in healthcare services, alongside the rise of startups that develop new technologies for screening and diagnosis. Moreover, some countries have permitted technology developers to use healthcare data without individual consent. For instance, Italy has granted IBM Watson exclusive rights to use its citizens' health records, including genomic data, anonymously.[21,32] Similarly, the University of Chicago Medical Center's partnership with Google to develop a predictive AI-based electronic health record (EHR) led to a lawsuit against both entities for alleged misuse of patient data. A significant challenge arises from Google's approach to redefining EHR data by merging it with their extensive personalized and geolocated datasets, complicating the integration of consent mechanisms for opting in or out of such extensive data use in an active environment.[21,33]

In oncology, a field characterized by dynamic advancements in screening, diagnosis, and treatment, access to big data is invaluable. However, the desire to use this critical resource can lead to regulatory breaches, potentially inviting misuse by researchers. Consequently, ensuring data privacy and maintaining accurate data integrity are pivotal for the ethical and legal integrity of AI applications in healthcare.

AUTONOMY

Patient Autonomy İn The Decision-Making Process

AI applications in healthcare are designed to enable patients to evaluate their symptoms and manage their care independently. These technologies, particularly those aimed at assisting patients with chronic diseases or disabilities, have the potential to enhance their quality of life and independence.[1] However, promoting patient autonomy may pose significant challenges in cancer diagnosis and treatment, where incorrect or de-

layed decisions can be life-threatening. Therefore, it is crucial to optimize the balance between patient autonomy and the insights of experienced physicians.[1,32]

Understandability And Patient Approval Of AI Applications

AI technologies have the potential to significantly improve the efficiency and quality of healthcare services, yet they also bring challenges concerning privacy, data protection, autonomy, and informed consent.[18] Informed consent involves a patient's voluntary choice to accept or decline a particular medical procedure, made freely and without any external influence.[31,32] This concept is ethically founded on the principle of respect for autonomy, affirming a patient's right to make decisions about their health independently. As such, AI should function as an auxiliary tool in medical care, requiring comprehensive informed consent that clearly outlines the process of its application. Healthcare professionals must promote and facilitate patients' abilities to make informed choices. A potential concern is whether patients fully comprehend the details when consenting to the use of AI. It is the duty of physicians to provide a detailed explanation about the implementation of AI in diagnostics, treatment, or any other medical service to ensure patients can make knowledgeable and autonomous decisions. There is also the risk that AI systems may be designed with a commercial bias, protecting the interests of developers, corporate executives, or insurers rather than the patients. To prevent such issues from affecting patient autonomy and transparency adversely, it is vital to uphold the patient's right to be informed about how extensively AI is used in the healthcare services they receive, its limitations, and their right to opt out of its use.[30-32]

Physician Autonomy

As AI technologies become more prevalent in healthcare, they may alter the required skill sets of healthcare professionals, necessitating adjustments in medical education.[18,32,33] Concurrently, an increased dependence on ML for decision-making could undermine physicians' professional autonomy, potentially diminishing their perceived roles and ethical obligations towards patients. This shift in decision-making to AI could reduce the direct involvement of physicians, thereby impacting their professional identity. Moreover, reliance on AI could lead to complications if the algorithms produce erroneous results that adversely affect patient treatment, potentially exposing physicians to malpractice charges. Malpractice involves harm caused by a physician's ignorance, negligence, or error, under the assumption that the physician, as the expert, is wholly accountable for the diagnosis, treatment, and medical care decisions. Typically, the physician is held primarily responsible for any harm resulting from incorrect diagnostic and therapeutic practices that deviate from standard care. However, this framework becomes doubtful when decisions are based on faulty AI algorithm outputs. If AI algorithms are deemed more accurate than average physician judgment, following their recommendations might be considered the statistically safer choice. In such cases, adherence to AI advice may not constitute sufficient grounds for malpractice accusations.[34] As AI continues to evolve and becomes more integrated into medical decision-making, the conventional definition of malpractice may need to be reevaluated to address these new complexities.

CONCLUSION

The substantial potential of AI technologies in healthcare brings both opportunities and challenges, including the promise of advancements in diagnosis, treatment, and medical care, alongside various ethical and legal concerns. To address these issues effectively, it is essential to thoroughly understand AI technologies and establish robust legal and ethical frameworks. Organizations must also tailor their own regulations, taking into account the personal attitudes of both users and those impacted by these technologies. Despite various strategies, significant gaps remain that need to be recognized, understood, and managed in this swiftly evolving field (Figure 3).

Ethical concerns such as accountability, trust, legality, autonomy, and data protection remain unresolved for both patients and physicians. A key issue is the potential for developers to impose their personal biases onto AI algorithms. Moreover, it is unclear who is accountable when AI algorithms generate incorrect results. Additionally, AI technologies pose risks to health records, patient privacy, and the abilities of the

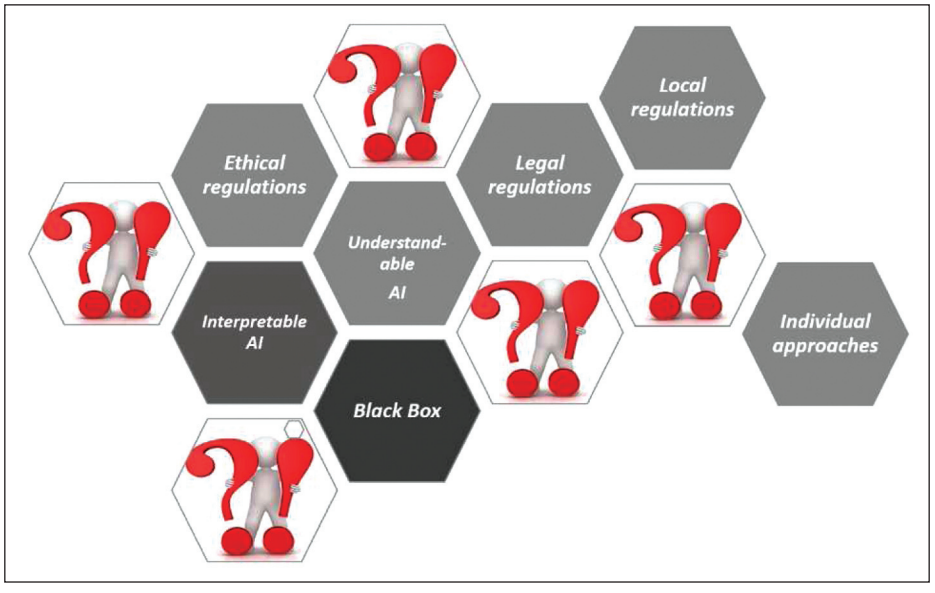

FIGURE 3: Schematization of attitudes toward the application of artificial intelligence technologies.

workforce involved in medical coding or data management.[5,18] Physicians must comprehend these ethical challenges posed by AI technologies and sustain trust with patients. It is also essential to ensure that the training data used by algorithms fairly represent all patients, irrespective of gender, race, or physical characteristics, and to clarify how this data relates to specific patients to avoid biases.

To address ethical concerns, it is essential to establish ethical standards for utilizing AI at both micro and macro levels. Priority should be given to human beings in all scenarios. Healthcare professionals must be knowledgeable about the fundamental operational norms of AI technologies and should be capable of intervening and collaborating for the patient's welfare as required.

AI companies are obligated to inform society about potential risks, as education and awareness are crucial aspects of responsibility. Furthermore, within the existing legal framework for AI technologies, ongoing discussions pertain to the assignment of responsibility. Proper management of the process of determining and distributing responsibilities is essential for the effective utilization of AI.[18]

Ensuring that the data used to train AI algorithms are unbiased and representative of the general population is particularly crucial in medical care. Additionally, providing patients with explanations regarding the utilization and benefits of their data can foster a positive perception of AI technologies, potentially enhancing their acceptance.

AI companies should practice transparency regarding the data they utilize and acknowledge the potential for algorithmic errors. Establishing trust among all stakeholders is paramount for the successful implementation of AI technologies in healthcare and life sciences. Introducing additional layers to ML software, thereby increasing transparency, requires extra efforts to uphold ethical principles such as transparency and accountability. International agreements and ethical standards are necessary to mitigate these risks and ensure the development and utilization of AI systems that are transparent, accountable, and beneficial to humanity, while also adhering to legal and ethical values. Furthermore, implementing ethical guidelines for health institutions, closely monitoring the process, and regularly assessing goal achievement will mitigate the risk of unforeseen outcomes.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

All authors contributed equally while this study preparing.

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