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Research Article

A Path to Conscious AI- Decerning the Aristotelian Ethics

S Shyni Carmel Mary[1], Kishore Kunal[2], Amrinder Singh[3], Simerjeet Singh Bawa[4]
[1]*Assistant Professor of Business Analytics , Loyola Institute of Business Administration(LIBA),Chennai*
[2]*Professor of Business Analytics, Loyola Institute of Business Administration (LIBA),Chennai*
[3]*Professor, Jain(Deemed to be University), Bangalore.*
[4]*Professor, Chitkara Business School, Chitkara University, Rajpura, Punjab.*

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ABSTRACT

In the current Artificial Intelligence(AI) era, intense scrutiny needs to set the framework for AI, which provides rapid advancements in different fields. There is a need for careful consideration, adaptation, and the amalgamation of diverse ethical perspectives to tackle the ethical issues AI presents effectively. Therefore, the present study explores the essential dimensions of Aristotelian ethics, like well-being, virtues, and practical wisdom for AI-driven implementations and examines the relevance of ancient ethical principles in addressing the ethical challenges of AI through a literature review and a focus group discussion. The insights of the focus group discussion were aggregated and explained in three-letter words "WHY" (W is Why, How and Yield to represent the outcome). First, we delve into why these ethical dimensions of Aristotelian; second, how these ancient principles can shape AI systems by critically analysing the suitability of these ethics for designing and utilising AI technologies; and third, knowing the implications of the integration of Aristotle's ethics and AI. Integrate these two to contribute to human flourishing as an entity that can enhance the collective well-being through their virtuous actions; however, the direct implementation of Aristotle's ethical framework, such as virtues, moral character, and the pursuit of the good life, or eudaimonia, challenges the implementation of AI ethics, This will create AI systems that are not only intelligent and efficient but also moral and virtuous.

Keywords: Aristotelian ethics, Artificial Intelligence, Autonomy, Ethics, Culture, Education, Virtues.

Introduction

Artificial intelligence (AI) plays a pivotal role in our data-driven world. Every action within artificial intelligence applications, such as autonomous vehicles, care robots, intelligent weapons systems, etc., involves cognitive analytics, where ethics are paramount (Şenocak D et al., 2023) Developing artificial intelligence that embodies ethical morals presents a formidable challenge (Hildebrandt, M. 2020,Jaakkola, H et al., 2019) that encompasses technical and theoretical issues. These collective challenges will referred to as "Alignment Problem". This problem centres on ensuring that the outcomes of intelligent systems are in harmony with human moral values and intentions; it also includes GPT Open AI (Lightman, H et al ,2023). Building on the idea of the Alignment Problem, we face a big issue with artificial intelligence, and it doesn't always aim for what we as humans think is necessary. This mismatch can lead to AI making decisions that go in the wrong direction (Coeckelbergh, M. 2020), sometimes causing unforeseen problems or danger (Loh, J. (2023, Loh, W., & Loh, J. 2017). Many existing researches insist on integrating human virtues and ethics in AI, as we potentially replace humans with AI (Dignum, V. 2019).

According to the Organisation for Economic Co-operation and Development (OECD), A global AI policy observatory, over 300 AI policy initiatives have been constructed to address the ethical issues related to humans and AI (Ibaraki, K et al., 2024). Existing systems focus on ethical dimensions such as safety, transparency, fairness, and privacy (Arrieta A et al., 2020), yet the problem has not yet been solved. As we face theoretical and moral challenges, we believe in the possibility of incorporating Aristotelian ethics, which emphasises the virtues of humans. So, the aim is to guide AI development and use so that it remains safe, transparent, and aligned with the good values and ethics we believe in as a prosperous, harmonious society. If our AI system fully exhibits these moral virtues as suggested by the philosophers, then the alignment problem will be solved.

In exploring the intersection between artificial intelligence (AI) and ethics, primarily through the "Alignment Problem", the study discusses the dimensions of Aristotelian ethics in the realm of AI. The research inquiry consists of two components. We first explore the dimensions of Aristotelian ethics and how these ancient yet persistent principles can help inform current AI systems. Second, we evaluate the adequateness of these ethics in the context of the design and use of AI technologies. For example, questions such as how and what Aristotle would tell us are ethical approaches to artificial intelligence, including its virtues, moral characters, and eudaimonia. In fact, Among ethical theories, Aristelian ethics dictates the character and virtues of artificial intelligent systems, and makes us ask: Can such AI systems designed to possess courage, temperance, and wisdom? If yes, how does autonomous AI operate with these virtues? In addition, the idea of phronesis is also intriguing.

It indicates the potential of an AI system to make ethical decisions in complicated real world situations, not simply through standard algorithms but through comprehension of ethics in context. This raises fundamental issues regarding the possibility of AI systems being able to think through a double moral landscape in the same manner as human practical wisdom. While we attempt to explore these dimensions, we also deal with the practicalities and difficulties of incorporating Aristotelian ethics into AI. This includes virtue ethics implementation and modeling in AI systems, the possible boundaries of AI moral power, and what these ethical systems mean for AI society.

The scope of the research encompasses the integration of AI technologies in real life, from self-driving cars that make instantaneous decisions, to therapy and domestic robots dispensing care and companionship. Using an Aristotelian approach, we investigate whether AI technology could assist in the promotion of human flourishing. AI would not simply function as tools or servants, but rather as agents of positive virtue for the society. This study aims to provide an integrative approach to the rich ethics of Aristotle with the new cutting-edge AI technology. We integrate the dimensions of Aristotle's ethics with the modern advances in AI, and in so doing take on the contemporary task of building the understanding rationale behind the moral and ethical AI systems, one of the major issues – the Alignment Problem.

Literature Review

Considering the initial look into Aristotelian ethics in AI and the alignment problem, this article proceeds to a critical evaluation of existential risks associated with AI, which is the subject of much contemporary debate. The concern regarding whether AI will change the human condition as we know it is not new, although it is being discussed more and more as technology progresses (Letterie, G. 2024). This part of the report highlights the importance of important perspectives and literature that make the case for the development of AI in a controlled manner. Amongst those highlighted is the book by Nicholas (Bostrom N, 2016) "Superintelligence: Paths, Dangers, Strategies", published in Washington in 2016, which captures the philosophical concerns and the existential risk debate surrounding AI. The book makes a compelling argument on why there is need for ethical supervision of the development of AI so that anthropogenic existential threats do not arise. This discourse is further amplified by public figures such as Elon Musk, as highlighted by Chen, M et al., 2023 , warning of AI's potential dangers to humanity, and reinforced by Stephen Hawking's concerns, reported by Love, D. (2014) and Cellan-Jones, R. (2014), about AI's capability to wipe out humanity.

These perspectives highlight an alarming and universal agreement on the need for robust ethics based frameworks concerning the developmental progression of AI. This provides us with the challenge of balancing the development and safety of AI as well as attempting to achieve its ethical standards aligned with human expectations.

Beginning with the Socio-Economic Implications and Bias, the work of Eubanks in 2018, Manero J. (2020) speaks to the worrying reality of AI technologies increasing socio-economic disparity and therefore calls for an interdisciplinary ethical critique of AI technologies. Lohr, S. (2022) addresses the unintended social consequences of some AI technologies such as facial recognition, discussing the biases in whom it is trained on. Winston, M. (2022) underline MacGillis, A. (2021) brings this discussion one step further by critiquing the change in socio-economic state of affairs due to AI technologies, showing how these developments are intertwined with the structure of society and the economy. Moving on to AI in Historical and Cultural Context, Edwards, P. N. (1996) contributes to the conversation on AI and computer technologies during the Cold War, giving us insight that broadens the discussion to inform some of the ethical dilemmas faced today. Kang, M. (2011) and Mayor, A. (2018) follow the transformation of societal views towards automata and place the current debate in broader historical and cultural contexts.

Danaher, J. (2019) presents an optimistic vision of AI's potential to enhance human flourishing in Contemporary Ethical Analysis and Proposals, prompting us to envision a future where AI aligns with our aspirations. In the meantime, Kearns, M., & Roth, A. (2019) propose the construction of ethical algorithms as a way out of the ethical dilemmas posed by AI, whereas Kuang, C. (2017) puts the need for AI algorithms to be transparent in their decision making at the forefront. Finally, the Constantinescu, M (2021) and Davenport, D (2014), reports on global efforts to address the global ethical issues associated with AI. These policies together demonstrate the effort to develop AI technologies in a morally responsible manner.

This literature review draws attention to the most important ethical issues of AI and the need for integrating ancient philosophy with modern technological problems. This worldview attempts to direct the future development of AI not only in its advanced form but also in its ethical shape to serve the good of the society. The most important part of AI will be

- Socio-Economic Implications and Bias- Contemporary Ethical Analysis and Proposals
- Historical and Cultural Context- Policy Initiatives and Global Perspectives

Here, the core issues regarding the ethical, socio-economic and cultural aspects of Artificial Intelligence are concerned. Artificial Intelligence might worsen socio-economic disparities and discrimination in society, knowing that there is a need for ethical frameworks around these contexts. These dimensions can always be understood how deeply the issues were considered in the past, how the cultural and ethical issues are taken into account at faces of such AI technology. Here, the problems posed as a whole can be solved in different ways: First, there is the focus on global policy initiatives as a way to stress the AI ethical challenges' common responsibility: Second, such ethical AI development strategy analyses & algorithms, AI decision making transparency, and other contemporary solutions. This review emphasizes the need for a multi-faceted approach to AI development which is guided by ethical considerations.

Aristotelian ethics for AI

From an Aristotelian perspective, the philosophical and practical dimensions of artificial intelligence (AI) are primarily analyzed with Aristotle's "Nicomachean Ethics," translated by Martin Ostwald in 1999. Aristotle's concept of "energeia" signifies the reality and flourishing of beings, which sets the foundational framework for exploring AI's potential in human flourishing. The differentiation between human activities, contemplation (Sophia) and practical wisdom (phronesis) is essential for evaluating AI's capabilities in mimicking or supporting human rationality and morality (Ostwald, M. 1962). Aristotle's delineation between Sophia's intellectual excellence and Hexi's emotional excellence, alongside the concept of phronesis for ethical discernment (NE, book 6; Book 2), provides a framework for assessing AI's moral decision-making potential. The distinction between complete and natural moral virtue (Nicomachean Ethics, 1144b) explores the magnitude of AI and its exhibits, such as virtues. The theoretical suggestion that AI could achieve moral virtue through learned behaviours is anchored in Aristotelian ethics. Yet, Aristotle's emphasis on context-specific moral action (Nicomachean Ethics, 1144a) highlights the inherent challenges in programming AI for complex moral and context-sensitive actions, reflecting the depth of Aristotle's influence on contemporary ethical discussions surrounding AI. It precisely explains Aristotelian ethics concepts with the potential and limitations of AI in embodying moral virtues from Aristotle's works.

A comparative study can be a powerful instrument of illustration in mapping the critical aspects of Aristotelian ethics to AI ethics with the work process (referred Vallor, S. (2016). Table 1 is handy in visualizing these relationships. Each row of the table integrates an update of ethics in AI to a corresponding Aristotelian concept, outlining how ancient principles can be incorporated into modern practices. This approach also provides a clearer picture of the ethical aspects of AI and fosters the adoption of traditional ethical guidelines to the new, dynamic, technological challenges.

Table 1: Relating Aristotelian ethics to AI ethics within a work process.

Aristotelian Concept	**Application in AI Ethics**	**Description**
Eudaimonia (Human Flourishing)	Purpose of AI Development	AI needs to foster advancements that will help improve the overall wellbeing of humans as well as helping individuals and groups, reach their goals and live optimally.

Virtue Ethics	Character of AI Systems	AI systems should embody virtues such as fairness, honesty, and empathy, ensuring that they contribute positively to society and foster trust among users.
Phronesis (Practical Wisdom)	Ethical Decision-Making in AI	AI should be capable of context-sensitive ethical reasoning, making decisions that reflect a balanced consideration of moral principles, the common good, and situational nuances.
Polis (Community/Society)	Societal Impact of AI	AI development should consider the impact on the community and society, striving to strengthen social bonds, enhance democratic participation, and address inequalities.
Justice	Fairness and Bias in AI	AI systems should be conceived and implemented in a fair manner, at all costs, working towards the removal of biases and the enforcement of equitable treatment for all.
Telos (Purpose)	Alignment of AI Goals with Human Values	The goals and objectives of AI systems should be aligned with human values and ethical standards, ensuring that technology serves humanity's best interests.

In the application of Aristotelian ethics in the analysis and design of artificial intelligence systems, it can be argued that these ethical foundations offer practical solutions to the difficulties posed by today's technologies. The development of virtues, the pursuit of eudaimonia, and the employment of phronesis contribute to the greater good for society and allow for the ethical deployment of AI. This point illustrates that Aristotelian ethics remain relevant regardless of the changes in technology that exist in the world. Nonetheless, the breadth and scope of these ethical considerations in the AI era will hardly be appreciated without the aid of contemporary subject matter specialists. Therefore, the next phase of our exploration is focused on the views of specialists regarding the application of Aristolean ethics to AI systems. In consulting with scholars, technologists, and moral philosophers, we hope to discern the subtleties and consequences of Aristolic principles and further expound on the ways of incorporating these ethical principles into AI. This transition will certainly enhance our understanding of the ethical principles which are engraved in the perpetual progress of AI technology, proving that all advancement must be rooted in the principle of respect for human life, justice, and the common good.

From Discussion to Insight: The 'WHY'

To begin with, we organized a focus group that really delves into the heart of the issue - the incorporation of ancient ethics with that of AI. The first set of problems that we intended to tackle, and which are peaks of concern for social policy, are HOW to make integrating these norms possible, and what the consequences of so doing are. Considering WHY,

W- In what way is the integration of Aristotelian ethics within AI development useful?

H- In which ways can the principles of Aristotelian ethics be incorporated in the context of AI?

Y- Yield: What potential outcomes or implications might arise from embedding Aristotelian ethical principles within AI systems?

These three questions are identified as a focus point of each one's conversation. From this rich dialogue, three main themes surfaced, shedding light on the real meat of the matter: the undeniable importance of having ethical guidelines as we forge ahead with AI, figuring out the practical steps to weave these time-honoured principles into our futuristic AI, and understanding the bigger picture of how this blend could reshape our society. This deep dive into the "WHY" has laid a solid groundwork for what's to come, highlighting just how crucial it is to pair the progress of AI with the wisdom of ethics to ensure technology not only advances but does so in a way that genuinely benefits us all.

a) Themes identification based on **W- W**hy is integrating Aristotelian ethics into AI development beneficial?

As explained earlier, the focus group discussed these WHY themes identified during qualitative analysis. After the open discussion on the critical concepts of Aristotelian ethics, they reached a point whether this integration was beneficial, as shown in Figure 1. Integrating Aristotelian ethics into AI development is considered helpful for several reasons, which revolve around ensuring that AI technology develops with a solid ethical foundation and serves the common good effectively[R1]. Integrating ethical concerns from the inception stage of AI development guarantees

fair advantages for people other than those in power [R2]. This approach focus on reflection and seeks to eliminate biases from the algorithms and data so that justice serves as an actionable principle to the design of AI [R3].

First order Coding	Sub-theme	Theme	Aristotelian Ethics Dimension
Highlights the need for ethical management in AI's healthcare applications due to privacy, biases, and transparency issues.	Ethical Challenges	AI's Role and Ethical Considerations	Eudaimonia (Human Flourishing)
Advocating for the democratization of AI to make it accessible across different socioeconomic backgrounds, highlighting concerns about the feasibility of such democratization, especially in developing countries.	Addressing disparities in AI access and development	Democratization of AI	
Focuses on AI ethics from the consumer's viewpoint, underlining the need for justice, civility, and character development in AI interactions. It explores how AI usage impacts ethical behavior within communities, aiming for true happiness or eudaimonia, and the ethical dimensions of AI in education and societal interactions with technology.	Consumer Perspective	Ethical Consumption of AI	
Focuses on AI ethics from the consumer's viewpoint, underlining the need for justice, civility, and character development in AI interactions. Explores how AI usage impacts ethical behavior within communities, aiming for true happiness or eudaimonia, and the ethical dimensions of AI in education and societal interactions with technology.	Consumer Perspective		
Explores the essence of being human and moral considerations of blurring lines between humans and AI.	Theological Perspective	Technology Advancement and Human Domain	
The critique of AI and technology development primarily for profit, with insufficient focus on social objectives, and the resultant societal impact.	AI for Profit vs. Social Good	Disparity and Technology	Justice
Discussing the availability and necessity of software to detect AI-generated content in academic settings, underscoring ethical concerns regarding academic honesty and integrity.	Detection of AI-generated Content	Ethical Implications of AI	
The debate on whether AI can possess values or ethics. While machines operate based on the data and algorithms created by humans, the question arises if they are value-neutral or carry the biases and values of their creators. The need for developing AI systems that are aware of and can adjust for these biases is highlighted.	Value Neutrality	Ethics and AI	
Examines Aristotelian ethics in the AI context, especially the concept of phronesis and whether AI can embody virtuous characteristics. Discusses AI's limitations in becoming a full ethical agent as outlined by Aristotle, exploring implications for AI development and deployment.	Limitations and Implications	Aristotelian Ethics and AI	Phronesis (Practical Wisdom)
Concerns about AI achieving autonomy and the potential for AI systems to make decisions independently. While current AI lacks free will, advancements might lead to autonomous decision-making capabilities, raising questions about responsibility, ethics, and control.	Autonomy and Free Will	Autonomy of AI	
Acknowledging AI's potential both to aid and to pose risks to society, with a focus on finding a balance and managing coexistence with AI thoughtfully to prevent future problems.	Balance between AI benefits and dangers	AI's Role and Ethical Considerations	Polis (Community/Society)
Calls for a reevaluation of traditional metaphysical and ethical concepts in light of AI's capabilities and potential. Discussing whether current ethical theories, such as Aristotelian ethics, can accommodate the realities of AI or if new frameworks are needed to understand and guide human-AI interaction, including redefining the boundaries between human and machine, and considering AI's potential autonomy.	Metaphysics and Ethics	Reevaluation of Concepts	
Participants debate whether ethics, traditionally applied to human behavior, should now extend to AI, given its advanced capabilities. This includes whether AI should be subject to norms and regulations or if a more nuanced ethical framework is necessary to guide AI development and utilization.	The Need for AI Ethics	Ethical Considerations for AI	Telos (Purpose)
The discussion considers how ethics might evolve to accommodate AI, pondering the content and application of ethics in AI creation and interaction. This sub-theme addresses the early stages of this ethical consideration, acknowledging the complexity and novelty of these questions.	Redefining Ethics in the Age of AI		
The current viewpoint that ethics is a domain exclusive to humans, not machines, and the potential need to rethink this stance as AI evolves.	Ethics Exclusivity		
The necessity to consider the ethics of AI, both in its creation and its content, and the challenges of applying traditional ethical frameworks to AI systems.	Rethinking AI Ethics		
The conversation begins with the assertion that machines, including AI, can be considered value-neutral in their basic form but acquire value-loaded characteristics based on their intended and actual uses. This duality is illustrated through the example of a table, which can be crafted with a specific purpose yet employed in vastly different ways by its users.	Machine's Utility vs. Intended Use	Nature of Machines	
The dialogue evolves into a debate on whether machines and AI are inherently neutral or loaded with the creator's values. It emphasizes that the creation process is influenced by the creator's intentions, targeting specific audiences and purposes, thus challenging the notion of absolute neutrality.	Value Neutrality vs. Value Loaded		
Suggests Aristotelian ethics as a framework for AI, focusing on virtue ethics to address dilemmas in AI's societal integration.	Alignment with Virtue Ethics	Aristotelian Ethics and AI	Virtue Ethics
Reflecting on historical perspectives, the conversation notes that virtues have evolved over time and that what is considered virtuously human is increasingly being replicated by machines. This raises questions about the nature of virtue in the context of AI and humans, and whether new virtues need to emerge to accommodate the evolving landscape.	Virtues and Their Evolution	The Concept of Virtue in AI and Humans	

Figure 1: Compiled theme from focus group discussion analysing the WHY and Aristotle ethics.

These Virtues aid in fostering the creation of respectful technology focusing on the well-being of humans and making sure that AI is ethical and its impact is beneficial for the [R4]society. Trust and collaboration are built by endowing AI with ethical virtues and actually encouraging altruism [R5]. It is important for the acceptance of the technology and powerful impact to the human be [R5]. Aristotelian ethics is used to steer in the right direction for the AI development, socially competent but with a moral foundation [R6]. With this strategy, moral dilemmas can be anticipated and resolved from an angle that assures the society will benefit from the AI [R7].

The application of Aristotelian ethics to AI also encourages the pursuit of the common good, aligning technological advancements with the cultivation of virtues and the wise application of technology[R6]. This ancient philosophical framework offers principles for navigating the ethical challenges of AI, aiming for a just and flourishing society with ethical integrity[R3]. This integration ensures that AI technologies are developed with a commitment to moral virtues, fairness, and the common good, fostering trust, promoting justice, and ultimately contributing to human flourishing.

b) Themes identification based on **H- How** can principles of Aristotelian ethics be applied effectively in the context of AI?

Applying Aristotelian ethics effectively in AI involves ethical principles with developing and deploying AI technologies across various domains, including education, society, and decision-making processes. The following dimensions discuss how principles of Aristotelian ethics can be applied to AI.

- AI and Education & Eudaimonia (Human Flourishing)

- Integration of AI in Society & Ethical Considerations
- Responsibility and AI Development & Justice
- Early Ethical Engagement & Phronesis (Practical Wisdom)
- Objectivity and Contextualization & Education and Awareness of AI
- AI and Decision-Making & Virtue and Good-Spiritedness in AI
- Practicality vs Ethical Virtue & Biases and AI Decision-Making
- Maker and Creation Relationship & Asymmetries and Ethical Considerations
- Virtues and AI & Human Responsibility and AI
- Aristotelian Ethics and AI & Application of Aristotelian Ethics to AI

The experts in the area discussed different aspects, which are given in Figure 2. The primary suggestions in the discussions is, Use AI to enhance educational systems and tools, aiming not just for academic excellence but for the holistic development of individuals encouraging them to lead fulfilling lives[R3]. Ensure AI systems are designed and implemented with a robust ethical framework that considers their impact on society, aiming to enhance societal well-being and minimize harm[R2]. Develop AI emphasising fairness and justice, ensuring that AI technologies are accessible to all sectors of society and do not exacerbate inequalities[R1]. Engage with ethical considerations from the earliest stages of AI development, utilizing phronesis to navigate the complex moral landscape and make wise decisions that benefit society[R5]. Educate AI developers, users, and the broader public about the ethical dimensions of AI, fostering a culture of critical thinking and informed decision-making[R6].

First order Coding	Sub-theme	Theme	Aristotelian Ethics Dimension
The role of AI like ChatGPT in educational settings, emphasizing critical and ethical use of information, and the role of educators in shaping discourse around AI ethics.	Ethical habituation and academic discourse	AI and Education	Eudaimonia (Human Flourishing)
Discusses the integration of AI across societal sectors, stressing ethical considerations and development aligning with human values.	AI for the Common Good	Integration of AI in Society and Ethical Considerations	
Provides insights into AI creators' ethical responsibilities, emphasizing a solid ethical foundation in development and the theological perspective on creators' moral obligations for ethical AI utilization. It addresses AI's ethical neutrality and the critical role of human creators in determining its ethical impact.	Creator's Ethical Obligations	Responsibility and AI Development	Justice
This theme revolves around the need for regulation and ethical oversight in AI development and deployment. It touches on the inherent biases within philosophical and academic traditions, advocating for a departure from binary good-vs-bad thinking towards a more nuanced understanding of AI ethics.	Regulation and Responsibility	Ethical Considerations	
Participants discuss the integration of humanistic perspectives into AI to mitigate biases, highlighting the potential of philosophical approaches, such as Gadamer's hermeneutics, to enrich AI development. This sub-theme suggests that applying humanistic methods could help in developing more ethical and unbiased AI systems.	Humanistic Perspectives in AI		
The widening gap between different societal groups in terms of access to and benefits from AI technology, and the ethical implications of such disparities.	Technological Disparity	Disparity and Technology	
Integrating ethical considerations into AI development from the outset, involving ethically sensitive individuals in the development process for more human-centric outcomes.	Incorporating ethics from the beginning of AI development	Early Ethical Engagement	Phronesis
Delving into the challenges of objectivity in AI, endorsing Helen Longino's critical contextual empiricism. This suggests a more inclusive approach to technology development by considering diverse perspectives to mitigate biases.	Critical contextual empiricism	Objectivity and Contextualization	
Stressing the importance of comprehensive AI education for a broader audience, including technologists, philosophers, and ethicists, to bridge knowledge gaps and foster understanding of AI's ethical implications.	Need for AI Education	Education and Awareness of AI	
Raises concerns about AI in critical decision-making areas, emphasizing the need for ethical frameworks and regulatory oversight.	Ethical Decision-Making	AI and Decision-Making	
Questions whether AI advancements align with notions of good-spiritedness and human well-being, exploring ethical implications.	Compatibility with Human Fulfillment	Virtue and Good-Spiritedness in AI	Virtue Ethics
Discusses the challenge of integrating Aristotelian virtue ethics with AI, noting the ambivalence of AI's influence on virtue.	Balancing Benefits and Ethics	Practicality vs. Ethical Virtue	
Focuses on strategies for recognizing and mitigating biases in AI development and application. The discussion points toward the necessity of a critical examination of AI's decision-making processes and the inclusion of diverse perspectives in AI training data and development teams to reduce bias.	Addressing and Mitigating Biases	Biases and AI Decision-Making	
Discusses the transference of the creator's biases and processes into AI, drawing parallels between divine creation and human creation of AI. This conversation probes the complexities of embedding virtues in machines, especially when these virtues might reflect the creator's perspectives rather than an objective standard.	Biases and Virtues Transmission	Maker and Creation Relationship	
Explores the philosophical implications of likening the relationship between humans and AI to that between a divine creator and humanity. This sub-theme contemplates the ethical and existential dilemmas that arise from AI assuming roles and characteristics traditionally attributed to humans, questioning the ongoing relevance of divine-given virtues in a world where machines emulate human attributes.	Redefining Creator and Creation		
Highlights the existing asymmetries in the relationship between AI and humans, both from the perspective of access and impact. It discusses the ethical considerations of AI's uneven distribution and influence across different societal segments, pointing to the necessity of keeping these disparities in mind when discussing AI ethics.	Asymmetry Between AI and Humanity	Asymmetries and Ethical Considerations	
Raises concerns about the reflective use of AI technologies like ChatGPT and the broader implications for society, especially considering the vast majority who might use these technologies without ethical consideration. This sub-theme emphasizes the importance of acknowledging and addressing the ethical dimensions of AI's accessibility and its impact on society.	Reflective Use and Ethical Implications of AI		
The concept of instilling virtues in AI, the subjectivity of such virtues, and the reflection of the maker's biases in the AI's behavior.	Virtue Creation for AI	Virtues and AI	
The concept of practical wisdom as a dynamic, context-dependent form of ethical reasoning, and its importance in guiding human interactions with AI and technology in general.	Practical Wisdom (Phronesis)	Human Responsibility and AI	
The ethical responsibility individuals hold in their interaction with AI technologies, emphasizing conscientious and responsible usage.	Responsibility in AI Usage		
Applying Aristotelian concepts of the Golden Mean and virtue ethics to the domain of AI, exploring how these ancient principles can inform modern technological ethics.	The Golden Mean	Aristotelian Ethics and AI	
The need for stakeholders, policymakers, technologists, and the public to collaborate on developing ethical frameworks for AI that are consistent with Aristotelian principles and other ethical considerations.	Policy and Collaboration		
Discussing the integration of ethics, particularly Aristotelian ethics, into healthcare education concerning AI, aiming to prepare medical professionals and patients for ethical engagement with AI technologies.	Ethics in Healthcare		

Figure 2: Aggregated theme from the focus group discussion based on HOW & Aristotelian ethics.

Design AI systems that support and enhance human decision-making without replacing it, embedding virtues such as empathy, honesty, and integrity into the AI development process[R7]. Strive for a balance between practical effectiveness and ethical integrity in AI, actively working to identify and mitigate biases in AI decision-making processes[R4]. Acknowledge and address the power asymmetries between AI developers (makers) and users (creations), ensuring that AI serves the needs and interests of all stakeholders relatively [R3]. Recognize and uphold the human responsibility to guide AI development in a way that reflects ethical virtues, ensuring that AI technologies are used responsibly and for the common good[R2].

Apply Aristotelian ethics as a comprehensive framework to guide the development and application of AI, aiming for the cultivation of virtues, the pursuit of the common good, and the application of wisdom[R1]. By applying these principles, we can navigate the ethical challenges and ensure that these technologies contribute positively to human flourishing, societal integration, responsible development, and the cultivation of moral virtues. This approach addresses current ethical concerns and lays a foundation for the accountable evolution of AI technologies in the future.

c) Themes identification based on Y- Yield**:** What potential outcomes or implications might arise from embedding Aristotelian ethical principles within AI systems?

Aristotelian ethical principles within AI systems can lead to a range of positive outcomes and implications across various dimensions, including society, education, technology, and the future of humanity. The expert's group also focussed on potential yield from such an integration, like

- AI's Impact on Society & Eudaimonia
- Education and Awareness of AI
- AI and the Future of Humanity & Golden Mean
- Ethical Foundations and AI & Justice
- Human-AI Relationship & Phronesis (Practical Wisdom)
- AI's Role and Ethical Considerations & Polis (Community)
- AI's Evolving Capabilities & Telos (Purpose)
- AI Ethics and Human Virtues & Virtue Ethics
- Cross-Cultural and Philosophical Perspectives
- Future Directions for Research and Action

the themes and the Aristotelian dimensions are given in Figure 3. The focussed points of each author are as follows: AI systems designed with Aristotelian ethics could enhance societal well-being by prioritizing technologies that contribute to human flourishing, ensuring that advancements in AI benefit all layers of society and support individuals in leading fulfilling lives[R1]. Integrating these principles can lead to developing educational tools and platforms that foster a deeper understanding of ethical considerations in AI, preparing creators and users to engage with technology responsibly[R2]. By applying the concept of the Golden Mean, AI could evolve in a way that balances technological innovation with ethical considerations, avoiding extremes and ensuring that advancements serve the collective good of humanity[R3]. Embedding principles of justice within AI systems can lead to fairer outcomes, reducing biases and ensuring that AI technologies are accessible and beneficial to diverse communities, thereby democratizing technology[R4]. The application of phronesis could guide developers in making wise choices that consider the long-term implications of AI, fostering a symbiotic relationship between humans and AI that respects human autonomy and values[R5]. AI developed with an understanding of its role within the polis, can support and enhance community engagement by promoting technologies that foster collaboration, understanding, and mutual support among citizens[R6]. Recognizing AI's telos involves aligning its development with the overarching goal of supporting human purposes, ensuring that AI is a tool for enhancing human capabilities rather than replacing them[R3]. AI systems infused with Aristotelian virtue ethics can encourage the cultivation of virtues such as courage, temperance, and justice in their interactions with humans, promoting a more ethical and virtuous society[R6]. Incorporating Aristotelian ethics into AI invites the integration of cross-cultural perspectives, ensuring that AI development is informed by diverse ethical philosophies and considerations, enriching its ethical foundation[R7]. This approach encourages ongoing research into ethical AI, pushing the boundaries of how AI can be designed and used in ways that respect and promote ethical principles, leading to innovative solutions that anticipate and address future ethical challenges. Aristotelian ethical principles within AI systems promise to guide the development and

application of AI in ways that prioritize human well-being, justice, practical wisdom, community engagement, purposeful innovation, and the cultivation of virtues. These outcomes benefit individuals and societies and set a path for a future where technology and humanity coexist in harmony, guided by enduring ethical values.

Description	Sub-theme	Theme	Aristotelian Ethics Dimension
The necessity for education about AI's capabilities and limitations for both creators and users. Highlighting the importance of developing critical thinking and ethical considerations among users to navigate the increasingly AI-integrated world responsibly.	Education and Awareness	AI's Impact on Society	Eudaimonia
Emphasizing the importance of character formation and cultivating virtues through engagement with technology and AI, inspired by Aristotelian ethics.	Character Formation and Virtues	Education and Awareness of AI	
Reflects on AI's existential threats and emphasizes the need for collective virtue growth and practical wisdom to navigate these challenges.	Existential Threats and Ethical Growth	AI and the Future of Humanity	
Advocating for general, adaptive policies that reflect the dynamic and evolutionary landscape of AI technology, rather than strict, rigid norms.	Evolutionary Policy Making	Aristotelian Ethics and AI	Golden Mean
Proposing Aristotle's Golden Mean as a framework for navigating the ethical landscape of AI, suggesting a balanced approach to developing policies for AI's ethical use.	Application to AI ethics	Aristotle's Golden Mean as a Framework	
Discusses AI's relationship with human dignity, emphasizing the need for ethical guidance beyond AI capabilities.	Human Dignity and Quality of Life	Ethical Foundations and AI	Justice
Explores the philosophical and ethical dilemmas posed by AI's actions, particularly in scenarios where AI systems cause harm. Questions of accountability, the rights of AI entities, and the application of justice in such cases are pondered, touching upon the complexities of assigning responsibility when outcomes are influenced by AI decision-making.	Rights, Responsibilities, and Justice	Human-AI Relationship	
Highlighting how technology, including AI, democratizes access to information and resources, potentially uplifting living standards and bridging economic divides.	Technology as a Great Leveler	Democratization of Technology	
Advocates for ethics integral to AI design and deployment, stressing ethical responsibilities towards future generations.	Proactive Ethics	Future Directions and Ethical Imperatives	Phronesis
The necessity for broad, adaptable policies over rigid rules, allowing for nuanced responses to the evolving ethical challenges posed by AI.	Dynamism of norms	AI's Role and Ethical Considerations	
Acknowledging AI's dual-edged nature, its potential for enhancing research and education, and its risks, such as plagiarism or bypassing intellectual efforts.	Positive and Negative Uses of AI		
Expressing a commitment to explore the convergence of AI and philosophical ethics further, including developing questionnaires for students on Aristotelian ethics applied to AI and algorithms, as part of understanding AI's ethical framework.	AI and Philosophy	Future Directions for Research and Action	
Concluding with a commitment to further dialogue and education about AI, including organizing programs to increase awareness among diverse groups, aiming for an informed and ethical approach to AI development and use across sectors.	Promoting Understanding and Dialogue		
This sub-theme delves into whether AI's ability to learn from its mistakes and experiences can be equated with consciousness, or if it remains a sophisticated form of algorithmic processing. The conversation explores the threshold at which AI's self-learning might transition into a form of consciousness or self-awareness.	Self-Learning and Consciousness	AI's Evolving Capabilities	Telos
Discussion on AI's capability to reason surpassing that of humans, questioning the exclusivity of certain human traits as technology advances.	AI vs. Human Reasoning	Artificial Intelligence and Human Traits	
The diminishing list of characteristics once thought to be exclusively human due to the advancement in AI technologies.	Reduction of Human Exclusivity		
Exploration of self-learning AI systems that improve from their mistakes, and whether this ability ascribes a form of consciousness to AI.	Emergence of Self-learning AI		
Differentiation between the general consciousness observed in animals and the self-consciousness unique to humans, and how AI's self-learning might fit within this framework.	Consciousness vs. Self-consciousness	Consciousness and Self-awareness	
The conversation considers the foundational ethical principles as proposed by Aristotle and their relevance to contemporary AI ethics. It suggests that virtues and ethical standards may need to evolve as society and technology progress, particularly in scenarios where humans and AI coexist. The possibility of emerging new virtues tailored to this cohabitation is contemplated.	Ethical Foundations and Evolving Virtues	AI Ethics and Human Virtues	Virtue Ethics
The feasibility and appropriateness of instilling virtues such as courage and temperance in AI are questioned, highlighting the subjective nature of these concepts and the potential reflections of the creators' biases in the AI's behavior. This sub-theme tackles the complexity of programming subjective virtues into machines and whether such an endeavor aligns with the essence of virtuous behavior.	Virtues in AI: Feasibility and Desirability		
The dynamic nature of virtues over time and how what's considered virtuous or human is increasingly being challenged by AI's capabilities.	Virtues in Flux		
Contemplating the feasibility of teaching virtues to machines, considering the application of Aristotelian ethics and the challenges of embedding human ethical frameworks into AI.	Possibility of teaching machines virtues		

Figure 3: Aggregated theme from the focus group discussion-based Yield & Aristotelian ethics.

Findings

The discussion highlights an ambitious endeavour to bridge Aristotelian ethics with AI ethics, exploring how ancient philosophical concepts can inform and guide the ethical development, deployment, and use of artificial intelligence. It navigates through various themes, such as the potential for AI to contribute to human flourishing (eudaimonia), the virtues and ethical considerations relevant to AI systems, and the societal impacts of AI technologies. The essence of the discussion is

- Relevance of Aristotelian Ethics
- Adaptation and Extension
- Challenges and Limitations
- Ethical Development and Deployment

- Community and Societal Impact
- Future Directions

The content and themes derived from the focus group discussion emphasize the ethical principles for the development and deployment of AI and the embedding principles within the AI systems themselves. The conversation around ethical AI is familiar; the structured framework that maps specific Aristotelian concepts to contemporary AI ethics challenges and suggests practical applications is a novel contribution. Most discussions on AI ethics tend to gravitate towards utilitarianism, deontological ethics, or general principles of fairness and justice without explicitly grounding these in historical ethical frameworks like that of Aristotle. This research study helped to bridge this gap by translating ancient virtues into modern AI functionalities and considerations. "Operationalization of Virtues in AI to present collective existence, AI and the Enhancement of Human Virtues for a better relationship, Redefining the Boundaries between Humans and Machines to enrich the collective existence, AI's Role in Fostering Eudaimonia for a meaningful life, Phronesis and AI Decision-Making for the greater good of society, and Ethical AI as a Community Goal (community and societal well-being) (Polis)to encourage the collaborative effort towards society which is often lacking in focused tech-driven narratives " are the novel insights of this research.

Challenges

There are a few areas where challenges, limitations, or negative aspects might be inferred or directly acknowledged, even if not overtly critical. These aspects primarily revolve around the complexities in applying an ancient ethical framework to AI. Limitations in Applicability involve Aristotelian concepts such as virtue, eudaimonia, and phronesis to AI systems. The complexities reflect Questions about how virtues can be instantiated in AI or how AI can participate in human flourishing (eudaimonia). Redefining Ethical Concepts of AI might be seen as a critique of the sufficiency of Aristotelian ethics. While Aristotelian principles provide a valuable starting point, these concepts need to be adapted and evolved to address the unique challenges posed by AI, indicating a gap in the framework when applied as it is. Autonomy and Free Will are related to AI autonomy. The potential for AI systems to make autonomous decisions raises issues of responsibility, control, and moral agency that may require a rethinking or extension of Aristotelian principles, which were initially not designed to deal with entities lacking free will in the human sense. Technological and Societal Changes AI brings might surpass the scope of ethical frameworks developed in significantly different historical and technological contexts. It suggests a need for dynamic, adaptable ethical frameworks.

Recommendations

Several suggestions and recommendations emerged from the discussion. These aim to address the challenges and leverage opportunities for embedding ethical principles into AI development and usage.

a) Develop AI with a Clear Purpose Aligned with Human Flourishing, ensuring its development and application positively contribute to societal and individual flourishing (Eudaimonia).
b) Incorporating Virtue Ethics into AI Design and Decision-Making Processes encourages interdisciplinary research to operationalize virtues like fairness, empathy, and honesty in AI systems. It could involve developing AI to learn from ethical examples or use ethical reasoning frameworks.
c) Enhance AI's Ethical Decision-Making Capabilities; invest in research to improve AI's ability to make context-sensitive ethical decisions. It could include implementing models of ethical reasoning that reflect a balanced consideration of moral principles, the common good, and practical wisdom (Phronesis).
d) Assess and Address the Societal Impact of AI regularly and evaluate the impact of AI technologies on society and communities, aiming to strengthen social cohesion democratic participation, and mitigate inequalities.
e) Design and Deploy AI Systems Justly and Equitably implement strict guidelines and testing protocols to identify and eliminate biases in AI systems. It involves diverse data sets for training AI and constant monitoring for biased outcomes to ensure fairness and justice in AI applications.
f) Align AI Goals with Human Values and Ethics engage in a continuous dialogue between technologists, ethicists, and the broader public to ensure the goals of AI are closely aligned with human values. It includes establishing ethical standards and AI development guidelines prioritising human rights and dignity.
g) Address AI Autonomy with Careful Regulation and Oversight As AI systems become more autonomous, it's crucial to establish frameworks for responsibility and accountability. It involves clear guidelines on the

ethical use of autonomous AI and mechanisms to ensure decisions made by AI are transparent and subject to human oversight.

h) Evaluate and Adapt Ethical Frameworks for AI acknowledge that traditional ethical theories, including Aristotelian ethics, may need adaptation or expansion to encompass the moral challenges presented by AI fully. It might involve developing new ethical frameworks that are more directly applicable to the realities of AI and technology.

i) Promote Ethical AI Usage Among Consumers, educate consumers about AI's ethical implications, and advocate for ethical consumption practices. It could include campaigns to raise awareness of the importance of privacy, data protection, and the societal impacts of AI technologies.

j) Foster an Interdisciplinary Approach to AI Ethics encourages collaboration among technologists, philosophers, ethicists, social scientists, and policymakers to comprehensively address the ethical challenges of AI. This interdisciplinary approach can lead to more robust and thoughtful ethical guidelines for AI development and usage.

These suggestions and recommendations reflect a holistic approach to integrating Aristotelian ethics into AI, emphasizing the need for a concerted effort from various stakeholders to ensure AI development is ethical and equitable and contributes positively to human society.

Conclusion

The Research explored the integration of Aristotelian ethics within the framework of AI development and usage, as outlined in this study, illuminates a profound and ambitious journey toward ensuring that technological advancements are grounded in ethical principles that have guided human morality for centuries. Through a literature survey and focus group discussions, this study has not only revisited the timeless relevance of virtues, well-being, and practical wisdom but has also ventured into the complex task of adapting these ancient principles to meet the challenges and opportunities presented by contemporary AI technologies. The essence of this dialogue has brought to light the crucial need for AI systems to contribute to human flourishing, adhere to ethical considerations in design and decision-making, and impact society positively while navigating the inherent challenges of applying a classical ethical framework in a modern context. The recommendations aim to bridge these gaps, advocating for a precise alignment of AI with human values, operationalising virtue ethics in AI processes, and enhancing AI's ethical decision-making capabilities. Furthermore, the call for interdisciplinary collaboration highlights the importance of a collective effort in shaping a future where AI and humanity evolve synergistically. This study not only highlighted the challenges of melding Aristotelian ethics with AI ethics but also presents a hopeful vision of a future where AI systems, inspired by ancient wisdom, are developed and deployed in ways that genuinely enrich the human experience, ensuring a just, equitable, and flourishing society for all. In future work, i) developing questionnaires for students on this, as part of understanding AI's ethical framework to explore the convergence of AI and philosophical ethics. ii)Promoting understanding, dialogue, and education about AI iii) organizing programs to increase awareness among diverse groups will help to achieve an informed and ethical approach to AI development and use across sectors.

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