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Ethical AI: Addressing bias, fairness, and accountability in autonomous decision-making systems

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Abstract

AI is one of the most marvelous technical domains that have opened several dimensions toward reaching out to diversified areas. The might of AI comes along with a number of hanging ethical dilemmas that need attention during the course of its expansion in the regime of independent decision-making. Ethical AI is the all-inclusive universe of considerations in AI, covering bias correction, assurance of fairness, and installation of accountability machinery. Bias in AI systems can be a manifestation of a faulty algorithm that hence discriminates; therefore, it is critical to apply operations such as data preprocessing and fairness algorithms to fix the issue, probably. There is some natural fairness locked through the whole AI system, but the result for this fairness should be to deal with everybody at an individual level and to be treated on the same terms, and there has to be a comprehensive approach to the meanwhile intertwining social forces. The third key aspect of Ethical AI is accountability in the sense that it calls for clear frameworks to define what is held accountable and to set up procedures for the questioning and containment of power in AI systems. It will review the already extant ethical challenges of AI and provide a hypothetical model that would guide stakeholders in the industry toward the creation of AI systems that are technologically advanced, ethically sound, and socially beneficial. These ethical concerns need to be addressed so that no moral problems are left at all, while at the same time creating AI that improves our intellectual capabilities and does not damage our moral code. The full paper elaborates on these issues in a more detailed way. It provides a detailed analysis of the ethical aspect in AI and the developers, policymakers, and users.

Keywords: Ethical AI; Autonomous Decision-Making System; Artificial Intelligence; Fairness in AI; Algorithmic Bias

1. Introduction

The expansion of AI solves the problems of industry and society but at the same time raises difficulties in control and regulation.

As AI systems are more and more making decisions about people's lives, we must consider the idea that it is an ethical AI becoming mandatory. However, these instruments are not only a response to the technical but also to the ethical challenges of prejudice, fairness, and accountability and entail an interdisciplinary approach using not only the technical but also the legal, and ethical expertise. Bias can appear in the context of outdated data or in case of the even human prejudice nor the lack of attention to fair treatment, which may be included in algorithms; these unjust outcomes more often affect the minority groups, heightening the already existed differences. So it is not only about developing flexible means of machines that are neutral in nature rather than a new question on the margin of how a machine would be able to make a decision in the frame of fairness where the machine is not part of biased society.

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AI accountability has the same giant role in this field as it is the ability to monitor and justify decisions made by the AI system. In the absence of proper accountability, these technologies do not move with the transparency and trust level of these technologies. The fruit of the discourse would be the trustworthy AI environment that would bring about us with a majority of its benefits. To see this happening, the actors involved joint efforts in creating the ethical use and deployment of AI. E.g. setting up of the basic standards for the use, the tough simulation for a bias, the increased transparency of the AI operation and the provision of a process for the recourse in such cases AI systems are misevaluating are the prescriptive measures of this ethic challenge.

First, let us understand what it really means to integrate AI technologies into the human sphere and the importance to prioritize ethical issues because this is the topic that we are currently discussing. Therefore, AI dealing sensitively does not only refer to the technical standards but also to the gentle moral values or necessary social norms, between others. For instance, algorithms could be programmed to be more transparent and explainable so the AI decisions can be understandable and checked by humans. Ethicality and fairness in AI would thus mean, first of all, using comprehensive and balanced data (including diverse and representative groups) that would help detect and resolve hidden biases through fairness-aware learning models. An essential grounding stone of the AI ethics framework is the accountability—specifically, the clear and unambiguous definition of responsibility lines for the AI-generated decisions. This requires, on the one hand, the establishment of legal and institutional mechanisms to regulate the development and deployment of AI as well as embedding a high ethical behaviour culture among AI practitioners to enable "AI for good".

Bias in AI is one of the toughest challenges, as social prejudices that are complexly developed get embedded in algorithms unawares. These can be alleviated through rigorous testing and validation of AI systems against bias metrics and the continuous monitoring of AI systems in operation to detect and correct any emergent discriminatory patterns. Ethical AI is a great example of interdisciplinary cooperation: It brings together experts in technology, law, philosophy, and social sciences that are going to propose solutions for such difficulties.

Ethical AI is a lively and evolving debate. It is a reflection of the deepening comprehension of what constitutes fairness and justice in a more and more automated world. As the decision-making authority is transferred to AI systems, the necessary ethical frameworks must also be made as labile and adaptable to new ethical dilemmas as possible. Why not let AI work for the good of society, so that the rights of individuals are preserved and the promotion of social equity is also done? It means that the researchers, policy makers, and the public have to team up so as to create a future with AI that is not only ethical but also equitable and accountable.

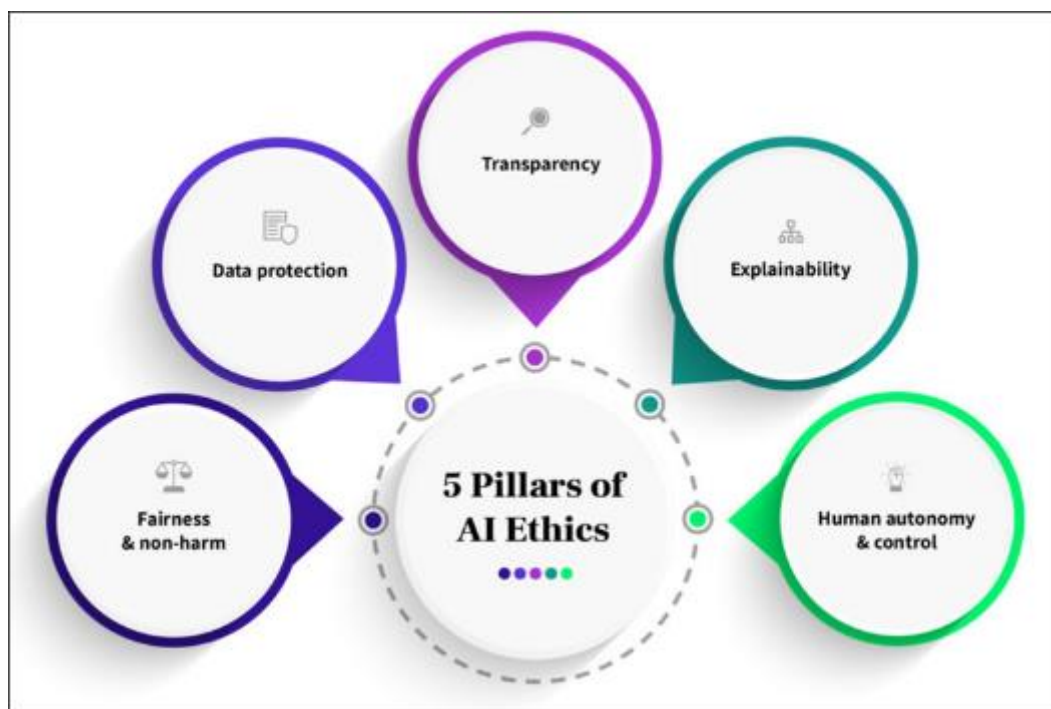


Figure 1 Pillars of AI Ethics

2. Ethical AI

One of the most important issues in terms of AI is ethical AI. Instead, it is mainly about working on these four (4) guiding principles that help in reducing these risks but not necessarily through, safety, security, humanity, and environment sustainability. In principle, Ethical AI delves into various ethical issues concerning data responsibility, privacy, fairness, explainability, robustness, transparency, and inclusion, and is a thoroughly interdisciplinary field that includes technologists, policy developers, and perhaps public actors too. In addition, AI technologies are increasingly becoming a part of almost every aspect of society and thus different risks as well as benefits are linked to this.

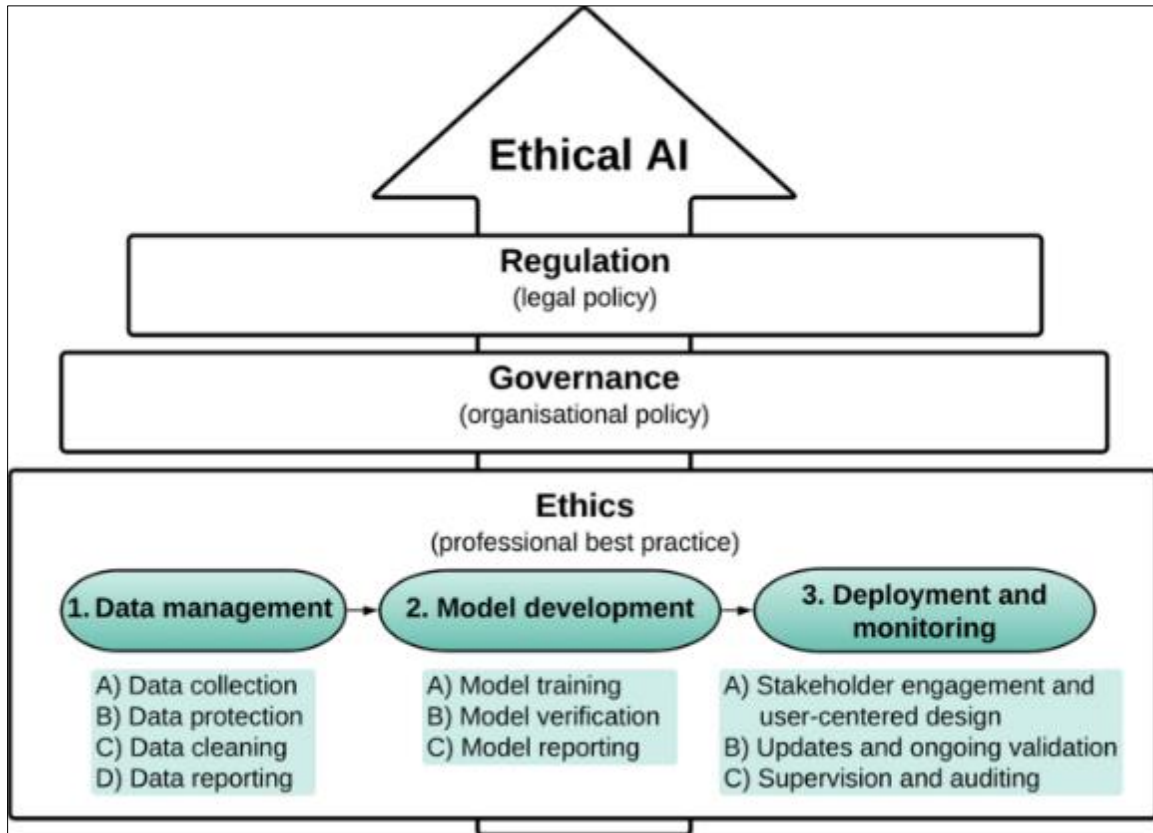


Figure 2 Structural Explanation of Ethical AI

Therefore, it is quite important that we have policies to guide the avoidance of negative outcomes and making the best use of AI to facilitate change. This is going to be coupled with the creation of a database of existing infrastructures which are also pieces of AI ethics programs, modification of the risk framework, and the dissemination of the importance of ethical considerations in AI to the workforce. For instance, among the most necessary actions to put the principles of ethical AI at work is setting up a corporate environment that encourages employees to report ethical issues as they appear, and the establishment of AI system assessment practices. The process of developing ethical AI also requires the input of stakeholders, specifically those that might be directly impacted by AI systems such as employees. Meanwhile, the allowances of different perspectives through the decision-making process should be on the priority list to gain this engagement. We can borrow this model from industry sectors like healthcare to sensitize the AI groups and thus bring about such an application in AI research and development.

This not only takes on AI use but ethical pragmatism as a core component that resolves corporate problems related to reputation, regulation, and legality due to misuse of AI.

3. Autonomous decision-making systems

One of the most important topics for discussion in ethical AI development and rollout is ethical AI. In other words, it is a set of principles that facilitate AI's responsible development, with the main focuses of dealing with security, humanity, and sustainability of the environment. Ethical AI is grounded on the aspects of social order and the interconnected civic issues. Such examples can be a proper handling of data, as part of data responsibility, privacy, fairness, and

trustworthiness, the primary characteristics of ethical AI. Besides that, the concerned issue is the one that stretches across different walks of life, from engineering to policy writing and governance. Although AI technology is now entering the mainstream in several domains of human society and hence this creates the impetus for the desired growth in AI systems to be realized, the risks associated with AI should not be undermined. Consequently, it is a pivotal task to design a regulatory frame and guidelines to guide technology integration in urban areas and to prevent unfavorable outcomes as well as harness the potential AI has for human change. Moreover, this will be fueled by the organization's determination to do one more level-of-the-moment discovery of the ran-in-the-nation infrastructure that can give aid to an AI ethical situation and also make a fully-customized risk-based model for their industry, along with the awareness that there should be a focus on ethical aspects of AI. The other key aspects to make ethical AI will include. The promotion of employees to be able to identify ethical risks and the surveillance of AI system outputs are the important things employees need to be supported to do in their AI jobs. The implementation of ethical AI, will also involve the engagement of the community and those who may be using AI systems, to ensure that they have a say in the decision-making process. In the future, the AI sector can look at the healthcare industry and adopt the established ethical practices to be the safe and sound use of AI technologies and thus improve society and business.

ADMS is a quantum leap in technology, which helps in making the most intricate decisions without human involvement. The autonomous decision-making system can rightly be referred to as the combination of a number of predictive models and algorithms that are capable of forecasting or estimating the existence of different kinds of physical phenomena and environmental processes, and as well as of responding to them. This level of sophistication of ADMS is such that it can be seen in their ability to analyze extensive data, learn from it, and later utilize this knowledge to change their behavior in real-time. This flexibility is essential for applications that range from autonomous vehicles and healthcare to decision making in a more effective and deliberate manner. It will be governed by the rules that ensure that the actions of ADMS are lawful, ethical, and military effective.

For instance, the Department of Defense came up with a framework assessing the danger involved in using smart automated systems, which ensures they are organically deployed.

Similarly, the research that involves and has sought out primary destructive computing centers like MIT has attuned itself to the independent functioning oldest with erratic supervision. This argues for the infallibility of algorithms and the reliability of performances in safety-critical applications. Thus, perception, cognition, planning, and execution are the decision-making steps that are on the highest order with respect to ADMS. Clearly, such tasks themselves cannot be performed by traditional control systems, but are the very first steps to the development of intellectual systems, which know to go through complex lands via artificial intelligence without human intervention. Indeed, the hierarchical control frameworks that are being developed for ADMS pave a structured way of autonomous decision-making which is able to solve complex tasks.

The benefits that ADMS bring may include changing the nature of the workforce to the better by reducing hazardous or physically burdensome tasks which can be offloaded to machines and in various other operational issues, a large part of which is environmental protection. However, it is the exploration of remote areas that is the most remarkable. The question of accountability in AI systems is a must and, the human oversight issue is always the first one that pops up, but it is also important. Unless ethical trait in the innovative process is instilled, focusing on that could lead to the mutual benefit of all the society.

To sum up, the automobile decision-making systems are the way forward in technology and civilization. Their evolution created the need to check on the new potential addressed as well as the new challenges UNSW s has for contributing to the viable innovative society which is still ethically responsible. As these systems are being introduced into every corner of life, the dual increase in their decision-making and ethical and legal responsibilities will be experienced.

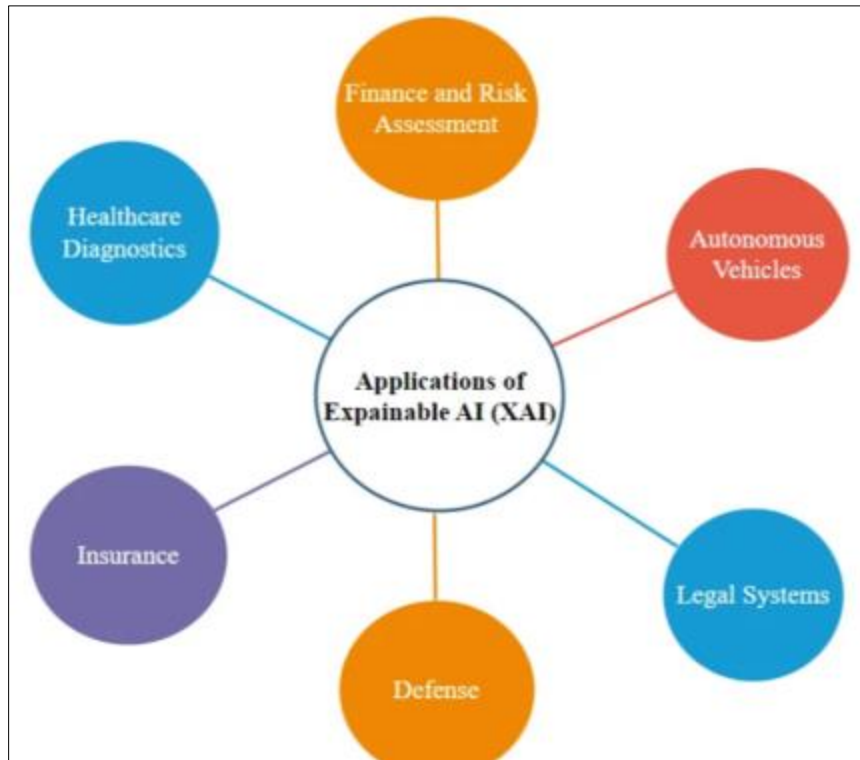


Figure 3 Application of Explainable AI

4. Bias and fairness of ethical ai in autonomous decision-making systems

A complex and detailed ethical maze is what AI's ethical landscape is. Demand of principals of bias and fairness stands out in the designing and implementation of each autonomous decision-making system. Health, and transport are just a few of the fields that AI systems now have the most impact on, and therefore urgent attention is required on the ethical issues. For example, addressing bias in AI is the same as the development lifecycle of AI technologies that ensure it does not make existing biases or create discrimination. Fair AI has to mature in its functionality that is: it perceives the various aspects of people's dignity and general human rights and at the same time helps to set up fair or just distribution of the goods for different demographic groups.

I.e., in health, AI can help healthcare providers to predict patient outcomes and suggest personalized treatments. Yet, in case the data used during the training come from a prejudiced implementation, the algorithms that come out of these data will be inclined to offer biased treatment actions that are only impacting those specified groups. Algorithms that make decisions of autonomous vehicles, though, need to balance the safety and rights of all stakeholders whether it is the whole time or only at critical moments. Here, capabilities come down to understanding frameworks and how they can be embedded in machine learning and deep learning models that drive AI behaviors.

According to ethical AI, both transparency and explainability are mandatory. This is because it is through these two features that stakeholders will be able to realize (not only technically but also ethically) the operation of AI systems. Lack of transparency and unexamination explain why bias detection and correction are not possible. Not being able to provide a confessional of AI decisions would make humans not trust AI, and this will offload the necessity of ethical oversight among robots, which will result in other benefits.

Currently, companies and researchers are busy looking into the ethical issues that AI systems should address like how to develop and execute guidelines and frameworks to regulate the ethical aspects of the AI systems. One good example of ethical guidelines is a statement by the European Group on Ethics in Science and New Technologies made on 'AI, Robotics, and Autonomous' artificial intelligence systems. Such measures will lead to the establishment and enforcement of strict moral norms that will govern the development and utilization of AI technologies.

Furthermore, it is very important for the AI system design to include the possible social impacts that may arise from its application. In contrast, through the inclusion of ethics in AI-based decision-making systems, some harmful

consequences like biases, discrimination, and other forms of social harm can be stopped. Ethical design aims to respect the differences in the needs, preferences, and feelings of people ensuring inclusivity and fairness. It is a proactive strategy that tries to address ethical challenges related to AI and at the same time not to violate the rights of individuals and their moral integrity.

To sum up, the establishment of the AI systems that abide by the principles of artificial intelligence is a conscientious approach that requires an active conversation, research, and partnership among the technologists, ethicists, policymakers, and the general public. The ethical obligation will be one of the factors in shaping the future where technology will co-own a man by offering new technologies that will be beneficial to human beings and will not involve any questioning or giving up of good values and rights.

5. Value alignment and accountability of ethical ai in autonomous decision-making systems

Among a variety of challenges in the AI development and deployment field, one of the top problems that has attracted great attention over the past years is the integration of ethical reviews into the development and deployment of AI in autonomous decision-making systems. The point of value alignment is the main guarantee of AI work being aimed at human good, but not at their destruction; simply put, AI is aligned with the human values. This includes the process of development utilizing technology and philosophical as well as practical levels to deal with thin places filled with diverse and mostly conflicting human values. Accountability in ethical AI therefore is - not just by demanding that AI systems work in a certain way, but that they too have to be equipped with a capacity of identifying and correcting their own actions on ethical criteria.

It gets more crucial, in the case of autonomous systems, where decision-making proceeds without human oversight. They will not only respect the rights of the people but also be such that any accidents would be either impossible or would have no injuries. Experts in the field have examined several methods to accomplish value alignment like involving major stakeholders in the development process or participatory design which is a way for AI systems to accumulate diversity of values. Accordingly, AI systems and there is a rising need to make AI systems be able to explain their decisions and actions to the users as a means of building trust and securing users to be held accountable for their decisions and actions.

The ethical design of autonomous intelligent systems is not merely a technical challenge but a societal requirement.

The greater the integration of AI systems into everyday living not being in alignment, the larger the stakes of misalignment increase. The AI system should be inherently flexible in its design to enable it to adjust and follow the ethical standards and norms of society as they develop. Consequently, only such the above-mentioned systems not only will be feasible in persistent value, but also they will be relevant in accordance with the level of our comprehension/value of them are developing. In other words, the pursuit of value alignment and ethical AI accountability is not over with achieving it; rather, it calls for a reflective, ongoing, evaluative and adaptive process.

Both the AI technology sector and the community should galvanize their efforts to achieve such goals as leveraging AI to serve the common good and improve the quality of life for every human. In order to further advance this domain, taking the time to be present and the ability to look ahead are key intangibles for the AI systems that carry these principles of ethics as pillars of the future of independent decision-making side by side with human morality.

6. Evaluation of ethical ai in autonomous decision-making systems

Striving for ethical considerations in the cutting-edge of autonomous decision-making systems is a significant aspect of AI's responsible implantation. As AI systems grow in complexity and importance across sectors, they make decisions that have numerous ethical implications. Ethical AI is the set of moral principles inherent within AI algorithms through which they are deemed as fair, just, and beneficial to society. This is done by the respect of human rights, making sure that the process is private and decisions are made without any form of discrimination. The latest research has been mainly centered on the topics of transparency, accountability, and trustworthiness of AI systems. These are the features people need to feel safe to use the systems and to know that they are reliable and secure for general use. Ethical AI is also about the reduction of potential harm by keeping in mind the fact that development of AI is supposed to concentrate on the development of efficient AI and AI that respects broader societal values.

The Ethics on AI frameworks are the theoretical justification for the inclusion of ethical considerations in each stage of the AI lifecycle- from design, through development, to deployment, and beyond.

It is, therefore, the most efficient way of ensuring that ethical issues do not come last but are the lead in the innovation phase. Some of them could be designed in such a way that AI can comply with the law along with morally higher levels of conduct that would help create a more trustworthy relation between AI systems and their human users. In the case of autonomous decision-making systems, participating in ethically responsible practices becomes one of the most critical domains for these systems to realize their full potential and bring benefit to society. The fields where these systems are typically used are exposure to a very vital point: health, law enforcement, and financial services, where the choices made can have the most impact on peoples' lives. The systems are, therefore, supposed to be planned based on a strong ethical foundation that will guarantee their positive contribution towards the welfare of society.

The ethical AI-morality discussion is a fluid one, with ongoing discussions and researches about the practicality of systems of AI that are fueled by these principles. It is an interdisciplinary feat that recruits from people of philosophy, ethics, technology, legal experts, and policy makers. This combined effort across disciplines is necessary in dealing with the difficult technological issues and the related ethics.

Rating of AI equipment by ethical standards is becoming one of the most vivid and crucial areas in AI research as AI technology goes on to develop. It is a field of continual investigation and revision that is necessary for the proper ethical functioning of AI programs, i.e. it guarantees that every step forward will be followed by a similar ethical advance for AI systems.

7. Challenges facing ethical ai in autonomous decision-making systems

Artificial intelligence brings an autonomously decision-making system to the fore leading to the multi-dimensional web of moral issues, which demand deep, critical, and rational thinking and solutioning. As AI systems spread, the complexity and ethicalness of their decisions increase, especially when true highly autonomous ones are involved. The Stanford University report calls attention to the privacy issues such as the importance of combatting or at the very least limiting discrimination and the use of opaque decision processes. The moral principles of AI, in this respect, should promote integrity, allow the AI decisions to be apprehended and respected by humans. Besides, the baseline of the correct practice would be the accountability, and such the AI systems to be so well designed that they are able to allow the detection and correction of errors or biases using already-existing rules and regulations. AI needs to integrate the fairness principle so that harmful outcomes won't emerge, and thus, it can also be done through the use of technology and ensuring human rights protection. Step one might be, for example, quantitative measures which will define the extent of the ethical issues involved. The National Institute of Standards and Technology study on the performance and bias of facial recognition emphasizes that point.

Furthermore, AI design should be ethically empowered frameworks which ethically consider different stages of life of the technology, covering the above-mentioned issues. These frameworks should also reflect that ethics is embedded in AI technologies and ensure the standards of ethics are met. The starting point, therefore, should be the implementation of ethics in procedures, but with ethical guidelines of organizational activities in AI research and development.

AI components that are embodied in self-driving cars are good examples of the moral problems stirred up by such intelligent artifacts that develop actively by tuning their responses to unpredictable environments. This situation simply about guidelines for safety, decision-making, and legal liabilities is described in a Medium article that talks about the AI ethical issues in smartly designed tech that also perform social functions like public transportation. The application of self-driving car companies should be those choices of activities that if one of them goes wrong, can have a very negative effect on human life or even kill someone; there should be therefore a rightful way to make these choices in a moral construct. The report on the unethical use of AI by UNESCO the institution issued was covering the full gambit from job disbarment to faulty applications of criminal law and order. This would mean that AI will have to be tackled from diverse perspectives; not only will techno-dabblers handle it but even feedback from ethicists, sociologists, legal experts, and such gross discipline expansion could be of the same nosy nature.

The growth of ethical artificial intelligence for systems that can make decisions on their own is very intricate and multifaceted and it involves the contribution of a number of players in the field. Some of the main ethical guidelines for AI developers could be strong guiding principles and frameworks, transparency, accountability, fairness, privacy, and finally a set of technologies with the potential of reducing the resulting harm. These reservations for ethics should be growing at the technological pace in AI of continuous development so that the public trust and AI reliability are still there. Further dialogue and mastering of this theme will be important in the future for the ethics of AI.

8. Conclusion

For ethical AI, the key messages are bias, fairness, and accountability to build trust and integrity into autonomous decision-making. The journey to ethical AI requires a multi-dimensional path: first of all, recognizing and reducing biases in datasets and algorithms. Fairness ought to be hardwired in the DNA of AI systems so that decisions taken are merely just and not oppressive but really don't perpetuate any existing asymmetries of society. Set out an accountability framework that defines who is answerable for the decisions taken by AI, hence giving transparency and ability to redress. This means that development strategies, such as the use of varied data sets, diverse developer teams, and strict adherence to ethical guidelines, are followed by the latter. Equally important are monitoring and evaluation of AI systems to detect and rectify biases, thus making the evolution of AI in tandem with ethics. The ethical landscape of AI is complex, but with combined efforts from the industry, academia, and regulatory bodies, it may be possible to guide forward the development of AI to a future that is fairer and more answerable.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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