EXPLORING THE ROLE OF TECHNOLOGY IN ENSURING ACCOUNTABILITY OF ARTIFICIAL INTELLIGENCE

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Abstract

Artificial Intelligence (AI) is quickly gaining traction in several professional fields. This quickly advancing technology offers various unique benefits to users and industry experts to work more efficiently and produce a greater quantity and quality of output. This has been made possible through advancements in machine learning, which is the primary method of building the AI system to make independent decisions in sophisticated scenarios. However, it has been often observed that AI also greatly suffers from a lack of accountability and the ethical concerns attached. Artificial Intelligence also is impacted by some practical setbacks which may be an outcome of biases inherent in human conduct, which in turn affects the output data it generates. This can lead to inaccuracies and inefficiencies which subsequently cause deterioration in productivity, and also result in inaccurate assessments upon analysis of complex problems. This paper delves into the concept of accountability in the development and use of Artificial Intelligence. It seeks to find a precise definition of accountability by approaching the concept from multiple perspectives, and attempts to provide a legal character for the purpose of promoting policy making and regulations on AI and machine learning. The practical aspects of accountability are also encountered and studied specifically in two major professional sectors, namely agriculture and financial services. A special focus is given to digital agriculture and integration of AI into corporate digital responsibility. A review of studies conducted so far suggests that, in order to provide a more precise and holistic definition of accountability, this concept cannot be addressed merely from an ethical perspective alone, but must also be done so from a practical standpoint. Inaccuracies in AI data collection and analysis

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appear to have grounds to be considered negligent activities, for which there must be regulatory activities as well. Thus, this study sheds light on legal principles and the expansion of their ambit in light of the development of Artificial Intelligence.

Keywords: *Artificial Intelligence, Machine Learning, Accountability, Ethics, Agriculture, Finance, Sectors.*

INTRODUCTION

Artificial intelligence (AI) refers to machines that are capable of performing tasks that usually require human intellect and intervention, without any prior specific programming that should enable them to do so.[1] AI systems are able to do this based on their ability to learn and adapt through exposure to various sets of data and algorithms in a process known as machine learning.[2] This process enables deployment of AI in highly complex and unpredictable scenarios in fields such as financial and e-commerce services, education, and several other professional sectors, in which solutions through standard computation are difficult to obtain.[3] However, these datasets are often taken from real, man-made works which raises questions of authenticity and right of authorship. Moreover, AI machinery requires a substantial input of resources in terms of technological infrastructure and user knowledge. This inadvertently limits the usage of AI to a few highly educated and privileged individuals and entities having vast amounts of capital, while simultaneously marginalizing smaller end-users who may otherwise benefit greatly from its application. All these aspects raise significant ethical and moral concerns on accountability.

As AI usage becomes more prevalent in various vocational sectors, so does the need to regulate its operation. One of the ways to do this is through the framing of laws and government policies. In policymaking aimed at creating accountability for AI, the object is to set standards for the assessment of activities by both the creators and users of AI systems and machine learning models. However, it is difficult to provide such standards, as, owing to the multifaceted and sociotechnical nature of this field, it is challenging to establish a precise definition of the term

[1] Francesca Rossi, *Building Trust in Artificial Intelligence*, 72 J. INT'L AFF. (1), 127–134. (2019) https://www.jstor.org/stable/26588348

[2] Lück, N. (2019), *Machine Learning-Powered Artificial Intelligence*, In *Machine Learning-Powered Artificial Intelligence in Arms Control* (pp 2–7), PEACE RESEARCH INSTITUTE FRANKFURT, http://www.jstor.org/stable/resrep26193.5

[3] *Id.*

"accountability" itself.[4] The laws relating to AI are limited, and the rules and regulations controlling accountability are less developed. Therefore, in order to create a structured system for regulating AI, there is firstly a need to define the term 'accountability'. This paper looks at various definitions of accountability in artificial intelligence and also attempts to apply these definitions sector-wise, with a special focus on the agricultural and finance sectors, in order to improve policymaking in these fields.

TRADITIONAL COMPUTING AND ARTIFICIAL INTELLIGENCE

In order to understand how concerns relating to accountability arise in AI and machine learning, it is first necessary to define how such systems are different from more traditional computers and programming methods.

The key distinction between the two systems lies in their respective approaches to problem solving. Traditional computing involves the use of algorithms – a sequential process of solving very specific problems through a finite number of steps.[5] Algorithms are crucial to traditional computer programming, but not exclusive to this field; in fact, computer algorithms have evolved from the routine procedures that human beings execute in their daily lives, such as preparing a breakfast recipe, getting ready for work, and so on. Algorithms provide a process flow for the execution of a computer programme. They set rules and boundaries within which the running of the programme itself shall be confined. However, these boundaries are set by programmers; traditional computers cannot set these rules on their own without some degree of human intervention.[6] For instance, a person may set a rule for an email management software to automatically transfer all messages containing the word 'promotion' to a spam folder. The email management software shall then transfer only those messages containing the word 'promotion' to the spam folder, while disregarding all other email messages.

The issue that arises from this process is that the machine cannot 'think' for itself. In the aforementioned example, there may occur a situation where there are several promotional messages that do not contain the specific word defined in the rule, yet they may have all the characteristics of a typical promotional or spam message. As the programme is not designed to

[4] Claudio Novelli, Mariarosaria Taddeo, Luciano Floridi, *Accountability in Artificial Intelligence: What It Is and How It Works*, AI & SOC 39, 1871–1882 (2024), https://doi.org/10.1007/s00146-023-01635-y
[5] Kassiani Nikolopoulou, *What Is an Algorithm? | Definition & Examples*, SCRIBBR, (Aug. 9th, 2023), https://www.scribbr.com/ai-tools/what-is-an-algorithm/
[6] *Id.*

consider such messages, the email management software will not automatically sort them into the desired folders.

Artificial intelligence (AI) addresses this issue by approaching problem-solving from a fundamentally different standpoint. Rather than using a pre-defined algorithm to solve a particular problem, AI makes use of large datasets relating to the scenario, from which it observes a pattern and then generates an algorithm to solve the problem.[7] This algorithm is iteratively generated as the AI receives more data and its pattern recognition improves. Essentially, the AI is trained to make decisions based on minute changes in data patterns and thus has the element of human cognitive function in problem-solving. This makes AI far quicker, adaptive and more flexible than regular computer programs when it comes to solving complex challenges. However, this new approach to problem solving raises unique questions concerning ethics and accountability in the usage of AI.

CONCEPT OF ACCOUNTABILITY IN ARTIFICIAL INTELLIGENCE

Accountability refers to a state of responsibility that is held by one person or entity with respect to the other. It can be said that accountability forms the crux of substantive law, as it seeks to define the rights that persons hold against another.[8] It is also understood that accountability arises from decisions that are made by certain persons in response to some external stimuli, which in turn may and usually do affect other stakeholders or the public at large. Thus, accountability can be said to be heavily tied to decision-making and subsequent conduct.

Until recently, the law has recognized only a number of natural and juristic persons as being capable of independent decision-making. Thus, the law could only hold these persons accountable for the consequences of their decisions, i.e. their conduct. The recent rapid evolution of Artificial Intelligence brings the current understanding of accountability itself into question, because, as was earlier mentioned, the capacity to make independent decisions in specific cases has been transferred from humans to a type of computer machinery. Additionally, due to the subjective nature of the concept, it is difficult to precisely define and measure

[7] Author n.d, *What's the Difference Between AI and Regular Computing?,* THE ROYAL INSTITUTION (Tuesday, Dec. 12th 2023, 2:00 pm), https://www.rigb.org/explore-science/explore/blog/whats-difference-between-ai-and-regular-computing

[8] P RAMANATHA AIYAR, CONCISE LAW DICTIONARY 1104 (Lexis Nexis Butterworths Wadhwa Nagpur 2010).

accountability. To enhance law and policymaking in the field of AI, it is first necessary to understand in what ways and to what extent the conduct of AI can be regulated.[9]

FACETS OF ACCOUNTABILITY

One of many definitions of accountability refers to it as the obligation of one person to make justifications for one's conduct to an authority. [10] Thus, accountability can be defined in terms of *answerability*, that is, one is answerable for one's actions and decisions to another. [11] In such a scenario, based on an approach by Mulgan, we may be able to quantify accountability in terms of who is answerable, to whom, in what context, on what subject, to what extent, and in comparison to what standards.[12] Thus, a systematic approach is created whereby one's actions and decisions are examined based on the context of the scenario itself.[13] The law can also be said to define accountability by *limiting the powers* of the person whose decisions and conduct are being assessed. [14] This is relevant with respect to policymaking, as the primary aim of any legislation is to define rights and responsibilities and provide powers and limitations. Thirdly, accountability may be defined in terms of *recognition of authority*, that is, for one to recognize one's own responsibility in one's conduct, there must be an authority figure towards whom one feels so obliged, and without which such recognition would be considered arbitrary and short-lived.[15] These facets of accountability are necessary to include in legislation and policymaking on regulation of Artificial Intelligence systems and developers.

ARTIFICIAL INTELLIENCE AS SUBJECT OF STATE LAW AND POLICY

As was previously established, pinning accountability on AI is difficult, as AI systems are trained to make decisions only based on data provided to them, and they do not have the cognitive ability to differentiate between these datasets on criteria that may be implicitly recognized by humans; for instance, AI may not be able to distinguish between real, factual data, and fabricated data, propaganda, or anecdotal evidence. Thus, the output of such systems

[9] Claudio Novelli, Mariarosaria Taddeo, Luciano Floridi, *supra* Note 4.
[10] Mark Bovens, *Analysing and Assessing Accountability: A Conceptual Framework,* European Law J 13(4):447–468, https://www.researchgate.net/publication/227681168_Analysing_and_Assessing_Accountability_A_Conceptual_Framework
[11] Claudio Novelli, Mariarosaria Taddeo, Luciano Floridi, *supra* Note 4
[12] Richard Mulgan, *Issues of Accountability*, in: *Holding Power to Account* PALGRAVE MACMILLAN, LONDON, https://doi.org/10.1057/9781403943835_1
[13] Madalina Busuioc, *Accountable Artificial Intelligence: Holding Algorithms to Account*, 81 PUB. ADMIN. REV. 825 (2021)
[14] Claudio Novelli, Mariarosaria Taddeo, Luciano Floridi, *supra* Note 4
[15] *Id.*

can be heavily skewed by the data fed to them. Additionally, AI systems do not recognize legal limitations and authorities in the same manner as humans do. As was established by Novelli, Taddeo and Floridi, a lack of recognition of authority challenges the accountability itself.[16]

It is necessary, then, that accountability be integrated into these systems at the initial stages itself. This can be hypothesized to be done in two ways: either by holding the system itself responsible, or by holding its creators responsible. The first considers the capacity of Artificial Intelligence to make independent decisions. The delegation of decision-making to Artificial Intelligence for tasks that were, until recently, entirely handled by human beings, naturally creates feelings of mistrust in users as to the capability of such machinery. The assumption that such decision-making could be done without any potential liability for repercussions further deepens this concern. Thus, accountability is now being seen as essential to creating systems that can be trusted with the administration of tasks. An example of this is in the development of *explainable artificial intelligence,* which seeks to build systems on a foundation of transparency and accountability by utilizing the human element in decision-making and explaining such decisions to the users.[17] Such transparency is also useful in detecting underlying biases that may exist in datasets and addressing them, which can promote the improvement of Artificial Intelligence.[18]

Given that AI is increasingly being used in various important administrative activities, a question that arises is whether it can assume the role of a state actor and hence be held accountable for violations of legal and constitutional rights.[19] To understand this, we must look at whether AI can perform any functions of a state. A state actor includes an agent of the government, however, certain criteria exist to define a body as a state actor: firstly, the private entity must perform a function that is traditionally and exclusively performed by the State; or secondly, the state directs or compels the private party's conduct; or thirdly, the private party acts jointly with the government.[20] In India, a similar view was held in Zee Telefilms Ltd. and Ors. Vs. Union of India (UOI), which observed that private entities performing a public duty

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[16] *Id.*

[17] Tim Miller, *Explanation in Artificial Intelligence: Insights from the Social Sciences,* ARTIFICIAL INTELLIGENCE 1-38 267 (2019)

[18] Express Computer, *AI and Transparency: Importance of Transparency and Accountability in AI Decision Making Processes,* EXPRESS COMPUTER (Aug. 28th, 2023), https://www.expresscomputer.in/exclusives/ai-and-transparency-importance-of-transparency-and-accountability-in-ai-decision-making-processes/102753/ (last visited on 1.08.2024.)

[19] Kate Crawford, Jason Schultz, *AI Systems as State Actors,* 1942-1943 COLUMBIA LAW REVIEW 119(7), https://www.jstor.org/stable/26810855.

[20] *Manhattan Cmty. Access Corp. v. Halleck*, 139 S. Ct. 1921, 1928 (2019); *Sybalski v. Indep. Grp. Home Living Program, Inc.*, 546 F.3d 255, 257 (2d Cir. 2008).

may be considered within the ambit of "other authorities" under Article 12 of the Indian Constitution, and thus may be considered to be state actors.[21] In view of these observations, it can be said that artificial intelligence systems employed in the management of public functions can be considered state actors and held responsible accordingly.

The second method of integration of accountability is by holding the creators of such systems accountable themselves. An obligation by developers to AI regulatory laws can certainly be presumed to bleed into the working of such systems itself. There is an essence of vicarious liability in this approach. The cardinal principle in AI accountability states that the organizations and individuals developing, deploying, or operating AI systems should be accountable for the actions and decisions of these systems.[22] Hence, if an organization or individual provides an artificially intelligent system with the ability to make decisions, the second approach indicates that they must also be held vicariously liable for the consequences of decisions made by that system as well, even if they did not make the decisions themselves.

Elements of the above observations have been incorporated into the EU AI Act, a 2023 legislation by the European Union that serves as the world's first comprehensive law on the regulation of Artificial Intelligence.[23] This Act has introduced certain safeguards to fundamental rights and provided for mechanisms to ensure transparency and enable affected persons to receive explanations of the process utilized by AI when their rights are affected by the decisions of the AI.[24] Thus, this Act has appeared as a crucial first step towards creating a robust regulatory framework on AI.

AI IN PROFESSIONAL SECTORS

As already mentioned, AI is being increasingly employed in several professional sectors to streamline and quicken various routine activities and tasks and improve overall efficiency. Regulatory mechanisms are required to prevent the exploitation of workers and users of these mechanisms and to prevent incorrect outputs from causing disastrous consequences. A recent controversy that highlights this is in the alleged use of Artificial Intelligence by United

[21] *Zee Telefilms Ltd. and Ors. Vs. Union of India (UOI) and Ors*. AIR 2005 SC 2677.
[22] Ian Thynne & John Goldring, Accountability and Control: Government Officials and the Exercise of Power (1987).
[23] European Parliament, *EU AI Act: First Regulation on Artificial Intelligence,* EUROPEAN PARLIAMENT (Feb. 3rd 2025, 8:00 PM) https://www.europarl.europa.eu/topics/en/article/20230601STO93804/eu-ai-act-first-regulation-on-artificial-intelligence
[24] Angela Müller & Matthias Spielkamp, AI Act Deal: Key Safeguards and Dangerous Loopholes, AlgorithmWatch (9 December 2023), https://algorithmwatch.org/en/ai-act-deal-key-safeguards-and-dangerous-loopholes/, last visited on 1.08.2024

Healthcare Insurance in denying medical and health insurance coverage for patients. A lawsuit was filed in 2023 alleging this and is currently ongoing in the US District Court for the District of Minnesota. According to this lawsuit, it is alleged that the insurance company used certain AI algorithms to predict health-care determinations, thus leading to discontinuation or denial of payment for necessary and vital medical treatments.[25]

Issues of such a nature must be prevented, as these professional sectors provide essential goods and services to the general public, and any discrepancy in that regard can affect the rights of the public at the receiving end. It is also pertinent to note that each vocational sector comes with its own specific issues which the AI system must be uniquely tailored to address. Thus, implementation of industry-specific accountability is needed.[26] With this in mind, we shall look at two specific sectors that are developing mechanisms that employ AI, and address issues of accountability in those contexts.

AI IN AGRICULTURE

The agricultural sector in India is prominent, being the leading sector in terms of employment, and contributing roughly 16 percent to the country's Gross Domestic Product (GDP).[27] In recent years, as an extension of the digital revolution in India, there has been a focus on developing the agricultural sector through technological advancements. One method rolled out by the Government of India has been the Digital Agriculture Mission, which aims to assist farmers in obtaining high yields from their land and resources, through digital infrastructure aimed at monitoring various resources such as groundwater, viable seeds, crop yield, drought and flood monitoring etc.[28] Artificial Intelligence can be heavily employed in the processing of agricultural data, and can provide innovative solutions to challenges in this sector. [29] Artificial Intelligence was first employed by McKinion and Lemmon to manage cotton crop

[25] Douglas B Laney, *AI Ethics Essentials: Lawsuit Over AI Denial of Healthcare,* FORBES (Nov 16, 2023,03:06pm EST) https://www.forbes.com/sites/douglaslaney/2023/11/16/ai-ethics-essentials-lawsuit-over-ai-denial-of-healthcare/

[26] Chris Percy, Simo Dragicevic, Sanjoy Sarkar, and Artur S. d'Avila Garcez, *Accountability in AI: From Principles to Industry-specific Accreditation,* AI COMMUNICATIONS. 2021;34(3):181-196. https://doi.org/10.3233/AIC-210080

[27] Sandhya Keelery, *Agriculture in India - statistics & facts,* STATISTA (Mar 15, 2024), https://www.statista.com/topics/4868/agricultural-sector-in-india/#editorsPicks

[28] PIB Delhi, *Digital Agriculture Mission: Tech for Transforming Farmers' Lives,* MINISTRY OF AGRICULTURE & FARMERS WELFARE (04 SEP 2024 3:17PM), https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2051719

[29] Jonathan Masasi, John N Ng'ombe, Blessing Masasi, *Artificial Intelligence in Agriculture: Current Trends and Innovations,* BIG DATA IN AGRICULTURE 6(2) (2024) 96-99 https://www.researchgate.net/publication/382943379_Artificial_Intelligence_in_Agriculture_Current_Trends_and_Innovations

production.[30] Today, AI can be utilized for providing accurate crop yield projections, monitoring soil health, predicting long-term climate changes and weather patterns, and livestock production based on eating habits and other behavioural patterns of animals.[31,32] Thus, AI can help promote long-term sustainability in agriculture.

However, there are certain biases inherent in this sector which can skew the data and thereby also the output from these AI engines. Farmers who are not acquainted with advanced technology such as AI may not be comfortable incorporating it into their work.[33] This is further hindered by inequality amongst producers in the agricultural sector. Small farmers do not have the same level of infrastructure as large-scale producers do. Due to its heavy reliance on data, Artificial Intelligence is a resource-intensive tool that requires large amounts of capital, which small farmers may not be able to afford. This in turn widens the gap between these farmers and larger operations. Another issue arises when AI systems acquire data from specific agricultural lands belonging to different individuals or entities; this raises concerns of confidentiality and data ownership. [34] Most importantly, there is a need to control and reduce mistakes made by AI models, as these could negatively affect the yield and lead to drastic impact on the economy.

Mitigating measures taken to address these concerns include introducing transparency and accountability in AI models and ensuring confidentiality and equitability through data minimisation, i.e. the collection of only that data which is considered necessary, regular audits to ensure compliance with privacy policies, regular impact assessments of AI systems on farmers, land, resources and crop yields, and providing budget-friendly solutions and access to AI systems for small farmers and marginalized sectors in order to prevent sole enjoyment of AI resources by large-scale agricultural operations.[35]

AI IN FINANCE

The integration of AI the banking and the finance industry helps bring about innovation and greater efficiency in banking practices and financial services. As a predominantly service-

[30] Hal Lemmon, Comax: An Expert System for Cotton Crop Management, SCIENCE 233(4759) Jul. 4th 1986, https://www.science.org/doi/10.1126/science.233.4759.29
[31] Jonathan Masasi, John N Ng'ombe, Blessing Masasi, *supra* Note 29
[32] Starlin Daniel Raj, Karthiban, *Artificial Intelligence in Agriculture: A Literature Survey*, INT'L J. OF CREATIVE RESEARCH THOUGHTS 10(6), Jun. 6th 2022, https://ijcrt.org/papers/IJCRT22A6896.pdf
[33] Rozita Dara, Seyed M H Fard, Jasmin Kaur, *Recommendations for ethical and responsible use of artificial intelligence in digital agriculture*, FRONTIERS IN ARTIFICIAL INTELLIGENCE 5:884192 Jul. 29th, 2022, https://www.researchgate.net/publication/362328020_Recommendations_for_ethical_and_responsible_use_of_artificial_intelligence_in_digital_agriculture
[34] *Id.*
[35] *Id.*

oriented sector, its performance is often measured by consumer satisfaction. By way of improving management of customer relationships, customer data, requests, risk assessment and fraud detection, AI greatly improves customer experience and satisfaction. AI also automates daily tasks and streamlines the regular workflow within these sectors.[36] Indian banks have also implemented AI in their online services; for instance, the State Bank of India (SBI) has an AI-driven application known as YONO (You Only Need One) which acts as a common interface for all services rendered by the bank.

However, there are several challenges related to accountability, especially with respect to privacy and confidentiality in the financial service sector. Personal data can often be used to defraud customers. Hence, regulation of AI systems is an essential consideration in the creation and amendment of data privacy laws. [37] Incorporation of transparent AI systems is also necessary to ensure the corporate digital responsibility of the financial sector, whereby trust and equitable access of customers and clients can be ensured. [38]

The recommendations for addressing accountability of AI in the financial sector can be summarized as follows:

- Implementation of bias mitigation in tools by providing appropriate set of data to AI can devoid the discriminatory outcomes.
- Establishing a robust mechanism to deal with cyber-attacks, to secure the sensitive data and detecting the fraud.
- Upskilling programs for the displaced people to balance the human and AI collaboration
- Energy efficient technologies that must be adhered to by financial institutions to offset the carbon footprint.
- Comprehensive guidelines to govern the AI ethical usage especially with respect to data protection and corporate digital responsibility

[36] Nurhadhinah Nadiah Ridzuan *et. al., AI in the Financial Sector: The Line between Innovation,Regulation and Ethical Responsibility*, INFORMATION 15(8):432, Jul. 2024, https://www.researchgate.net/publication/382588389_AI_in_the_Financial_Sector_The_Line_between_Innovation_Regulation_and_Ethical_Responsibility

[37] Ngozi Samuel Uzougbo, Chinonso Gladys Ikegwu, and Adefolake Olachi Adewusi, *Legal accountability and ethical considerations of AI in financial services,* GSC ADVANCED RESEARCH AND REVIEWS, 2024, 19(02), 130–142, https://gsconlinepress.com/journals/gscarr/sites/default/files/GSCARR-2024-0171.pdf

[38] Zsófia Tóth, Markus Blut, *Ethical compass: The need for Corporate Digital Responsibility in the use of Artificial Intelligence in financial services*, ORGANIZATIONAL DYNAMICS,VOL 53, ISS 2,2024,101041, https://doi.org/10.1016/j.orgdyn.2024.101041.

- Developing AI solutions to bridge gaps in financial inclusion and equitable economic development.

CONCLUSION

It can be observed that accountability is an essential feature of Artificial Intelligence, and must be considered in the drafting of public policy and legislation governing such systems. Accountability forms the crux of regulatory mechanisms for AI, and is thus required for ensuring good governance, transparency, equity, responsibility, and integrity. It can be concluded that the nature of AI usage has far-reaching implications on its role in the public, as part of the State, and as part of professional sectors. Sector-wise data and trends show that the nature of accountability is multi-faceted; it not only deals with the ethics of confidentiality and privacy, but also with concerns of equitable access and equality. Thus, a well-rounded perspective on accountability is needed to frame robust policies on regulation of Artificial Intelligence in professional sectors.