
SUSTAINABLE PRACTICES IN DESIGN, APPLICATION AND USE OF ARTIFICIAL INTELLIGENCE-INTRODUCING THE HEART OF AI

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ABSTRACT

Artificial Intelligence (AI) is rapidly impacting the way we lead our lives today and the days to come. It is mandatory, to ensure that AI systems will uphold human values, sustainable design methods and also incorporate ethical principles and address societal concerns. This research paper, intends to bring to light the HEART of AI for the development of AI systems in the best interest of mankind. There are both positive and negative implications on society as artificial intelligence continues to interfere, transform and be a part of our lives. This paper brings out certain sustainable practices that ensures a more honest, Ethical, Accountable, Responsible and Transparent approach to managing a Sustainable AI. The inputs for this research were derived from a survey conducted and recorded by contacting the service providers, client feedback from reference checks, end users, and Subject matter experts. Unintended outcomes of artificial intelligence will likely challenge us all. Hence, the findings of this research throw light on certain sustainable practices that govern appropriate use of the AI systems.

Abbreviations: AI; Artificial Intelligence; HEART Honest, Ethical, Accountable, Responsible and Transparent

Key words: Artificial Intelligence, Sustainability, AI Governance, Internal control system of AI

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1. INTRODUCTION

Artificial Intelligence (AI) is a buzz word, rapidly impacting the way we lead our lives today and the days to come. It is mandatory, to ensure that AI systems will uphold human values, sustainable design methods and also incorporate ethical principles and address societal concerns. In this research paper, the researchers wish to bring to light the HEART of AI which is being (Honest, Ethical, Accountable, Responsible and Transparent) for the development of AI systems in the best interest of mankind at large.

It is imperative for every AI service provider to follow a very responsible approach to ensure a very purposeful outcome with clarity on the implications of the decision and information provided by the machine. There is a need to provide a safe and fair decision without any biased, unintended discrimination. Around 150 end users and 125 subject matter experts were interviewed and surveyed respectively, to obtain their inputs about AI interventions in their lives both personally and professionally. It is observed that there is a mixed opinion about the impact. However, record shows that most of them have placed

Honesty in approach, safety in usage, accountability and ownership of design and applications, responsible operations and transparency when it comes to personal data usage as the most important expectations that they have from the AI.

2. RESULTS AND DISCUSSION

The primary stake holders within the AI are the concept creators who are Visionaries, Gap Identifiers, Research & Development (R&D) team who are the triggers or initiators of the idea or concept of machine interference in solving an identified problem, or they try to enhance an existing field of operation for better safety and use. They involve the AI service providers who encrypt, design, and make algorithms to be either sold to the end user directly or to engage any organization to provide the services to the end user.

Sustainable practices in Design, Application and Use of Artificial Intelligence-Introducing the HEART of AI Fig.1

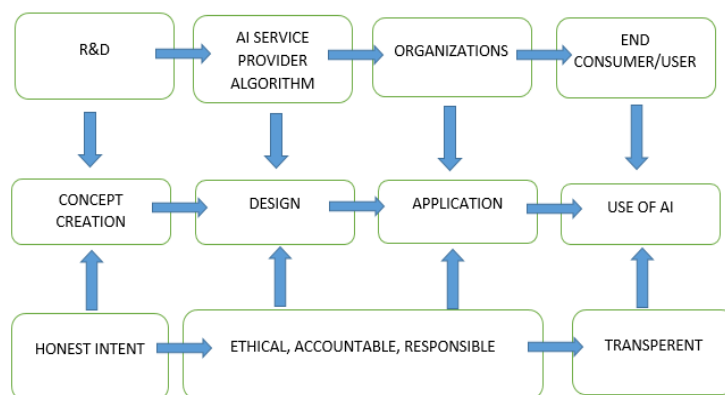


Figure 1 HEART of AI

AI services involves a complex and challenging process, as AI service providers keep the clients always updated on a constantly evolving set of technologies, develop expertise

knowledge and skills and also invest in R&D. Developments Greater autonomous operations must come with greater responsibility, even though it is applied to machines. The AI system must ensure to design responsibly to earn the trust of all stakeholders. It also requires accountability and transparency requires to be able to explain and justify decisions, and the ways systems make decisions and to the data being used. To ensure a more safe implications of AI and to ensure an internal control system it is proposed to introduce the HEART of AI.

1. The “H” in the HEART refers to the Honesty of Intent by the initiator or concept creator who proposes a certain need for the creation of AI. It is a value system to ensure that the purpose to propose the need for AI application is not to compromise purposefully or to favor a particular person, group or institution and to gain monetary or non-monetary benefits. It ensures that the intent is not bent down or made flexible to accommodate the particular person’s individual / organization’s selfish intended outcome. If so, it must be acknowledged and disclosure must be publically available. According to the article published by Michael Kearns, Seth Neel, Aaron Roth, Zhiwei Steven Wu, “Preventing fairness gerrymandering”, the statistical definitions of fairness and recently proposed individual notions of fairness, , raises several computational challenge

2. The “E” stands for Ethical practices adopted during the Design and operational stages of AI. Fairness, reliability and safety, Privacy and Security and Inclusiveness must be implemented throughout the process right from beginning until the end. According to an article by, Yvonne Baur, Brenda Reid, Steve Hunt, and Fawn Fitter about how AI can end bias, they have observed that, “Humans are hindered by both assumptions and incapacity to deal with large amounts of information and patterns Machines can filter information, discard unwanted, irrelevant information in a fraction of a second, that enables quick and unbiased decisions.

3. Accountability refers not just to justify alone but take charge and to take ownership of the implications and outcome of the machine decisions. To ensure this, decisions must be carefully taken at every step when algorithms are created. It includes moral values and following the societal norms with ethical actions. Accountability in AI requires both the function of guiding action, and the function of explanation.

According to a study conducted for the IEEE Global Initiative for Ethically Aligned Design, accountability has been defined in many dimensions. In the common man’s understanding, “Liability to account for and answer for one's conduct; judgment of blameworthiness; obligation to provide a satisfactory answer to an external oversight agent” In the Computational Disciplines, it is “A set of mechanisms, practices and attributes that sum to a governance structure which “consists of accepting responsibility for the stewardship of personal and/or confidential data with which it [data organization] is entrusted in a cloud”.

4. Responsibility refers to the role of all stake holders. It is essential to disclose the authenticity, reliability and validity of Data drawn from various sources for creating an algorithm. The algorithm must make sure to test, validate and check for pre-judicial data impacting the output. It is also necessary to account for the internal and external bug report. If there is any update or advanced version, how the given additional data is re-processed and how the machine is re-trained to be strong enough to implement and get the desired outcome. The goals of creating an algorithm must be set and priorities listed. The deployment of the algorithm system must have an intended outcome with no hidden agenda. The compliance report must be supported by the data and should be able to be verified by the end user if required. The end user should also know, what personal data is being used for decision making.

5. Transparency is required when it comes to using personal data for decision making. The end user has the right to know how the decision is made. The organization which offers the product or service has to disclose the source or the pattern in which the decision was made or the series of inputs that were used to take the data driven decisions, when asked for. The regulatory authorities have to be provided with the structure and what type of data was used to arrive at a decision, if demanded. The entire process need to be documented for evidence and produced when demanded.

According to the article posted by Lawrence Lessig, Against Transparency in the New Republic, “To know whether a particular transparency rule works, then, we need to trace just the source of information and how it gains entry into the entire chain of operations. If there is transparency on the source of data, how it flows, what data’s are considered for decision making and how decisions are arrived.

According to the study conducted by , European Parliamentary Research Service in April 2019, “An important difference between transparency and accountability is that accountability is primarily a legal and ethical obligation on an individual or organization to account for its activities, accept responsibility for them, and to disclose the results in a transparent manner”.

Table 1 Sustainable Practices at Design Stage

ABILITY DIMENSIONS	DESIGN OF AI SUSTAINABLE PRACTICES
ETHICAL PERSPECTIVE	<ol style="list-style-type: none"> 1. Is the Concept, Design and Intent Responsible? 2. Does the Deep learning include sufficient inputs and patterns without cons 3. Did all the stake holders ensure Ethical practice during coding, or planning algorithm? 4. Is the visual object detection inclusive and free from unintended discrimin 5. Is the speech recognition detection equipped with sufficient pattern and in
ENVIRONMENTAL PERSPECTIVE	<ol style="list-style-type: none"> 1. Is there any environmental concern at the design stage? 2. What impact does the design create on the environment? 3. Is the design considering the global warming and climate change issues?
ECONOMIC PERSPECTIVE	<ol style="list-style-type: none"> 1. Does the Design of AI create any economic value?
SOCIETAL PERSPECTIVE	<ol style="list-style-type: none"> 1. What impact does the design of this AI create on the society? 2. What is the contribution of the design for creating Jobs in the society? 3. How does the design of the AI create societal benefit?
INDIVIDUAL PERSPECTIVE	<ol style="list-style-type: none"> 1. Does the design of AI consider the emotional wellbeing of Human 2. Does the design consider the privacy concerns of the individual? 3. Does the design of AI consider all factors to decide on the educational asp individual? 4. Does the design stage have enough pattern reading and learning inputs to health conditions of an individual? 5. Are all aspects for elderly care taken into consideration? 6. Does the design stage take into consideration all factors to decide on work efficiency?

Table 2 Sustainable Practices at AI Application Stage

ABILITY DIMENSIONS	APPLICATION OF AI SUSTAINABLE PRACTICES
ETHICAL PERSPECTIVE	<ul style="list-style-type: none"> ✓ Is the Application of the AI Honest, Ethical, Accountable, Responsible and transparent? ✓ Does the application include fair and safe methods? ✓ Did all the stake holders ensure Ethical practice during application? ✓ Is the application inclusive and free from unintended discrimination? ✓ Is the speech recognition detection justifiable?
ENVIRONMENTAL PERSPECTIVE	<ul style="list-style-type: none"> ✓ Is there any environmental concern at the application stage? ✓ What impact does the application of AI create on the environment? ✓ Is the application of AI considering the global warming and climate change
ECONOMIC PERSPECTIVE	<ul style="list-style-type: none"> ✓ Does the Application of AI create any economic value?
SOCIETAL PERSPECTIVE	<ul style="list-style-type: none"> ✓ What impact does the application of AI create on the society? ✓ What is the contribution of application for creating Jobs in the society? ✓ How does the AI create societal benefit?
INDIVIDUAL PERSPECTIVE	<ul style="list-style-type: none"> ✓ Does the design and application of AI consider the emotional wellbeing of ✓ Does the AI application consider the privacy concerns of the individual? ✓ Does the AI consider all factors to decide on the educational aspects of an individual? ✓ Does the AI create an opportunity to develop knowledge, new skills and ab ✓ Does the AI help to decide on health conditions of an individual? ✓ Are all aspects for elderly care taken into consideration? ✓ Does the AI helps to decide on work efficiency appropriately?

Table 3 Sustainable Practices at End User Level

SUSTAINABILITY DIMENSIONS		AI SUSTAINABLE PRACTICES AT END USER LEVEL	
ENVIRONMENTAL PERSPECTIVE	✓	Is the AI Honest, Ethical, Accountable, Responsible and transparent?	
	✓	Does the outcome include fair and safe methods?	
	✓	Did all the stake holders ensure Ethical practice for the end user?	
	✓	Is the application inclusive and free from unintended discrimination?	
	✓	Is the speech recognition detection justifiable?	
ENVIRONMENTAL PERSPECTIVE	✓	Is there any environmental concern at the end user level?	
	✓	What impact does the AI create on the environment?	
	✓	Is the AI outcome considering the global warming and climate change issues?	
ECONOMIC PERSPECTIVE	✓	Does the AI create any economic value?	
	✓	What impact does the AI create on the end user and the society?	
	✓	What is the contribution of AI for creating Jobs in the society?	
	✓	How does the AI create societal benefit?	
SOCIAL PERSPECTIVE	✓	Does the AI outcome consider the emotional wellbeing of Human?	
	✓	Does the AI outcome consider the privacy concerns of the individual?	
	✓	Does the AI consider all factors to decide on the educational aspects of an individual?	
	✓	Does the AI create an opportunity to develop knowledge, new skills and abilities?	
	✓	Does the AI help to decide on health conditions of an individual?	
	✓	Are all aspects for elderly care taken into consideration?	
	✓	Does the AI help to decide on work efficiency appropriately?	

Fig 2. Perception on end user cognitive abilities and rise of industry using AI and AI investments

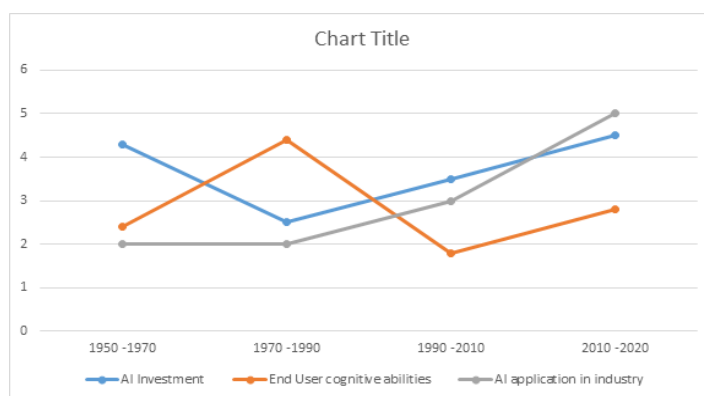


Figure 2 AI and AI investments

It is observed that , though the livelihood is made easy, however the younger generation is deprived of knowledge of how to do things. They will indeed learn what to do, but fail to know how to do important things for survival due to major interventions of AI in their lives.

A number of respondents have shown showed growing concerns in various aspects of our future lifestyle. There is a need to enhance the understanding, cooperation between different stakeholders, within the region, locally, across borders to have a harmonious co-operative smooth operation of collecting, acquiring, using the information pertaining to market. One must as to assure to develop guidelines and policies to govern that AI will be directed at augmenting humans and the common good. The shifting of the priorities of economic, political and education systems to empower individuals to stay ahead in the “race with the machines.”

Very few years from now, we will definitely take advantage of radically improved accuracy and efficiency of decisions and predictions across all sectors. Deep learning systems will actively support humans throughout their work and play as they tend to understand the pattern of our attitude and behavior. This support will be unseen but rapidly conquering the world silently.

As the AI will enable machine's ability to sense, learn, interact naturally and act autonomously increases, due to Deep learning of patterns and behavior, they will blur the distinction between the physical and the digital world. AI systems will interconnect and work together to predict and adapt to our human needs and emotions. Physical life will completely start depending on Artificial support system which may lead to independence of human nature. The growing consensus that AI should benefit globally at-large leads to call to facilitate the adoption of AI systems to promote creativity, innovation and development, help address global challenges, and boost jobs and skills development, while at the same time establishing appropriate safeguards to ensure these systems are transparent, accountable and explainable, and respect human rights, democracy, culture, nondiscrimination, privacy and control, safety, and security. Given the inherently global nature of our networks and applications that run across them, we need to improve collaboration across countries and stakeholder groups to move toward common understanding and coherent approaches to key opportunities and issues presented by AI. This is not too different from the post-war discussion on nuclear power. We should also tread carefully toward Artificial General Intelligence and avoid current assumptions on the upper limits of future AI capabilities

3. CONCLUSION

AI is a key change agent in the way business around the world is operating today. Its capacity to derive deep insights from unstructured data, to learn and improve from its activity, and to optimize business operations means that despite still being a growing technology, its value to organizations is clear.

Companies that do well at implementing AI throughout the process within the organization will find themselves at a competitive advantage in a world where humans and machines working together outperform either humans or machines working on their own. Louise Matsakis in her article has proved that, sometimes it is really out of hands when an adversarial example could divert the AI system that controls a self-driving car, resulting in errors to recognize the command in a wrong way. After reading a lot of literature, it is thought provoking to not to call it "Artificial Intelligence" any more, but re- christen it as "Automated Machine Intelligence", henceforth.

4. FUTURE SCOPE

- The scope of this research study can be used to draft, design policies for better governance of AI systems.
- It can also be used to create an awareness and clarity of the rights of the end user.
- It can provide an understanding of accountability and responsibility of the stake holders in the field of AI.
- It can be used by beginners to understand the framework within which AI operates.

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