Artificial Intelligence for NGO

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Abstract

Artificial intelligence (AI) is a technology that mimics human intelligence using machines, particularly computer systems. It encompasses various functions such as expert systems, natural language processing, data recognition, and computer vision, which can significantly impact multiple sectors. Implementing AI in non-governmental organizations (NGOs) can play a vital role in sectors like healthcare, safety, agriculture, education, poverty alleviation, employment, technology, and emergency response. However, only a few NGOs, known as "AI embedded NGOs," are currently utilizing smart technology worldwide. For AI integration to be successful, it requires a concerted effort and movement within the NGO community, along with ethical considerations regarding technology use to ensure privacy and security. NGOs also face challenges in dealing with data, including identification, collection, and interpretation. Overall, AI presents both opportunities and challenges for NGOs to enhance their impact and effectiveness in addressing societal issues.

Key words: *Artificial intelligence (AI), NGOs, Healthcare*

Introduction

AI is beginning to significantly impact various societal sectors, including research, transportation, banking, and healthcare. Its rapid advancement is estimated to have economic implications in the trillions of dollars, marking it as a key aspect of the Fourth Industrial Revolution. As awareness of AI's transformative potential grows, so does the focus on its social and ethical implications. Consequently, numerous organizations have published materials addressing the moral concerns surrounding AI while also outlining guiding principles and methodologies for its development. It is emphasized that AI should be approached with caution.

These materials, which encompass ethics codes, principles, frameworks, standards, and political strategies, reflect the moral values and beliefs of global leaders, including national governments, international organizations, multinational corporations, well-established NGOs, and AI-focused entities.

the effectiveness of NGOs and governments by leveraging technology and creating new projects that utilize innovative techniques to lead ethically and effectively with technology. Given the rapid pace at which AI is advancing, strong support from governments is deemed necessary to ensure its ethical implementation. The overarching goal is to utilize AI to simplify people's lives and provide them with genuine security in the digital era, while also disseminating crucial AI knowledge for both present and future endeavors. **(LeCun, 2015)**

In this context, it is imperative to explore the ethical dimensions surrounding the adoption and implementation of AI. While the potential benefits of AI are extensive, it is equally important to acknowledge the significant risks and challenges it poses. Therefore, thorough discussions on ethical guidelines, responsible AI development, and strategies for addressing societal concerns are essential to navigate the complexities of the AI landscape.

The concept of "AI for NGOs" aims to enhance

Literature review

Table 1.Methods and Outcomes

Author	Methods	Outcome
(Okoh, March 2022)	Utilized AI to analyze temperature variations in equatorial Africa during covid-19 lockdowns	Revealed significant temperature changes, attributing them to lockdown effects.
(Ha, 2021)	Survey and interview analysis of ESL learners using Microsoft Teams	Identified technical, pedagogical and engagement challenges; suggested improvements in materials and technology use
(Kumar, 2022)	Review and analysis of advancements in AI, sensor technology, and big data applications in agriculture.	Highlighted their transformative impact on farming efficiency, productivity, and sustainability.
(LeCun, 2015)	Comprehensive review of deep learning architectures, algorithms, and application.	Demonstrated deep learning's potential to revolutionaize various fields by learning from complex data.
(Jacobsgaard, 2011)	Exploration of embedded evaluation practices within AI system	Advocated for integrated evaluation mechanisms to enhance AI system reliability and effectiveness.
(Parson, 2019)	Analytical discussion on AI's potential for social progress and necessary conditions for its realization	Identified key requirements for AI to significantly contribute to social progress, including ethical guidelines, regulatory framework, and inclusive technologies.
(Tomašev, 2020)	Review of AI applications aimed at benefiting society across various sectors.	Highlighted successful AI initiatives and proposed stratagies to overcome challenges for maximizing social good.
(Verdegem, 2021)	Analysis on the accessibility and inclusivity of AI for social good.	AI technology to ensure its universally accessible and need for ethical considerartions.
(Yadav, 2022)	Analyzes India's digital governance and divides post-independence through reviews or surveys	Identifies digital access inequalities; suggests policy reforms for inclusivity.

Artificial intelligence (AI) is rapidly emerging as a transformative force with the potential to address societal challenges and drive positive change across various sectors. The literature review provides valuable insights into the role of AI in societal development and offers strategies for NGOs to leverage this technology effectively.

One of the seminal works in this field is the study by (LeCun, 2015) which highlights the impact of deep learning algorithms on industries and their potential for driving innovation. These algorithms, such as those used in convolutional neural networks (CNNs), have become industry standards and are employed by companies like Google, Amazon, and Facebook. However, despite their widespread adoption in the business sector, the application of these techniques in social development and humanitarian projects has been limited.

UNICEF's initiatives, as documented in their annual report (2020), demonstrate the organization's commitment to leveraging technology, including AI, to address pressing social issues. The report showcases projects aimed at harnessing AI for child welfare, education, and healthcare, underscoring the potential of technology to drive positive change in underserved communities. Similarly, (Verdegem, 2021) explores the accessibility of AI for diverse stakeholders, including NGOs, and discusses the implications of AI democratization for societal progress.

Furthermore, (Sehgal, 2020) examine corporate social responsibility (CSR) efforts related to AI, focusing on initiatives undertaken by companies like Microsoft. These efforts include programs aimed at using AI for social good, such as promoting digital literacy, enhancing healthcare access, and addressing environmental challenges. The study underscores the importance of collaboration between corporations, NGOs, and government agencies to maximize the impact of AI on societal development.

(Tomašev, 2020) delve into the potential of AI for social good and outline strategies for its implementation. The paper discusses various applications of AI, including healthcare diagnostics, disaster response, and environmental monitoring, highlighting the transformative potential of technology in addressing pressing social challenges. Additionally, (Yadav, 2022) explores the intersection of governance, technology, and social inclusion in India, shedding light on the opportunities and challenges associated with AI adoption in developing countries.

(Parson, 2019) examine the conditions necessary for AI to drive transformative social progress, emphasizing the importance of ethical considerations, regulatory frameworks, and stakeholder engagement. The study underscores the need for a holistic approach to AI deployment, one that prioritizes social impact and inclusivity. Finally, (Kumar, "Role of artificial intelligence, sensor technology, big data in agriculture: next-generation farming." , 2022) delves into the application of AI and related technologies in agriculture, highlighting their potential to enhance farming practices, improve food security, and mitigate environmental risks.

In conclusion, the literature review provides a comprehensive overview of the role of AI in societal development and offers valuable insights into how NGOs can harness this technology for positive impact. By leveraging AI-driven solutions, NGOs can address pressing social challenges, enhance service delivery, and promote inclusive development. However, to realize the full potential of AI, it is essential to adopt a collaborative, ethical, and inclusive approach that prioritizes social impact and addresses the needs of marginalized communities.

Issues encountered when enforcing AI:

Artificial intelligence (AI) promises to revolutionize India's economy, potentially increasing GDP by $957 billion and raising the growth rate by 1.3% by 2035. However, significant roadblocks impede its widespread

adoption, as outlined in a recent whitepaper by the Data Security Council of India (DSCI).

Data security and privacy emerge as primary concerns, given AI's reliance on sensitive information. While initiatives such as the Personal Data Protection Bill, 2019, and the National Cyber Security Strategy, 2020, aim to mitigate risks, organizations remain vulnerable to cyber threats amidst automation.

The scarcity of AI expertise and inadequate investment pose formidable obstacles. A shortage of skilled professionals hampers progress, despite efforts like NASSCOM's Future Skills Prime. Moreover, high implementation costs deter businesses, particularly in sectors like manufacturing.

Further hindering advancement is the insufficient AI and cloud computing infrastructure. While projects like AIRAWAT strive to bolster capabilities, additional investments are necessary for widespread adoption.

Data scarcity and poor quality exacerbate the situation. Access to high-quality, open-source data is vital for innovation, yet regulatory hurdles and annotation challenges persist. Government initiatives to open geospatial data show promise in addressing this issue.

Ensuring ethical AI development and deployment is paramount. Biases in training data threaten the integrity of AI solutions, underscoring the need for ethical practices to foster public trust.

In conclusion, realizing AI's potential in India demands collaborative efforts to address data safety, talent shortages, infrastructure limitations, data quality issues, and ethical concerns. By surmounting these challenges India can harness the transformative power of AI for a prosperous future.

How to come to be an AI-embedded NGO.

Becoming an AI-enabled NGO involves a structured process with four phases.

In Phase 1, Discovery, organizations identify potential AI applications and assess available data sources. This stage reveals insights that refine problem statements and data requirements. For example, a project with Impact Hub Istanbul initially aimed to reunite families after earthquakes but evolved to calculate the safest routes for city residents. Identifying relevant data sources, such as open street maps, is crucial.

In Phase 2, Rapid Prototyping, organizations develop and demonstrate AI solutions to key stakeholders within a two-month timeframe. For instance, Trash Out collaborated with AI experts to prototype models predicting illegal dumping patterns.

Prototyping serves as a preliminary step towards Phase 3, Productionalize, where prototypes transition into reliable products. This phase requires algorithm refinement, data augmentation, and rigorous testing. The World Resources Institute (WRI) improved the reliability of their socio-economic well-being algorithm from 60-75% to 85-90% by incorporating additional satellite data sources.

Phase 4, Capacity Building, focuses on scaling AI initiatives and fostering internal expertise. Over 3-6 months, NGOs launch larger projects to enhance organizational capacity and develop additional AI solutions. Collaboration with external partners, such as Omdena, enables knowledge sharing and accelerates learning. The United Nations World Food Program (WFP) emphasizes collaborative innovation in addressing humanitarian challenges. By involving more staff members as active contributors, NGOs can leverage AI to tackle societal issues and drive positive impact at scale. The journey to becoming an AI-enabled NGO requires strategic planning, iterative development, and a commitment to building internal capacity for sustainable innovation and social change.

Top NGOs working on AI.

Several leading non-governmental organizations (NGOs) are actively leveraging artificial intelligence (AI) to tackle global challenges. Omdena stands out for its emphasis on data-driven solutions and effective service delivery through AI. Omdena's platform aids organizations at different maturity levels, enabling the creation of practical solutions and speeding up the shift toward data-driven practices. Similarly, Wadhwani AI acknowledges AI's transformative power in

development and concentrates on addressing intricate problems in agriculture and healthcare.

Digital Green, Digital Green, stemming from a Microsoft Research project, has grown into an independent NGO committed to enhancing the livelihoods of small-scale farmers worldwide. Partnering with top technology firms, Digital Green utilizes AI, machine learning, and data analytics to empower impoverished farmers. Innovative initiatives like the COCO (Connect Online and Offline) service help Digital Green tackle rural connectivity obstacles, facilitating offline data collection and utilization.

Operation Red Alert, headquartered in Hyderabad, combats human trafficking using data science and AI. Partnering with Australian analytics firm Quantium, it employs advanced data analysis to improve real-time grievance reporting and government responses to trafficking incidents. Its service, MapR, enhances performance, security, and data integration for swift anti-trafficking measures.

The Save Life Foundation aims to tackle India's high rate of traffic accidents through nationwide surveys analyzing public perceptions of road safety.

Conclusion:In conclusion, NGOs can greatly improve their service delivery and reach by implementing AI-based solutions. Drawing from Omdena's experience, a four-stage approach can be adopted. The initial phase, "Discovery," involves identifying AI capabilities and potential applications. Phase 2, "Rapid Prototyping," develops prototype products to showcase AI benefits. Phase 3, "Productionalize," refines the prototype for everyday use. Lastly, in phase 4, "Capacity Building," internal skills are developed to leverage AI's potential. This structured approach enables NGOs to enhance efficiency, expand impact, and better serve beneficiaries and communities.

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