



Regulating Artificial Intelligence Beyond the Limits of Traditional Legal Frameworks

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ABSTRACT:-

These computer systems, which are mainly involved in a great deal of data processing, are becoming an everyday system applicable in hospitals, banks, and governmental offices for assistance in day-to-day decision-making. As much as these systems can be useful in their operations, issues arise when guidelines on the usage and oversight therein are not set. In these situations, decisions can appear unfair, it may be hard to understand why they were made, personal information may be mishandled, and responsibility for mistakes may not be clear.. This work stresses the need for clear and practical rules to guide the use of these systems so that they are applied in a responsible and ethical manner. It considers how existing laws, commonly followed guidelines, and basic technical controls influence how such systems are developed and used in real settings, with emphasis on fair treatment, understandable decisions, protection of personal information, and the continued involvement of humans in important decision-making.

Keywords:

Regulated artificial intelligence, data-driven decision systems, algorithmic governance, fairness in decision-making, transparency and explainability, accountability, data protection and privacy, human-in-the-loop systems, ethical AI deployment, regulatory frameworks

1.INTRODUCTION

Computer-based systems that depend on large volumes of data have become a routine part of decision-making in everyday life. Government agencies rely on them to deliver public services, monitor operations, and support administrative choices. In the medical industry, these types of systems exist to help doctors in terms of planning the treatment or diagnostic process for their patients. Banks and financial institutions implement this technology for the purpose of risk analysis and suspected cases of fraud. Adoption of this technology primarily occurs for increase efficiency and faster results.

2. Literature Review

Sr. No	Author(s)	Year	Focus Area	Key Contribution (Rewritten Conceptually)
1	Catherine M. Sharkey	2025	Government use of AI	Explains how governments’ own deployment of AI systems helps regulators identify risks, market gaps, and appropriate timing for regulatory intervention.
2	Brian Judge et al.	2024	Regulatory models	Demonstrates why traditional legal regulation struggles with opaque AI models and suggests stronger institutional oversight mechanisms.
3	Miltiadis D. Lytras & Andreea C. Șerban	2025	Social impact	Examines AI regulation across nations and highlights social challenges such as workforce disruption, inequality, and ethical risks.
4	Andrew Stranieri & Sun Zhaohao	2022	Process-based regulation	Proposes a structured and deliberative regulatory process to replace fragmented and reactive AI governance approaches.
5	Ken Huang et al.	2024	Global regulation	Argues that effective AI regulation requires coordinated international governance rather than isolated national policies.
6	Avinash Pamisetty	2025	Regulated industries	Focuses on compliance, fairness, and transparency challenges when AI systems are deployed in legally sensitive sectors.
7	Maria Cuellar & Aziz Z. Huq	2022	AI as regulator	Explores the idea of using AI within regulatory systems and discusses the risks of legitimacy, bias, and accountability.
8	Patricia G. R. Almeida et al.	2021	Governance frameworks	Develops an integrated framework covering all stages of public policy for regulating AI systems responsibly.
9	Luciano Floridi et al.	2018	Ethical foundations	Introduces core ethical principles for building AI systems that promote human welfare and societal good.
10	Karen Yeung	2019	Algorithmic decision-making	Analyzes legal and social concerns arising from automated decisions and stresses the need for accountability mechanisms.
11	Urs Gasser & Virgilio Almeida	2017	AI governance models	Presents a layered governance model combining legal, technical, and social controls for AI oversight.
12	Reuben Binns	2018	Algorithmic fairness	Applies concepts from political philosophy to explain fairness challenges in machine-learning systems.
13	Brent Mittelstadt et al.	2016	Ethics of algorithms	Identifies ethical risks related to transparency, responsibility, and harm caused by algorithmic systems.
14	Jobin, Ienca & Vayena	2019	Ethics guidelines	Reviews global AI ethics guidelines and highlights common principles and gaps in enforcement.

15	Iyad Rahwan et al.	2019	Machine behaviour	Treats AI systems as behavioral actors and argues for studying their collective social impact.
16	OECD	2019	Policy principles	Establishes high-level principles for trustworthy AI, focusing on fairness, transparency, and accountability.
17	European Commission	2021	EU AI Act	Proposes a risk-based regulatory framework that classifies AI systems according to potential harm.
18	UNESCO	2021	Global ethics	Provides a universal ethical framework emphasizing human rights and societal values in AI governance.
19	Ryan Calo	2017	AI policy roadmap	Outlines policy directions for addressing long-term risks and governance challenges of AI technologies.
20	Kroll et al.	2017	Accountable algorithms	Introduces technical and legal tools to ensure algorithmic accountability and auditability.

Despite the advantages that come with data-driven systems, there are a lot of concerns when these systems are implemented without guidelines and regulation. The results or outcomes of data-driven systems may not always be considered fair by those affected by the outcome because the affected individuals cannot clearly understand the process by which the outcome was arrived at. This process or reasoning behind the outcome also cannot be questioned because it is opaque and hidden away. The use of a lot of personal and sensitive information also raises serious questions and concerns about privacy and data regulation policies because in the event of errors and harm being caused, it becomes difficult to determine where the blame actually lies – the designers or the system and technology itself.

However, as the power of these systems keeps increasing, a need for regulation becomes apparent. This call for regulation is not meant to stifle technological development but rather to help it develop in a manner well aligned with the desired outcomes of society, otherwise, future advanced data systems will end up creating inequalities or rather will be used for destructive means.

Different methods of dealing with these technologies have developed over various regions and industries. These cover ethics, laws, and standards for compliance. Nevertheless, these methods can sometimes be piecemeal and hard to enforce. Technological advancements are now proceeding at a quick pace, thereby leading to a gap in the speed at which technologies can advance and the capacity of regulations to keep up with these advancements.

It's an iterative analysis concerning the issue of "regulated" artificial intelligence in relation to finding the solutions. Solutions are analyzed in relation to finding them through the use of legal frameworks and technological tools independently. It addresses how such tools can be used altogether and effectively in order to establish governance. The issue of "regulated" artificial intelligence in relation to finding the solutions in this case relates to the application of diverse tools; in other words, it does not favor the use of just any facilitated mechanism. The key characteristics of the issue of "regulated" artificial intelligence are highlighted in relation to fairness in the outcome, transparency in the process of decision-making, personal data

protection, and human control in relation to significant social decision-making. Conversely, there are challenges involved in regulating cutting edge technology. Excessive regulation could hamper innovation and practical utilization of such technology. This is in a bid to assist in clarifying the need to control these systems using regulation, the effective application of regulation in regulating these systems, and the type of regulation necessary in these systems ultimately to assist in developing

2.1.Related work:

Governmental use of artificial intelligence has played an important role in shaping regulatory thinking. Sharkey explains that when public agencies act as users of AI, they gain practical insight into system risks, market failures, and governance gaps. These experiences help regulators decide when intervention is necessary and how rules can be designed realistically rather than theoretically.[1]

What the authors notice is that AI systems are difficult to anticipate and audit in their behavior, as in most cases, the system learns its desired actions from data rather than being programmed to explicitly do them. The authors would also like to have stronger regulatory instruments in place such as licensing and verification. [2]

Lytras and Şerban's study was focused on the impacts of artificial intelligence on society, whether in education, health, or within the financial sector. "That could happen," Lytras said, "because there are no rules regarding the usage of artificial intelligence.[3]

Stranieri and Zhaohao have suggested the following process-oriented approach for the regulation of AI systems. Instead of the formulation of ad-hoc regulations, the authors propose the use of structured decision-making processes involving deliberative groups. The process helps in the responsible and explainable development of AI systems and is aligned with the values of society.[4]

In the analysis of the regulation of AI by Huang, Joshi, and Dun, the regulation of AI is viewed through the perspective of global governance. These scholars suggest that the fragmented approach to regulation at the national level would not work well for such technology as AI due to its cross-boundary nature. [5]

Pamisetty's work looks at the application of AI in the highly regulated industry where a choice has legal and monetary implications. The need for a choice between AI and human judgment in terms of reliability and dependability has also been included in the work. A lack of clarity in the application of AI governance guidelines has also been talked about by the researcher. [6]

Cuéllar and Huq present the notion of a regulation with intelligent artificiality, where AI tools are used to implement or support regulatory processes. They discuss benefits such as efficiency and accessibility, but also risks, for instance, on transparency and democratic accountability. [7]

Almeida et al. further contribute by highlighting an inclusive framework on regulation of AI in terms of governance throughout the formulation process. In addition, Almeida et al. explain the inclusion of ethical aspects such as fairness and sustainability in the regulation process. This framework is indeed a pointer or guide to lawmakers and researchers. [8]

In this regard, Cardozo highlights the trends in the regulation of AI across the world, focusing on the main economic powers like the EU, China, and the USA. Indeed, the issue remains relevant despite the vast differences in the policies to be enforced. The issue at hand is the issue of universal consistency. [9]

Floridi et al. have discussed the essential tenets of ethical AI use: beneficence, non-maleficence, autonomy, and justice for AI development. There has been extensive reliance on their work regarding the inclusion of ethical bases in the legislation of AI. [10]

The European Commission's AI Act has been one of the widest-ranging regulative efforts to date. The proposed regulation sets up a system of risk classification for AI systems. "High-risk" systems are required to adhere to stricter principles regarding transparency, data, and human control. [11]

The OECD guidelines released for handling artificial intelligence emphasized the need for trust, responsibility, and a human-centered approach. These guidelines have been applicable to both private and public institutions. The guidelines are not binding, but they have managed to shape the way the international community treats this issue. [12]

The specific concern here is the promotion of the human right and diversity in culture through the UNESCO Recommendation on the Ethics of AI. The need for inclusiveness in the use of AI technologies has been emphasized by UNESCO. The next passage is a source for ethical advice on AI matters specifically targeting developing countries. [13]

The "IEEE Ethically Aligned Design" model is one of the initiatives taken by IEEE to meet the technical as well as the ethics-related challenges that have arisen in the development of AI. This new proposed model underlines ethics not only being embedded in the designing process of the development of the AI, but also during the development process. [14]

Gasser & Almeida discussed the issue of a trade-off between innovation and regulatory issues in AI management. The authors are deeply convinced that too much rigidity in rules creates barriers for technological development, but under-regulation also leads to increase risks for society. According to the authors, adaptive regulatory approaches should be applied.

Accountability in algorithmic decision-making is explored in Kroll et al. The authors discuss mechanisms like "auditing and explanation rights." The authors' work was used to help inform discussions about legal liability in AI systems. [16]

Raji et al. make a case for the importance of the audit algorithmic method per se. The authors indicate that independent testing of the audits for possible bias is needed with regard to the results of the audit. The study demonstrates how audits can be utilized in underpinning rules enforcement.[17] Binns focuses his research on fairness in machine learning from a regulatory perspective. The matter revolves around disparities in results which could be achieved based on a different fairness definition. [18]

Veale and Borgesius examine the connection between artificial intelligence regulation and data protection law. The authors argue that data governance is an essential consideration with regards to artificial intelligence accountability. In their study, it was found that there is a relationship between artificial intelligence regulation and privacy laws. [19] Russell's final point is that the long-term control of AI needs to concentrate on safety and values. It is a requirement to control AI early compared to controlling it after the fact. The point encourages a proactive approach towards the regulation of AI.[20]

3.METHODOLOGY:

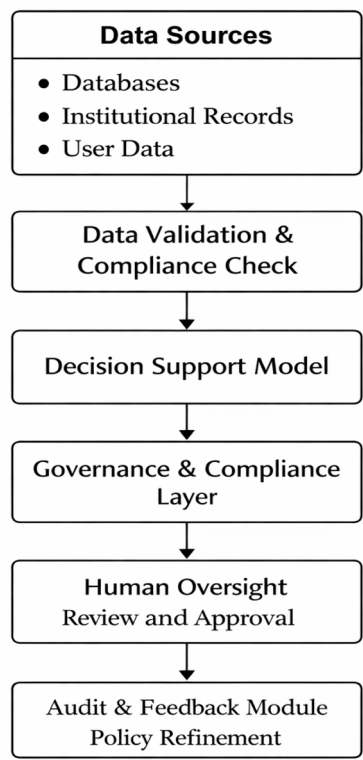


Fig. 1. Controlled AI Governance Architecture

The controlled AI system provides a systematic approach on how to manage data systems that follow certain rules and are closely observed. The system begins its process with data inputs that include databases, organizational files, and user-generated input that plays a critical role in the system but does not have a role in the decisions that are made.

The data then proceeds to a data validation and compliance check phase prior to data processing. The function of this module is to test the effectiveness and relevancy of data. The data has the potential to be incomplete, biased, or invalid. It is feasible to filter this data and ensure there are no chances of biased and incorrect outcomes.

The verified data is then passed on to the decision support model. The model tracks all the trends and correlations existing in the data to arrive at predictions or suggestions. Worth mentioning is that this system should prove to be a helpful one within the decision-making process.

The outputs are then evaluated in terms of governance and compliance. The governance and compliance stage ensures that all the outputs generated by the model meet the legal and organizational standards. If there are violations identified in some of the outputs, those violations are pointed out instead of automatically accepting the outputs..

Humans have an integral role in this process. The decisions that seem problematic are assessed by specialists or assigned individuals, accepting valid answers and even taking corrective measures for necessary corrections. Secondly, the aim of including the audit and feedback module would be monitoring decisions and system behavior, which serve as feedback for enhancing rules and models.

3.1. Algorithm :-

- Turn on
- Gather the input data using approved sources.
- Conduct data validation for its accuracy, completeness, and relevancy.
- Ensure that the data adheres to all legal and ethical standards
- Invalid or failure to comply with data validation, reject the data, write it to a log.
- if data is valid, proceed to send it to the decision-support model.
- Make a decision or recommendation on the basis of the model.
- The output goes to the governance & compliance layer.
- Evaluate whether the output complies with regulatory and policy limitations.
- The output should be flagged for human inspection if any violations are found.
- Make provision for a human evaluator to validate, alter or discredit the decision.
- The final decision and actions undertaken during the audit should be documented.
- Refine rules or policies on your data and model settings using audit feedback.
- End the process or repeat for new data.

4. Conclusion-

The critical decision-making functions include the application of artificial intelligence in different sectors of the economy. However, the complexity of artificial intelligence systems presents challenges to the current regulatory systems. The main purpose of this study is to address the importance of the controlled AI governance structure, which includes the application of legal rules and technical measures for ensuring the transparency, fairness, and accountability of decision making systems based on artificial intelligence. The controlled AI governance architecture, which involves data validation, compliance, decision support, and human oversight, is an important area that needs to be addressed in the context of developing more effective auditing systems for artificial intelligence systems.

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