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Role of Responsible AI & Assistive Technology in Empowering Individuals Through Inclusivity

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Abstract

Artificial Intelligence (AI) plays the role of empowering the lives of individuals with diverse needs through the mechanism of Responsible AI (RAI). Assistive Technology & Inclusivity is the key to embracing the positive implications in technology and advancements. This paper focuses on analysing the various mechanisms in the domain of RAI for the disadvantaged individuals with selective disabilities, making them use their abilities to grow and rejuvenate their lives. The opportunities through the advent of technology and more specifically through Responsible AI are much more than the challenges that take a step back in terms of ethical concerns, affordability and accessibility. The paper provides a broad outlook to ways of inclusion and assistive technology which enhances and empowers livelihoods of people with disability and caps on their abilities for them to lead a better life. The paper also highlights the challenges faced by organisations and individuals in implementations and acceptance as dependence on assistive tools should be limited by need and necessity and not by compulsion. In conclusion, the paper offers valuable insights for disadvantaged individuals who are the prominent end users of this framework and for developers and researchers to overcome hindrances in successful ways of implementing RAI for empowerment through assistive technology and inclusivity.

Keywords : Responsible AI, inclusivity, assistive technology, artificial intelligence, disadvantaged individuals, disability, empowerment through AI.

In the present times , every individual belongs to the Artificial Intelligence ecosystem wherein together it is everyone's responsibility to support and develop applications appropriate to diverse people with different needs for making their lives better. Every individual is unique by the way they choose their necessities and comfort and it is the responsibility of the evolving era to consider the requirements and serve the community better. AI-driven solutions are being utilized to create more inclusive and equitable work environments (Halls, 2025).

In the midst of a lot of technology advancements , a developer of an application should remember that the developed tools or product or service is focussed and designed with a commitment towards the end user. In this society, people have some societal norms and artificial intelligence (Singh, 2024: Russell et al. 2019) can give them a breakthrough by being designed and developed within a responsible framework. Individuals who have a dependency on others share a different set of requirements for empowering their lives.

This paper focuses on the role of Responsible Artificial Intelligence and assistive technology with a focus on inclusivity. Existing mechanisms in place and positive implications will be appreciated by many , only if they consider accessibility to those mechanisms and affordability to access them (Kaushik, 2025). There is a need for making things accessible and affordable through collaborations with agencies involved in providing assistance to disadvantaged individuals. This paper focuses on research of assistive aids for individuals with visual and sign language requirements. Ethics play an important role in providing the best to disadvantaged individuals by being more responsible in supporting their livelihood and increasing their opportunities in life.

Artificial Intelligence

Artificial Intelligence (AI) is a term coined in support of imitating possible components of natural intelligence to provide an ability to the computer systems to perform tasks that typically require natural human intelligence.

Natural human Intelligence comprises perceiving an environment and learning, reasoning, problem-solving and decision-making. All of this is accomplished by means of mimicking cognition through patterns and processes that are analysed and programmed. One step further Artificial Intelligence focusses on creating machines that can relate and comprehend the content provided by a user and act according to its knowledge base and reasoning.

Artificial Intelligence (Singh, 2024) can be considered as a system that has a knowledge base and acts upon the same and also adds on more knowledge through the interactions with the user. In this paper we discuss the efforts of artificial intelligence as a responsible component in the lives of disadvantaged individuals.

Artificial Intelligence (AI) is used in numerous domains for problem solving in the field of education, healthcare, finance, business, logistics, engineering and transportation offering recommendations based on content provided to it. For individuals , AI can implement tools for recommending better suggestions and help in mobilization and environment accessibility (Zallio et al., 2024) as required by the individual. AI enables machines to analyze data, adapt to variant content, and make autonomous decisions and justified suggestions.

AI is a transformational technology that can bring meaningful and positive change to the way people experience moments in their lives and enhance their livelihood. The advent of Artificial Intelligence goes back to the Dartmouth Conference in 1956 (Russell et al., 2019) , where the term "artificial intelligence" was coined. Research continued in the area and prominently focused on logic and problem-solving. High expectations were met with limited, non-scalable results.
Further the implementations progressed in AI and its unlimited possibilities through Machine Learning, Deep Learning, Large Language Models (LLMs) allowing for enhanced image recognition and advancements in neural networks (Kissinger et al. 2022) & autonomous agents.

AI has paved its way from simple automation to advanced agentic systems that can plan and act autonomously to achieve need based goals and this can benefit the disadvantaged individuals in a big way if implemented responsibly. Some notable AI implementations include recommendation systems via services of OTT Platforms, virtual assistants at home and workplace and self-driving cars and drone technology. AI implementations are accompanied with challenges of data privacy , ethics, security, bias and fairness and sometimes lack of transparency in domains where confidentiality is of utmost importance.

Responsible Artificial Intelligence

Responsible Artificial Intelligence (RAI) is a framework that includes the design, development, deployment and use of AI for building trust in AI solutions that have the potential to empower individuals, organizations and any stakeholders of that domain. RAI plays an extremely important role in today's world as it focuses on developing Responsible Applications in

AI which can enhance the livelihood of people and more prominently have a positive empowered approach towards disadvantaged individuals.

This paper emphasizes the need of implementing applications of RAI with the focus of inclusivity and assistive technology towards the disadvantaged individuals of the society. Responsible AI will be one step forward for building trust with users and stakeholders for fair outcomes. Principles of Responsible AI (Hussain , 2025) ensures that AI should work equitably and does not dilute results based on different characteristics of users. Responsible AI is a mandatory compliance rather than a voluntary commitment.

Responsible AI should move from good practice to mandatory compliance to ensure inclusivity. Different stakeholders of the AI ecosystem shape the future of AI, and it is essential to have a common set of principles which can guide all stakeholder groups towards responsible AI (NITI Aayog, 2021).

Assistive Technology

Assistive technology refers to any tool as a hardware or software used to improve the functional capabilities of individuals with disabilities (Zallio et al., 2022).

It includes various tools like basic walkers and magnifiers to high-tech power wheelchairs & screen readers that facilitate confidence, empowerment, independence, education, employment and improved daily living. Assistive technology also comprises devices used at rehabilitation centres for people with disabilities and the elderly. Assistive technology is any item, piece of equipment, software program, or product system that is used to increase, maintain, or improve the functional capabilities of persons with disabilities. It helps people who find it difficult to communicate, write, remember, see, hear, learn and walk. Different disabilities require different assistive technologies as per their needs.

Inclusivity

Inclusivity refers to providing equal access to opportunities and resources to every individual irrespective of their approach and livelihood. Each individual has an ability to overcome their weakness or disability. The paper narrates the meaning of disadvantaged individuals, who are considered to have a different set of abilities which can be harnessed to bring in a very positive impact on their lives. Inclusivity (Halls, 2025) paves way for interacting precisely with all individuals and it involves showing sensitivity, empathy, and commitment to fairness and respect in all interactions.

Disadvantaged Individuals

Disadvantaged individuals are those who have one form of disability which makes them do certain routine things with a sense of discomfort or with difficulty. They can be provided with assistive technology to help them convert their disability into an ability to help them enhance the quality (Halls, 2025) of their lives.

Objectives, Scope & Methodology

This paper aims to identify suggestive implementations considering the review of the impact brought in with assistive technology by way of inclusion for empowering the lives of disadvantaged individuals. Selective disabilities and the work in those fields is showcased to infer suggestive improvements for achieving the goal of assistive technology for diverse individuals.

The paper discusses and acknowledges the contributions in the area of Assistive technology with inclusivity as a focus in Responsible Artificial Intelligence (RAI), by exploring different ways in which Assistive Technologies have brought comfort to disadvantaged individuals. Selective disabilities are considered for this review to explore and provide suggestive measures for different stakeholders.

The research design adopted for this paper involved a review of the existing literature of different papers and studies on the relationship of AI, assistive technology (Liu et al., 2024) & inclusivity. Secondary data was collected from verified sources including journal publications, websites and Books.

Literature Review

Recent research studies have focussed on various assistive tools for disadvantaged individuals. The use of artificial intelligence has profoundly improved the scope of assistance through technology that can be provided to individuals with disabilities. The inclusion(GAAD n.d.) of every individual and the approach in developing and providing the best tools with relevant concerns into consideration can make the tools more effective and will empower the disadvantaged individuals.
Studies show the necessity for adaptable and configurable technology solutions that align with universal design concepts to meet diverse needs (Korada et al., 2024). Focussing on including individuals with disabilities in AI development to ensure fairness and mitigate discrimination (Trewin et al., 2019) has been prevailing.

Significant improvements in task completion times, user satisfaction, and communication efficiency compared to traditional assistive technologies(Brotosaputro et al., 2024) are found to be extremely relevant. There is a transformative potential of AI in enhancing accessibility and inclusivity for individuals with disabilities, emphasizing the need for adaptable and configurable technological solutions (Korada et al., 2024).A research framework was proposed to enhance inclusivity in AI by integrating Natural Language Processing (NLP) and Reinforcement Learning (RL), addressing significant challenges in representation for underrepresented communities(Ibitoye, 2025).

There are a few advancements seen as Responsible artificial intelligence solutions such as AI-powered wheelchairs and ReWalk technology, which have significantly improved user autonomy and mobility, with reported increases in independence by 50% and daily exercise levels by 60% respectively (Korada et al., 2024). Datasets Masakhane and Mozilla Common Voice were utilized to improve language translation and speech recognition for low-resource languages (Ibitoye, 2025). It is observed that there is a transformative influence of Artificial Intelligence on sign language communication , enhancing accessibility and inclusivity for the deaf and hard-of-hearing community (Beknazar,2025).
There is a need for AI systems to accommodate diverse linguistic and cultural contexts to mitigate biases (Ibitoye, 2025). For more indepth benefits included the development of AI systems that bridge linguistic and cultural gaps, fostering inclusivity and empowering communities (Ibitoye, 2025). Responsible Artificial Intelligence should focus on assistive technology and its accessibility to all sections of individuals.

A study (Korada et al., 2024) highlights the transformative potential of AI in enhancing accessibility and inclusivity for individuals with disabilities, emphasizing the need for adaptable and configurable technological solutions, which Artificial Intelligence can develop and deploy. As we need to focus on empowerment, it makes an individual more confident in doing their task, which could be basic routine tasks or reactive tasks based on situations.
Inclusivity with Responsible Artificial Intelligence together can empower individuals. There is a need for special educators to play a big role in the analysis and design of the assistive tools for a better outcome making it accessible to many needful individuals.

Existing Technology Tools for disadvantaged individuals

The Department of Empowerment of Persons with Disabilities has provided access to a digital library titled Sugamya Pustakalaya designed for individuals with visual and other print disabilities. As per the approach and usage of the Pustakalaya, it also serves as a platform for content producers and publishers to create and share more better accessible material. Table 1 shows some effective tools which can be procured from their relevant firms. (The Department of Empowerment of Persons with Disabilities, n.d.) .

Table 1

Technology Solutions / Tools as Assistive Technology to Visually Impaired

Sr. No	Name of the Organisation / Institution / Company	Technology Solutions / Tools Available
1	Torch It	(i) Saarthi – Assistive Aid Designed To Optimize Mobility For Visually Impaired. (ii) Inclusive Education- Saksharta kit, Jyoti AI Pro, AI reader, Talking solutions, Labelers. (iii) Independent Mobility- Wearable AI Jyoti, Canes, Types of Canes, Accessories, Smart Saarthi cane, etc. (iv) Enablemart: All in one hub for assistive solutions
2	Thinker Bells	(i) Annie is the world's first self learning braille device for the visually impaired.

Sr. No	Name of the Organisation / Institution / Company	Technology Solutions / Tools
3	Phoenix Vibrating Cane	(i) Smart Cane- A technologically advanced mobility aid for visually impaired individuals that promotes safe and independent navigation.
4	Hear Sight	(i) HearSight HeadBand- Portable device specially created to assist visually impaired person to handle everyday tasks without the internet.
5	ICMR - SunBot	(i) Smarton is the world's most affordable AI wearable, featuring advanced glasses equipped with a camera and complemented by a mobile application. It enhances daily life

		with features like text and currency recognition, educational support.
6	Trestle Labs	(i) Kibo includes software and hardware that allows one to: Listen, Translate, Digitize and Audio'tize any kind of printed, handwritten and digital content across 60+ global languages.
7	Noba Flix	(i) An OTT platform for visually impaired people to enjoy mainstream entertainment.
8	Orbit	(i) The Orbit Reader 20 is the world's most affordable Refreshable Braille Display. It is a unique 3-in-1 device and serves as a self-contained book reader, a note-taker and as a braille display by connecting to a computer or smartphone via USB or Bluetooth.
9	Tactile	(i) Tactile graphics and Braille transcription services.

Sr. No	**Name of the Organisation / Institution / Company**	**Technology Solutions / Tools**
10	National Association for Blind	(i) Shravan is India's first AI powered Interactive Voice Response(IVR) audio books library for persons with print disabilities. People who do not have internet access or limited digital skills can just call a phone number and read a book of their choice. (ii) Aditi AI Chatbot provides information on Sexual and Reproductive Health in English and Hindi.

Note. Source : The Department of Empowerment of Persons with Disabilities.(n.d.). https://depwd.gov.in/en/visual-impairment/

With Reference to Table 1, we see a lot of advancements with the inclusion of AI for visually impaired individuals but we observe the affordability and accessibility lacking in some of them. This can be overcome with a proper channelised approach to distribution of the tools to beneficiaries through funding organisations.

Table 2

Technology Solutions / Tools as Assistive Technology for Sign Language

Note . Source : Indian Sign Language Research & Training Center. (n.d.).

Sr. No.	**Name of the Department / Center**	**Name of the Assistive Technology Application**
1	Department of Empowerment of PwD (DoEPwD)	Sign Learn App for Android and iOS : It has options of languages and countries and categories like Academic, Legal, Regional, Village Sign Language etc.
2.	Indian Sign Language Research & Training Center (ISLRTC)	ISL (Indian Sign Language) Dictionary https://islrtc.nic.in/

With reference to Table 2 above , the Apps designed for use by disadvantaged individuals are a step towards taking their options for the preferences and categories based on one's domain knowledge. ISL Dictionary has been developed with the objective of helping people to learn ISL, it is an important resource for special educators, teachers, parents and employers. ISLRTC provides a one stop platform for persons with disabilities to access information about government schemes, support services, benefits and facilities across India named as Divya Chatbot and Divya Voicebot. SATYA, developed by Centre for Development of Advanced Computing is a Google Chrome extension designed to assist in testing and evaluating website accessibility. The tool helps identify accessibility issues in web pages in alignment with established accessibility guidelines, supporting the development of inclusive and user-friendly digital platforms.

SATYA can be used by developers, designers, and content managers to assess compliance with accessibility standards (Centre for Advanced Computing , n.d.).

Barriers to Technology access for diverse needs

It is observed that there is a prominent increase required in the importance of addressing ethical considerations, such as data privacy and informed consent, in the implementation of accessible technology (Korada et al., 2024). Existing global AI education frameworks fail to meet the diverse needs of learners in the Global South, particularly regarding linguistic, cultural, and socio-economic factors(Sasikala et al., 2025). There is a need for societal impact of empowering communities, preserving cultural heritage, and promoting trust in AI systems (Ibitoye, 2025).

The potential of AI-driven solutions to address longstanding challenges related to accessibility and inclusivity for individuals with disabilities is underscored (Korada et al., 2024).
Emphasis should be on the importance of inclusivity and ethical considerations in AI development, particularly for people withdisabilities.(Brotosaputroetal.2024).

Intersection of Responsible AI, Assistive Technology & Inclusivity

AI-driven applications, such as speech and emotion recognition systems, provide tangible benefits, improving social interactions and independence for users with disabilities(Brotosaputro et al. , 2024).

Focus should be on including people with disabilities in the design process to enhance user experience and broaden the potential user base (Trewin et al., 2019). Sign language communication in AI, focuses on enhancing accessibility and inclusivity for the deaf community(Beknazar,2025). There is a lot of importance for personalized and adaptive support provided by AI technologies, which is crucial for enhancing accessibility (Brotosaputro et al. , 2024). A global standard establishment for inclusive education can help in emphasizing the role of web components in enhancing accessibility for individuals with disabilities (Sahasrabudhe et al.,2016).

An increased representation of people with disabilities in tech fields will help to enhance their voices in technological innovation (Brotosaputro et al. , 2024; Marko et al., 2025) puts forth the need for effective regulations to promote inclusion and equity, and emphasize rigorous validation.

In most studies it is mentioned that developers should involve the disadvantaged individuals in developing assistive technology systems for them, and we propose that a special educator or instructor and the family or parents involvement in all the phases of the development of the technology can be a better initiative to give a boost to Responsible AI with inclusivity.

The literature on human-centered design processes offers insights for Artificial Intelligence and Machine Learning engineers to innovate algorithms that improve the lives of people with disabilities (Trewin et al., 2019). It is observed that AI can enhance end-user compliance in rehabilitation by personalizing interventions and improving communication between users and healthcare providers (MohammadNamdar et al. , 2025).

Use of photovoice as a method to engage and empower individuals with intellectual disabilities in the design of assistive technology has shown how this approach can help identify user needs and enhance participants' coping abilities, self-determination, and ownership in the innovation process (Wass et al., 2020).

The authors positively put forth that AI has the potential to improve the lives of people with disabilities, but it must be developed with a focus on fairness and equality (Trewin et al., 2019; Burgstahler, 2020).

Studies suggest that AI has the potential to improve the lives of people with disabilities across various domains, such as healthcare and public safety (Trewin et al., 2019). Authors have also acknowledged a lot of studies that contribute to understanding user involvement of vulnerable groups, specifically people with intellectual disabilities, in the design of assistive technology (Wass et al., 2020).

Advancements in AI technologies facilitate real-time sign language translation, while also addressing challenges such as variability in sign languages and ethical concerns.(Beknazar,2025). A lot of research emphasizes the importance of engaging disadvantaged user groups to improve digital solutions and address previously overlooked needs (Wass et al., 2020).

There are studies that focus on the societal value of AI technologies in education, healthcare, and public services, promoting social inclusion (Beknazar,2025). Brotosaputro et al. (2024) employed a mixed-methods approach, revealing significant enhancements in usability and user satisfaction compared to traditional technologies, while also highlighting the need for further research on long-term impacts and cost-effectiveness.

Beknazar (2025) reveals that while AI applications in sign language communication are expanding, challenges remain, such as variability in sign languages and ethical concerns regarding data privacy.The authors of this paper identify the lack of ethical responsibility of technologists to ensure that people with disabilities are not marginalized in the AI revolution.
Ethical concerns are a challenge which can be overcome if relevant agencies get involved in the process of developing assistive technologies.

The authors highlight the importance of inclusivity and representation of people with disabilities in technological innovation, advocating for more inclusive educational and workplace environments. Sahasrabudhe et al. (2016) discusses innovative Web components designed to provide alternatives to images, precise spoken and braille representations of text, and custom user interface components and the research emphasizes the importance of exploring Brain-Computer Interface (BCI) systems for improving communication for individuals with intellectual disabilities.

MohammadNamdar et al. (2025) identifies key strategies, such as motivation through tracking and reminders, to address challenges in rehabilitation adherence and disability simulation has been found to create negative impressions of the capabilities of people with disabilities (Morris ,2020).

A Case study of Torch I was analysed , it is a firm based in India which has grown into a hub for innovation in the assistive technology sector, making a significant impact on the lives of people with disabilities. The company's flagship product, "Saarthi," an affordable navigation device for the visually impaired, marked a breakthrough in accessibility by using sensors to guide users safely through their surroundings. This product has allowed thousands of visually impaired individuals to regain independence.

All of their product assembly and operations include training led by People with Disabilities from understanding the need & providing feedback on developed products to assembling of the devices to training being provided to the new users.
This is a significant and focussed achievement by TorchIt. Statistics derived from Torch It web resource specifies they have 10+ Blind employees for Marketing, Sales, 500+ Visually Impaired Trainers, 9,500+ Differently Abled Friends Employed, 2,50,000+ Specially Abled Friends Uplifted and over 6,00,000+ Lives Impacted Directly (Torch It , n.d.).

Potential Frameworks for Integration

Future work aims to improve the system's accuracy in recognizing complex gestures and developing an engaging graphic interface for interactive Sign Language learning, indicating a commitment to ongoing innovation (Cabana et al., 2024). Sahasrabudhe et al. (2016) highlights that individuals with disabilities use cellphones at a lower rate compared to the general population, but they utilize smartphones and tablets at somewhat higher rates, indicating a shift in technology adoption among this group. The findings suggest that the concept of affordances is crucial in explaining the interaction between human capabilities and technology, which can lead to better design and accessibility solutions (Sahasrabuddhe et al., 2016).
Creation of an engaging graphic interface for interactive Sign Language learning, contributes to inclusivity within the community and the research ultimately seeks to bridge communication gaps between the deaf and hearing communities through accessible AI technologies (Cabana et al., 2024).

In India, the Ministry has been implementing the Scheme for Implementation of the Persons with Disabilities Act, 1995 (SIPDA) to provide financial assistance for activities outlined in the Persons with Disabilities (Equal Opportunities,

Protection of Rights and Full Participation) Act, 1995. These primarily focus on rehabilitation and the provision of barrier-free access. Grant-in-aid is offered to State Governments and various Central and State Government-established bodies, including autonomous bodies and universities. If these grants are channelised considering the needs of the disadvantaged individuals then the challenge of accessibility and affordability can be overcomed (SIPDA, n.d.).

Suggestive Improvements for Future Direction For Industry developing Assistive Technology

Special education Instructors as an external Team Member in the Analysis of the requirements of the assistive technology will greatly enhance the end user acceptability. Corporate Social Responsibility initiatives for supporting and creating awareness among all for assistive tools is needed.

For Organisations & Institutions supporting Inclusion

Investment and tie ups for accessibility to tools at the organisation and institutions should be prominent. Prioritization of needs of disadvantaged individuals to be focussed based on the urgency & necessities in their routine tasks.

For Authorised Official Departments supporting the Disadvantaged Individuals

More schemes and funding for Assistive Technology Startups can make a huge positive addition for the empowerment of the disadvantaged individuals. Awareness Campaigns about the role of Responsible AI through data available on official portals can increase confidence of the disadvantaged individuals.

Conclusion

The study concludes the need for the development of AI applications in assistive technologies, driving advancements for a more inclusive society focussing to add more value to the life of disadvantaged individuals. Turning their disabilities into abilities to empower and live a better life can be achieved with more focus on stakeholders involvement at a special education instructor's continuous involvement in the analysis team.

AI technologies are noted for their potential to enhance capabilities for people with disabilities and ethical considerations must guide their development and deployment. Inclusivity issues in AI systems, particularly regarding disability, are under-discussed, posing risks of exclusion from emerging technologies, which necessitates better data sourcing from under-represented groups.

The suggestive improvements give scope for more research in this area to boost the Role of Responsible AI and assistive technology with inclusivity. The confidence level of a disadvantaged individual can be boosted through assistive tools and the individuals can be motivated to be self independent with better employment opportunities.

Author's Contribution

Ms. Sweta S. Alve and Ms. Shilpa Karpe jointly and equally contributed to the paper through discussions with literature review content and contributed to the suggestive improvements. Both the authors have equally contributed and provided a direction for future in-depth research in the area of Responsible AI, Assistive Technology & Inclusivity.

Conflict of Interest

The authors certify that they have no involvement in any organisation or entity with any financial interest in the subject matter discussed in this manuscript.We certify that the submission is original work and is not under review at any other publication.

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