

The Promise and Peril of AI for People With Disabilities

As Potencialidades e os Riscos da Inteligência Artificial para Pessoas com Deficiência

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Abstract: To critically analyze the dual impact of Artificial Intelligence (AI) on people with disabilities, exploring both its potential for inclusion and the risk of perpetuating systemic discrimination (ableism). **Method:** This study employs a qualitative, literature-based methodology. It analyzes foundational concepts from disability studies (e.g., the social model,

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techno-ableism), examines case studies of assistive and potentially biased AI technologies, and reviews the international regulatory framework, focusing on the Convention on the Rights of Persons with Disabilities (CRPD) and the EU's AI Act. **Result:** The analysis reveals that while AI offers significant opportunities for enhancing accessibility, it also presents substantial risks. Algorithmic bias, flawed conceptions of "fairness," and the reinforcement of normative standards can create new digital barriers, deepening the marginalization of individuals with functional diversity. The emerging regulatory frameworks, like the AI Act, represent a crucial step towards mitigating these risks but require robust implementation and the active participation of the disability community. **Conclusion:** Technology is not neutral. To realize the inclusive promise of AI, a paradigm shift from a "design for" to a "design with" approach is an ethical imperative, ensuring technology serves as a tool for liberation, not a new form of automated control.

Keywords: Technology Law, Disability Studies, and Artificial Intelligence Ethics.

Resumo: Empreender uma análise crítica acerca da dupla dimensionalidade do impacto exercido pela Inteligência Artificial (IA) sobre os indivíduos portadores de diversidade funcional, perscrutando, de um lado, seu potencial transformador para a promoção da inclusão social e, de outro, os riscos inerentes à perpetuação da discriminação sistêmica manifestada através do fenômeno do capacitismo.

Método: O presente estudo adota uma metodologia de natureza qualitativa, fundamentada em revisão bibliográfica sistemática e análise documental. Procedeu-se ao exame minucioso dos conceitos basilares dos estudos da deficiência – notadamente o modelo social

e o tecnocapacitismo, à investigação pormenorizada de estudos de caso concernentes a tecnologias de IA de caráter assistivo e potencialmente enviesado, bem como à apreciação crítica do arcabouço regulatório internacional vigente, com especial atenção à Convenção sobre os Direitos das Pessoas com Deficiência (CRPD) e ao AI Act da União Europeia.

Resultado: A análise empreendida desvela que, conquanto a IA apresente oportunidades de significativa magnitude para a ampliação da acessibilidade, simultaneamente manifesta riscos de substancial relevância. O viés algorítmico, concepções epistemologicamente falhas acerca da “justiça” e o reforço de padrões normativos hegemônicos configuram elementos propiciadores da criação de novas barreiras de natureza digital, aprofundando, por conseguinte, a marginalização de indivíduos com diversidade funcional. O arcabouço regulatório contemporâneo, exemplificado pelo AI Act, constitui medida de importância crucial para a mitigação desses riscos, demandando, contudo, implementação robusta e a participação ativa e deliberativa da comunidade de pessoas com deficiência.

Conclusão: A tecnologia não se reveste de neutralidade intrínseca. Para a concretização efetiva da promessa inclusiva inerente à IA, impõe-se uma transformação paradigmática, transitando-se de um modelo de “projetar para” em direção ao preceito de “projetar com”. A integração sistemática da experiência vivenciada por pessoas com deficiência em todo o ciclo de vida da IA constitui imperativo de ordem ética, destinado a assegurar que a tecnologia opere como instrumento de emancipação e libertação, e não como nova modalidade de controle automatizado e excludente.

Introduction

The rise of Artificial Intelligence (AI) permeates contemporary discourse with narratives of optimization and progress, promising to redefine the boundaries of human capacity. For people with disabilities, this promise materializes in increasingly sophisticated assistive technologies capable of translating the visual world into sound, captioning conversations in real-time, or offering new forms of mobility and interaction. However, beneath this surface of techno-optimism lies a structural danger: algorithms are not neutral. They are sociotechnical artifacts that inherit, encode, and amplify the biases present in the data that trains them and in the assumptions of those who design them. Ableism – the systematic discrimination against people with disabilities – finds in AI architecture a new and potent means of perpetuation, often in invisible and automated ways.

This article argues that while AI offers unprecedented potential for inclusion, its development devoid of critical analysis and robust regulatory framework risks deepening marginalization. Technology, instead of serving as a tool for equity, may become a digital barrier that reinforces norms of corporeality and cognition, penalizing functional diversity. To unveil this tension, the text begins by establishing a foundation in disability studies, differentiating the social model from the medical paradigm and introducing the concept of “techno-ableism.” Subsequently, it maps both the opportunities opened by AI and its inherent risks, such as algorithmic bias, the fallacy of purely mathematical “fairness,” and surveillance. Finally, it analyzes how the emerging regulatory landscape, with emphasis on the European Union’s AI Act, seeks to navigate this challenge, using the Convention on the

Rights of Persons with Disabilities (CRPD) as a normative compass for a truly inclusive digital future.

1. Brief Notations on Disability Studies and Assistive Technology (AT)

According to the Centers for Disease Control and Prevention (CDC)³, a disability is defined as any condition of the body or mind that impedes an individual's capacity to perform certain activities and interact effectively with their environment. Disabilities can influence various facets of an individual's life, including but not limited to vision, mobility, cognitive abilities, memory, learning, communication, hearing, and mental health. The World Health Organization (WHO)⁴ categorizes disability into three dimensions: (i) impairments in body structure or function, or mental functioning, such as vision loss or memory impairment; (ii), activity limitations, exemplified by difficulties in seeing, hearing, walking, or problem-solving; (iii), participation restrictions, which limit engagement in normal daily activities such as employment, social and recreational activities, and access to health care.

It is critical to acknowledge that disability is not a monolithic or universally accepted concept. Neither legal frameworks nor academic discourse has settled on a singular definition, often contrasting it with notions of normalcy or ability. Scholars in disability studies differentiate between the medical and social models of disability. The medical model, grounded in biomedical norms, has been criticized for reinforcing stigma towards those who deviate from

3 CENTERS FOR DISEASE CONTROL AND PREVENTION, 2024.

4 WORLD HEALTH ORGANIZATION, 2021.

these norms. Conversely, the social model conceptualizes disability as a consequence of disabling environments and societal attitudes, linking the notion of ability to social and material conditions.⁵

Within this framework, disability may sometimes be misinterpreted as synonymous with deficiency and dependency, intersecting with other identifiers characteristic of marginalized groups, such as gender, ethnicity, economic status, and age. This viewpoint fails to consider the diverse experiences of people with disabilities, who may vary greatly in their economic and social backgrounds, ethnicities, genders, and ages. Reflecting the fluidity of this concept, Article 1 of the Convention on the Rights of People with Disabilities (CRPD) refrains from endorsing a static definition of disability. Instead, it adopts an inclusive approach, recognizing people with disabilities (PWD) as those with long-term physical, mental, intellectual, or sensory impairments which, in conjunction with various barriers, may obstruct their full and effective participation in society on an equal basis with others. Trewin adds to this argument, pointing out that:

fairness for people with disabilities is different to fairness for other protected attributes such as age, gender or race. One major difference is the extreme diversity of ways disabilities manifest, and people adapt. Secondly, disability information is highly sensitive and not always shared, precisely because of the potential for discrimination.⁶

According to Shew⁷, the discourse surrounding technology for disabled individuals often carries a distinctive rhetoric that emphasizes the potential of technology to complete individuals. This techno-optimistic narrative promotes

5 ZARRA; FAVALLI; CERON, 2023, p. 334.

6 TREWIN, 2018, p. 3.

7 SHEW, 2018.

the idea of “overcoming” bodily conditions, suggesting that recovery involves not only regaining previous capabilities but also enhancing them through cutting-edge technologies. From TED talks to media representations featuring Paralympians, the technologized disabled body is portrayed as a beacon of redemption for those deemed broken. Such technableist (term coined by Shew) notions prevail in our perceptions of disabled bodies and influence how technologies are designed to address disability, often under the assumption that technology’s role is to restore physical capabilities and that without such technologies, disabled bodies are inferior.

Ableism (discrimination in favor of nondisabled people and against disabled people) impacts technological imagination. Like sexism, racism, and other types of bigotry, ableism works in insidious ways: by shaping our expectations, it shapes how and what we design (given these expectations), and therefore the infrastructure all around us. And ableism shapes more than just the physical environment. It also shapes our digital and technological imaginations – notions of who will “benefit” from the development of Artificial Intelligence (AI) and the ways that those systems are designed and implemented are a product of how we envision the “proper” functioning of bodies and minds.⁸

However, this perspective severely constrains our understanding of disabled bodies and has tangible consequences for individuals with disabilities. One significant limitation is structural: the technologies envisioned for disabled people frequently overlook the broader systems that dictate access to these technologies. These systems include health insurance policies, prescription requirements, vocational rehabilitation programs, warranties, maintenance routines, and service contracts, all of which determine who accesses what technologies and when – or if they ever do.⁹

8 SHEW, 2020, p. 40.

9 SHEW, 2018.

Shew¹⁰ also points out the iBOT power wheelchair serves as a poignant example of these imaginative limitations. Developed in the early 2000s by Dean Kamen, also known for the Segway, the iBOT was lauded by *New Mobility* magazine as a “revolutionary four-wheel-drive wheelchair” capable of navigating stairs, rough terrain, and even elevating the user to a standing height. Despite its potential, the iBOT was prohibitively expensive at around \$25,000 and was never covered by insurance, partly because the Food and Drug Administration (FDA) classified it as a Class III medical device – reserved for high-risk devices like pacemakers – rather than as a Class II device, which includes most power wheelchairs and is more likely to be covered by Medicare and Medicaid.

This case illustrates that technology must be understood within its broader context. Designing for disability is not merely a technological challenge but also requires consideration of the structural contexts in which disabled individuals must navigate. Without addressing these structures, designers risk creating exclusive, expensive devices that few can access. Achieving disability inclusion and empowerment extends beyond individual technological fixes to involve designing physical environments that do not stigmatize disabled individuals. Many environments are physically exclusionary – steps, malfunctioning elevators, poorly designed restrooms, inconveniently located disability access, and hazardous surfaces all contribute to the exclusion and discomfort of disabled individuals.¹¹

In that matter, Shew also points out the importance of incorporating the perspectives of disabled individuals, which leads to superior technologies and designs that benefit everyone. Designing with disabled people in mind – creating

10 SHEW, 2018.

11 SHEW, 2018.

technologies that accommodate a broad spectrum of physical and mental conditions – results in better, more universally welcomed solutions. As disabled designer J.H. Adamé notes, cited by Shew, ableist attitudes have historically hindered progress in these areas by dismissing problems that do not affect the majority. However, by listening to those who face the most significant challenges, solutions designed to address their needs can also alleviate minor inconveniences for others, leading to universally beneficial designs.¹²

When designs consider those at the farthest reaches of need, they tend to create more accessible and user-friendly solutions for everyone. This principle of inclusive design extends beyond just technological products to the built environment as well. Making spaces accessible to those with the most substantial usage challenges creates environments that are easier and more comfortable for everyone to navigate. This includes not only those with disabilities but also non-disabled individuals like parents pushing strollers, athletes with temporary injuries, and many others. In essence, when we design for disability, we enhance usability for all.¹³

Rethinking how disabled bodies are viewed – as inherently complete, valuable, and worthy as they are – challenges the dominant medicalized narratives in technological design. This approach does not preclude enjoying technology but advocates for a non-conformist, playful engagement with it. Effective disability design emerges not from stigma but from an inventive interaction with the material world and recognizing our contextualized physical embodiments. This perspective not only focuses on the individual but also fosters a sense of community.¹⁴

12 SHEW, 2020, p. 40.

13 SHEW, 2020, p. 40.

14 SHEW, 2018.

2. What Technology Can do for People With Disabilities?

According to the European Disability Forum's report on emerging tech and accessibilities¹⁵, the increasing prevalence of AI raises significant considerations for people with disabilities. AI technologies offer considerable potential benefits, potentially enhancing their rights to equality, non-discrimination, employment, access to goods and services, independent living, communication, and education. Indeed, AI can act as a powerful assistive tool for people with disabilities.

One notable development in the realm of AI-enhanced accessibility is Facebook's introduction of tools designed to make images more accessible.¹⁶ In April 2016, the company launched the "Automatic Alternative Text"¹⁷ tool, utilizing AI to detect and describe objects or scenes in images through audio descriptions. This technology is capable of identifying human features such as smiles, beards, and glasses, and can articulate environmental aspects like sunlight, snow, or ocean presence. Furthermore, in 2017, Facebook expanded its AI capabilities to include facial recognition technology, which aids in identifying individuals in photos, regardless of whether they have been tagged by the uploader.¹⁸ These advancements underscore the transformative potential of AI in promoting accessibility and inclusion for people with disabilities.

15 MARZIN, 2018.

16 USA TODAY, 2016.

17 WIRED, 2016.

18 META ACCESSIBILITY, 2017.

Similarly, Microsoft has developed the 'Seeing AI' app¹⁹, aimed at enhancing the visual experience for individuals who are blind or have low vision by providing descriptive narratives of images. Concurrently, the company is in the process of developing the 'Hearing AI' app, targeted at assisting individuals who are hard of hearing; this application is designed to transform auditory signals into visual representations. Another pioneering initiative is the AIPOLY app, which mitigates the challenges posed by internet connectivity issues by storing data about recognized objects offline until an internet connection can be reestablished.²⁰

Translation tools are being increasingly leveraged to enhance inclusivity for people with disabilities. Technologies such as subtitles, captions, and sign language interpretation improve access to television, videos, and live events for individuals who are hard of hearing, deaf, or deafblind. AI-enabled systems are instrumental in facilitating automatic captioning. For example, YouTube provides this feature, though it typically requires manual adjustments by the uploader to ensure accuracy.²¹ Additionally, Microsoft's Presentation Translator offers the capability to automatically produce real-time subtitles for PowerPoint presentations, maintaining the original formatting. This technology supports multilingual audiences and enhances accessibility for those who are unable to hear the presentation, although its accuracy is not yet sufficient to guarantee full participation.²²

Individuals who primarily communicate through sign language often experience isolation from mainstream dialogues and access to information. In response, developers are

19 MICROSOFT, 2024.

20 TECHCRUNCH, 2015.

21 MICROSOFT GARAGE, 2018.

22 INTERNATIONAL TELECOMMUNICATION UNION, 2018.

exploring technological innovations to close this communication gap. Recent advances in AI, utilizing computer vision and machine learning, have facilitated the translation of sign language into written text displayed on digital devices. While multiple applications now possess this functionality, there are ongoing concerns regarding their efficacy, especially related to the deployment of avatars, which will be further discussed in subsequent sections on reality technologies.²³

Complex documents pose comprehension challenges for many people, particularly for individuals with intellectual disabilities. In an effort to address this issue, new AI-powered tools have been developed to streamline the presentation of information, enhancing understandability for users. A notable example is the Polisis tool, which employs deep learning algorithms to create visual representations of privacy policy content. This aids users in grasping the types of data collected by organizations and their intended uses. Such AI applications hold promise for numerous areas where clarity of information is essential, potentially improving autonomy and decision-making capabilities for people with disabilities as well as the general population.²⁴

Virtual reality (VR) provides individuals who cannot move independently with opportunities to experience activities that are typically inaccessible, such as skateboarding or mountain climbing. Environmental barriers significantly impede people with disabilities, making the navigation of unfamiliar environments often frustrating, stressful, time-consuming, and hazardous. VR aids individuals who use wheelchairs, those with autism, or people who are partially sighted in planning routes and becoming acquainted with new environments prior to a journey, meeting, or ap-

23 NVIDIA, 2017.

24 WIRED, 2018.

pointment.²⁵ Furthermore, VR is employed to simulate the experiences of individuals with conditions such as autism, epilepsy, or Alzheimer's, offering insights into the sensory and cognitive challenges associated with these conditions.²⁶ This application of VR is particularly valuable in educational contexts for training caregivers or medical students, enhancing their understanding of these disabilities.

Additionally, various reality technologies, including Augmented Reality (AR) and 360-degree video, serve as effective tools for exploring unfamiliar spaces. For example, 360-degree video is utilized in mapping services, allowing users to zoom and navigate through environments by manipulating the view in all directions. AR, on the other hand, enables partially sighted individuals to perceive detailed features on digital screens, such as smartphones or tablets, which might be difficult to discern in their physical surroundings. These technologies collectively expand the accessibility and understanding of different environments, promoting greater inclusion for people with disabilities.²⁷

Certain individuals process information more effectively through visual or experiential means rather than textual content, highlighting the utility of reality technologies for these learners.²⁸ While digital learning environments are well-established, their role in aiding people with disabilities has become prominently recognized only recently. For example, individuals with dyslexia frequently encounter difficulties with reading, spelling, and memory retention, rendering traditional educational approaches less accessible and imposing barriers to their academic success. Research

25 MARZIN, 2018.

26 BBC, 2016.

27 MARZIN, 2018.

28 INTERNATIONAL DYSLLEXIA ASSOCIATION, 2002.

suggests that virtual environments can alleviate stress associated with conventional schooling for many children with dyslexia, aiding in their focus and enjoyment of the learning process.²⁹

In the field of neurorehabilitation, reality technologies are demonstrating substantial benefits for people with disabilities. Jane Marshall from City University London has been conducting research using VR and avatar technology in therapy for aphasia, a disorder typically caused by stroke that affects communication and language abilities. City University has developed a virtual space known as EVA Park³⁰, which was designed collaboratively with input from individuals with aphasia, speech and language therapists, computer scientists, and HCI specialists. EVA Park facilitates interaction among people with aphasia, support professionals, therapists, and peers. Empirical studies on this virtual platform have shown enhancements in participants' comprehension skills and an increase in their levels of happiness and confidence, coupled with a reduction in feelings of isolation. Furthermore, participants have expressed enjoyment of the social interactions and the gamified elements of completing tasks within the virtual environment, significantly improving their overall quality of life.³¹

Avatars, initially developed predominantly for use in gaming, have broadened their applications to include roles such as automated assistants and sign language interpreters. This integration of avatar technology with AI serves multiple purposes, providing instructional and informational support across a variety of settings. Notably, avatars capable of sign

29 MARZIN, 2018.

30 EVA PARK, 2018.

31 MARZIN, 2018.

language have been deployed in environments with constrained vocabulary needs, such as hotels and train stations, where they provide basic directional assistance.³²

Despite these technological strides, representatives from the deaf community have expressed concerns regarding the current capabilities of these avatars. They argue that avatar technology does not yet match the nuanced quality and expertise of certified human interpreters and translators. These advocates also strongly advise against the use of signing avatars in situations where accurate and reliable communication is crucial, such as during broadcasts of news or public emergencies, emphasizing the necessity for live sign language interpretation in these contexts.³³

As the use of avatars grows in various domains, there emerges a critical discussion on the representation of disabilities within avatar design. Frequently, user-generated avatars lack the options to accurately represent disabilities, which could otherwise enhance visibility for people with disabilities and confront prevailing stereotypes about their abilities. It is imperative that avatar designs do not inadvertently reinforce the erroneous belief that all disabilities are visible. Users should be afforded the autonomy to design avatars that accurately reflect their own appearances, including any disabilities.³⁴ In a positive development, companies like Microsoft are making significant efforts to address these issues. Their Xbox Live platform, for example, now includes avatar customization options that allow for the representation of various disabilities: “there’s an amputee, playful costumes, wheelchairs, skateboards, and even motorbikes to demonstrate the wide array of props and customization. There’s

32 MARZIN, 2018.

33 MARZIN, 2018.

34 MARZIN, 2018.

even a new pregnancy option, and the ability to control the colors of an avatar with a picker system.”³⁵

3. The Perils of AI Design for People With Disabilities

Technologies that are theoretically designed to assist people with disabilities can, paradoxically, complicate PWD interaction with smart devices. For example, individuals with speech impairments often find that voice-controlled smart assistants – which respond to queries, play audio, and control smart home devices – are unable to understand them. These assistants are generally trained on datasets that favor typical speech patterns, excluding those with atypical speech characteristics.

Furthermore, it is important to critique the ableist assumptions embedded in some of the most sophisticated technologies intended to support people with disabilities. A notable instance is found in VR games that incorporate gaze detection and facial recognition technologies. These games are designed to train individuals with autism spectrum disorders to maintain eye contact and modulate their emotional responses. However, the underlying goal of these technologies often aligns more with conditioning behaviors to conform to conventional norms of interaction, primarily serving the interests of medical professionals tasked with integrating such individuals into mainstream societal frameworks. This approach raises ethical concerns about the true beneficiaries of such technologies and whether they genuinely serve the needs of people with disabilities or merely reinforce existing societal biases.

35 ROBERTSON, 2017.

In spite of these advancements, AI also introduces new obstacles and threats to the rights of people with disabilities, potentially deepening their marginalization. There is a risk that AI may not fully address the complex needs of people with disabilities. For instance, AI designs influenced by ableist views could inadvertently cause harm by striving to 'correct' perceived deficiencies that deviate from established norms. Additionally, the intricate concept of disability might challenge the creation of automated decision-making systems that rely on rigid algorithms. Ultimately, people with disabilities face a heightened risk of experiencing algorithmic bias, resulting in exclusion or discrimination and a lack of representation in AI training datasets.³⁶

In the context of privacy, people with disabilities often exhibit reluctance to disclose personal information about their condition due to fears of discrimination. This concern is particularly acute with algorithms used by companies in the hiring process, which may reinforce discriminatory practices:

In one recent field study, disclosing a disability (spinal cord injury or Asperger's Syndrome) in a job application cover letter resulted in 26% fewer positive responses from employers, even though the disability was not likely to affect productivity for the position (Ameri et al., 2018). Another study found that the pay gap between people with and without disability cannot be explained by productivity differences, and likely represents discrimination (Kruse, Schur, Rogers, & Ameri, 2017).³⁷

When AI agents are employed to assess candidates, there is a tendency to overlook the unique working experiences of people with disabilities. It has been documented by Buyl et al.³⁸ that applicants with disabilities are systematically

36 ZARRA; FAVALLI; CERON, 2023, p. 332.

37 TREWIN, 2018, p. 3.

38 BUYL et al., 2022, p. 1071.

assigned a negative weighting in the scoring algorithms that determine employability. This results in employment agencies allocating fewer resources and less support to these individuals during their job search.

Moreover, these systems often profile individuals based on various factors, including healthcare needs. AI is also commonly used by public administrations to determine eligibility for social protection benefits. The use of biased datasets, which fail to adequately represent people with disabilities or other marginalized groups, can lead to the potential exclusion of these individuals from accessing necessary services. Automated decision-making systems typically do not allow for individualized assessments, which are crucial in evaluating the specific needs and care costs of people with disabilities.

A similar issue arises with automated systems used to determine access to private insurance. People with disabilities might find themselves not only denied coverage but also facing higher premiums due to flawed decision-making processes. Such outcomes underscore the critical need for inclusive datasets and algorithms that consider the diverse circumstances of all users, particularly those from vulnerable groups.

One of the critical issues concerns the potential for discriminatory outcomes from automated decision-making (ADM) systems, which may be trained on datasets lacking representation from vulnerable groups, such as people with disabilities, or employ fixed parameters to define disability. While the existing literature³⁹ on AI bias and fairness has predominantly focused on gender and race, attributes including disability have often been overlooked.

39 ZARRA; FAVALLI; CERON, 2023, p. 336.

Hoffmann identifies four primary limitations in an approach to AI that centers on fairness. First, she argues that fairness itself is not inherently fair; it seeks to elevate the status of disadvantaged groups without directly addressing the potential reduction in privileges for more powerful groups. Second, the concept of fairness depends on well-defined traits, requiring the system to have a clear understanding of these traits to function appropriately. Third, traditional approaches to fairness focus on addressing one contested identity at a time, which fails to consider the complexities of individuals who may experience multiple forms of marginalization. This perspective overlooks how various identity facets and oppressive structures interact to produce systemic discrimination in diverse contexts. Finally, the author critiques the typical framing of marginalization within fairness discourse, which often focuses on specific desirable outcomes, such as employment. She points out that many injustices arise from the establishment and application of standards across various domains, suggesting that marginalization is not an isolated event, but a continuous experience influenced by prevailing norms and the institutions that enforce them.⁴⁰

The Bennett and Keyes⁴¹ discuss a significant and long-standing research area involving collaborations among AI researchers, health researchers, and HCI scholars: the use of computer vision – a form of AI that enables systems to “see” – to support individuals with vision impairments. According to the authors, several projects permeate the literature, highlighting the diverse applications of this technology. These projects include haptic and vision-based systems designed to detect and represent emotions conveyed through facial expressions, augmented touch technologies that com-

40 HOFFMANN, 2019, p. 900.

41 BENNETT; KEYES, 2020, p. 1.

municate visual information, facial recognition systems that help identify conversational partners, and technologies for recognizing objects and scenes. These initiatives illustrate the potential of computer vision to enhance accessibility for vision-impaired users, showcasing its practical applications in translating visual data into other sensory modalities. According to the authors:

First, we must ask: **sight for whom and what gets seen?** There is a longstanding recognition of biases within computer vision systems, and limitations in their ability to represent the complexity of the world – biases that often impact those already marginalized. In the case of object recognition, for example, a recent paper demonstrates that such systems are developed largely in a white, western and middle-class context, failing to recognize common household objects that are more-often found in poor or non-western environments. The centering of such systems in AT design risks further harm to people already marginalized within both society widely, and the disability community. And improving algorithms to recognize more genders, races and objects still predispose futures where surveillance technologies may be justified for their utility for blind people while ignoring their ongoing documented misuse.⁴²

The use of computer vision to enhance the capabilities of visually impaired individuals ostensibly shifts more control into the hands of users, transforming them from being the subjects of observation to the observers themselves. However, this apparent inversion of roles does not necessarily equate to a beneficial redistribution of power; it can still perpetuate asymmetrical and potentially harmful power dynamics. Traditional tools like the white cane place analytical responsibility on the user's cognition, whereas computer vision might delegate this critical judgment to automated decision-making systems. Although developers often emphasize that these

42 BENNETT; KEYES, 2020, p. 1.

technologies are intended to augment rather than replace human decision-making, there is a prevalent bias towards valuing technological and scientific methods of “knowing” as superior. This deference can occur even when these methods provide contradictory information or are assumed to be more accurate than they truly are.

While computer vision systems can make environments more accessible by interpreting visual data for the user, they also shift the locus of analysis from the user to the technology, which is often opaque, costly, and shaped by commercial interests. Additionally, even when implemented equitably, computer vision reinforces the primacy of sight over other senses and legitimizes surveillance, a practice that is fraught with ethical concerns. Despite recognition of the value of non-visual sensemaking in research, there is insufficient enthusiasm for developing technologies that enhance or prioritize these alternative sensory processes.

The potential integration of assistive technologies into policing tools poses significant ethical dilemmas about their use and the privacy of individuals, including those they are meant to assist. Critical questions about the misuse of such technologies underscore the importance of a nuanced discussion about disability beyond the simplistic application of *fairness*. These issues require confronting not just the disparate treatment within disabled communities or in comparison to the broader society, but also challenging the broader power structures that the model of technological liberation fails to address.

Moreover, growing evidence also suggests that AI systems manifest systematic biases stemming from societal attitudes that view disability negatively. For instance, machine learning (ML) algorithms designed to identify online hate speech and conduct sentiment analysis have been found

to categorize mentions of disability as disproportionately toxic or negative. This phenomenon suggests that AI bias is a comprehensive issue encompassing concerns related to privacy, consent, and misclassification, thereby necessitating broader consideration in the development and implementation of these technologies. Trewin explains:

Impairments and health conditions that can lead to disabilities are not only diverse, but vary in intensity and impact, and often change over time. This diversity also applies within groups that might at first seem homogeneous. A popular saying in the autism community is: “When you’ve met one person with autism, you’ve met one person with autism.” **Rather than forming a cohesive group, the disabled community includes many outliers.** This poses a challenge for machine learning, which works by finding patterns and forming groups. Outlier data is often treated as ‘noise’ and disregarded. Even with the data included, there may not be enough individuals with a given type and severity of disability in a data set for the machine to identify a pattern. Including outlier data makes the learning task more difficult and leads to more complex models that may overfit the data. Simpler models are preferred, and their predictions for these ‘outlier’ individuals may be poor quality, or unfairly negative. Compared to gender, race or age, it is not easy to address biased outcomes by gathering a balanced set of training data, because there are so many forms and degrees of disability.⁴³

Regarding this kind of unfairness that AI can do, again, Bennett and Keyes⁴⁴ point out that, within the field of computer vision, researchers are developing systems that use facial recognition technology to automatically diagnose certain neurodiverse conditions, including autism. These systems are trained using data from children who have already been diagnosed with autism, analyzing their facial expressions, levels of emotiveness, and repetitive behaviors

43 TREWIN, 2018, p. 3.

44 BENNETT; KEYES, 2020, p. 1.

to create diagnostic tools. Proponents argue that such tools could significantly reduce the delay in diagnosing autism in children.

However, the development of these diagnostic tools faces significant challenges due to biases inherent in the existing framework of autism diagnosis. This includes a well-documented gender bias in the manifestation of symptoms and subsequent disparities in diagnostic rates. Additionally, there are less studied but significant biases related to race, ethnicity, class, and geography. Relying on diagnostic tools calibrated primarily with data from previously diagnosed individuals may perpetuate these biases. Such tools might erroneously uphold the notion that children who do not present symptoms consistent with those typically observed in (white, assigned male at birth) autistic individuals cannot be autistic, thereby excluding them from necessary support systems.

In attempts to address these issues, one might consider employing a fairness metric that involves diversifying datasets to include underrepresented genders and races, ensuring more accurate diagnoses across diverse groups. However, this approach may still fail to address deeper questions regarding the locus of diagnostic authority and the potential consequences of diagnosis. Who has the power to diagnose, and what are the implications for those diagnosed under such systems? This inquiry calls for a critical examination of not only how diagnostic tools are developed but also how they are implemented and who they ultimately serve.

In the realm of diagnostic tools for autism, there are significant concerns related to medicalization and gatekeeping, which stem from the profound authority that diagnostic power confers within the institutional frameworks of a medicalized model of disability. The use of tools designed to

aid autistic individuals, particularly those based on existing computer vision prototypes, extends beyond mere diagnostic functions. They reinforce the perception that the formal diagnostic pathway is the only valid approach to recognizing autistic conditions, thereby consolidating the authority of psychiatrists. The process of medicalization, where formal gatekeeping is legitimized, has been identified within the context of autism diagnostics, revealing issues with the validity of the diagnostic systems that computer vision researchers use as benchmarks. The integration of technical and scientific authority with medical authority does not empower individuals subjected to medical contexts. Instead, it further diminishes their power, reducing the legitimacy of the patient's voice in these settings. Textually, Bennett and Keyes:

Autism diagnosed with AI is an issue of fairness – an issue of the unfair treatment of autistic people – but it is not one that can be solved simply through examining the immediate algorithmic inputs and outputs of the computer vision system. Instead, we need a model that considers holistic, societal implications, and the way that technologies alter the life chances of those they are used by or on.⁴⁵

The concept of fairness alone does not adequately address these issues; rather, they are fundamentally about power and the broader social contexts in which technical systems are embedded.⁴⁶ Thus, according to Bennett and Keyes, regarding the consequences and implications of an autism diagnosis, AI systems in this domain are often predicated on the belief that an *early diagnosis leads to better outcomes*, opening up possibilities for treatment, support, and accommodation. However, given the biases in access to diagnosis and the construction of diagnostic tests, there is a pertinent debate about

45 BENNETT; KEYES, 2020, p. 1.

46 BENNETT; KEYES, 2020, p. 1.

whether an earlier diagnosis necessarily equates to a better one. Contrary to the intended benefits, early diagnoses may, in fact, be detrimental. This underscores the need for a critical examination of both the assumptions underpinning these diagnostic tools and the broader implications of their use.

According to Trewin⁴⁷, to enhance fairness for people with disabilities in AI-based solutions, it is essential for developers to integrate several proactive strategies in the design and implementation of these technologies:

1. Developers should evaluate the impact of AI solutions on people with disabilities. This includes questioning which data patterns presented by individuals might be poorly handled by machine learning systems trained on typical data sets. It is crucial to identify if any disability group could be significantly affected;
2. Involving members of affected disability groups in the design and development process is critical. This approach not only enriches the design process but also helps in collecting specific training data from these groups, addressing potential biases at the source;⁴⁸

Reinforcing this point, the United Nations Committee on Economic, Social and Cultural Rights in its General Comment No. 25 on science and economic, social, and cultural rights, has acknowledged that “people with disabilities have suffered deep discrimination in the enjoyment of the right to participate in and to enjoy the benefits of scientific progress and its applications.”⁴⁹ The Committee underscored the need to incorporate the unique perspectives and experiences of people with disabilities into the scientific landscape, recognizing their contribution as essential to fostering a more

47 TREWIN, 2018, p. 6.

48 SHEW, 2020, p. 49.

49 UNITED NATIONS COMMITTEE ON ECONOMIC, SOCIAL AND CULTURAL RIGHTS, 2020.

inclusive approach to the development and application of scientific advancements.

3. Developers should employ existing methods to detect and mitigate bias across the machine learning pipeline – this includes biases in data collection, model training, and output processing. Trewin notes that tools such as the IBM AI Fairness 360 toolkit promises valuable resources for pre-processing data to reduce bias, training models fairly, and adjusting model outputs to enhance fairness;
4. Developers must also consider other variables that could be influenced by disabilities, such as the time required to perform tasks. For applications where these considerations are critical, adopting an ‘individual fairness’ approach to define and measure fairness may be appropriate;

As Shew⁵⁰ highlights, the impact of disability extends beyond the mere distribution of assistive technologies and accommodating designs. It also encompasses the maintenance of these technologies and the social meanings associated with them⁵¹. The social attitudes towards disability significantly influence the well-being of people with disabilities in ways that are crucial for achieving justice. However, addressing these attitudes and their effects cannot be fully resolved through redistribution alone; it requires a more comprehensive approach that considers both social and material dimensions of disability, specifically gender and racial biases that shape them.

5. Since machine learning systems typically perform optimally with standard inputs and struggle with outliers, it is important to develop methods that adequately recognize and manage outlier data. Enhancing representation in training data is beneficial, but given the diversity of disability experiences, focusing on methodologies that effectively address outlier

50 SHEW, 2017.

51 HOFFMANN, 2019, p. 908.

cases is also essential.

6. Comprehensive documentation of the AI service is crucial. This documentation should include details on the inclusion of people with disabilities in data collection, design, and testing phases; outcomes of fairness assessments; measures taken to reduce bias against people with disabilities; and any known limitations of the service for specific disability groups.

Similarly, when it comes to autonomous vehicles equipped with computer vision technologies, there is a significant risk for individuals in wheelchairs. These people frequently go undetected both by the automated systems and their human operators, posing a serious safety hazard.

4. Digital Design Regulation for People With Disability Between the Convention on the Rights Of People (CRPD) With Disabilities and New AI Regulations

According to Zarra, Favalli and Ceron⁵², in recent years, several specialized agencies of the United Nations (UN) and within the European Parliament have highlighted the impact of AI and design on disability rights. Notable among these are the Office of the United Nations High Commissioner for Human Rights (OHCHR)⁵³, the International Labour Organization (ILO)⁵⁴, the United Nations Educational, Scientific and Cultural Organization (UNESCO)'s Report of the Social and Human Sciences Commission⁵⁵ and Recommendation on the

52 ZARRA; FAVALLI; CERON, 2023, p. 339.

53 UNITED NATIONS, 2021.

54 INTERNATIONAL LABOUR ORGANIZATION, 2021.

55 UNESCO, 2021.

Ethics of Artificial Intelligence⁵⁶. These organizations have explored the balance of risks and opportunities presented by AI, particularly emphasizing the disproportionate risks faced by people with disabilities.

The OHCHR's report on the right to privacy in the digital age states that assessing the impact on human rights is a critical component of human rights due diligence. Such due diligence should be implemented throughout the entire lifecycle of an AI system. Special attention must be given to the disproportionate impacts on various vulnerable groups including women and girls, lesbian, gay, bisexual, transgender, and queer (LGBTQ) individuals, people with disabilities, members of minority groups, older adults, people living in poverty, and other individuals who may be particularly vulnerable. This comprehensive approach ensures that AI technologies promote inclusivity and do not exacerbate existing disparities or create new forms of discrimination.⁵⁷

For instance, the OHCHR's report states that a dataset that categorizes gender as binary fails to accurately represent individuals who do not identify as male or female, thereby misgendering them. Additionally, the long-term storage of personal data presents specific risks, as such data are susceptible to forms of exploitation that were not anticipated at the time of collection. As time progresses, this data may become outdated, irrelevant, or perpetuate historical inaccuracies and misidentifications, leading to biased or incorrect results in subsequent data processing activities. Such issues underscore the need for careful consideration of data management practices within AI systems to ensure they remain accurate and fair over time.⁵⁸ It, at last, recommends that:

56 UNESCO, 2022.

57 UNITED NATIONS, 2021, p. 13.

58 UNITED NATIONS, 2021, p. 4.

States and business enterprises: (a) Systematically conduct human rights due diligence throughout the life cycle of the AI systems they design, develop, deploy, sell, obtain or operate. A key element of their human rights due diligence should be regular, comprehensive human rights impact assessments; [...] (c) Ensure participation of all relevant stakeholders in decisions on the development, deployment and use of AI, in particular affected individuals and groups;⁵⁹

The United Nations Committee on Economic, Social and Cultural Rights in its General Comment No. 25 on science and economic, social, and cultural rights, already mentioned before, highlights the need to critically evaluate how technological progress can both promote and hinder the equitable enjoyment of these fundamental rights of PWD:

34. People with disabilities have suffered deep discrimination in the enjoyment of the right to participate in and to enjoy the benefits of scientific progress and its applications, either because of severe physical, communication and information obstacles to access basic and higher scientific education and careers, or because the products of scientific progress do not take into account their specificities and particular needs. People with disabilities bring their unique perspectives and experiences into the scientific landscape, thus specifically contributing to the promotion of the right to participate in and to enjoy the benefits of scientific progress and its applications.

35. States parties should, at the least, adopt the following measures and policies to overcome discrimination against people with disabilities in the enjoyment of this right: (a) promote the participation and contributions of people with disabilities, including women with disabilities who face multiple discrimination, in decision-making procedures concerning science; (b) develop statistics on access to science and its benefits disaggregated by disability; **(c) implement universal design**; (d) promote technologies that facilitate access to scientific education and employment for people with disabilities; (e) ensure that reasonable accommodation

59 UNITED NATIONS, 2021, p. 16.

is provided for people with disabilities to enable them to have access to scientific education and employment and to ensure that they benefit from the products of scientific development, including its diffusion and dissemination in adapted formats; (f) adopt appropriate measures to raise awareness of the capabilities and contributions of people with disabilities and to combat stereotypes and harmful practices relating to these people; and (g) ensure that people with disabilities have given their free, prior and informed consent when they are subjects of research.⁶⁰

UNESCO's recommendation on the Ethics of Artificial Intelligence⁶¹ very much reflects the content of the Report of the Social and Human Sciences Commission issued in 2021. According to the recommendation, states that the respect, protection, and promotion of diversity and inclusiveness should be maintained throughout the *lifecycle of AI systems*, aligning with international and human rights laws. This involves *encouraging the active participation* of all individuals and groups, irrespective of race, color, descent, gender, age, language, religion, political opinion, national or ethnic origin, social origin, economic or social condition of birth, *disability*, or any other grounds. Additionally, the scope for lifestyle choices, beliefs, opinions, expressions, or personal experiences, including the *optional use of AI systems and co-design of these architectures*, should remain unrestricted throughout any phase of the AI system lifecycle.

People may interact with AI systems throughout their life cycle and **receive assistance from them**, such as care for vulnerable people or people in vulnerable situations, including but not limited to children, older people, people with disabilities or the ill. Within such interactions, **people should never be objectified, nor**

60 UNITED NATIONS COMMITTEE ON ECONOMIC, SOCIAL AND CULTURAL RIGHTS, 2020.

61 UNESCO, 2022.

should their dignity be otherwise undermined, or human rights and fundamental freedoms violated or abused.⁶²

According to UNESCO, efforts should be enhanced, including through international cooperation, to address and not exploit the absence of essential technological infrastructure, education, skills, and legal frameworks. AI stakeholders are also urged by UNESCO to promote social justice and ensure fairness and non-discrimination in accordance with international law. This requires an inclusive strategy to make AI technology benefits widely available and accessible, considering the particular needs of diverse age groups, cultural systems, language groups, PWD, girls and women, and disadvantaged, marginalized, and vulnerable individuals or those in vulnerable situations.

Member States are encouraged by UNESCO to foster participation and leadership among girls and women, diverse ethnicities and cultures, people with disabilities, marginalized and vulnerable groups, minorities, and all individuals not fully benefiting from digital inclusion in AI education programs at all levels. This includes monitoring and sharing best practices with other Member States.

UNESCO also displays that member States should develop *AI ethics curricula* that integrate with national education programs and traditions, applicable to all educational levels. This should promote cross-disciplinary collaboration that includes technical, humanistic, ethical, and social aspects of AI education. Development of online courses and digital AI ethics resources should be pursued in local languages, including indigenous languages, taking into account diverse environments and ensuring accessibility for people with disabilities. This comprehensive approach will help ensure

62 UNESCO, 2021, p. 7.

that AI development is inclusive, equitable, and culturally sensitive.

Member States should develop guidelines for **human-robot interactions and their impact on human-human relationships**, based on research and directed at the future development of robots, and with special attention to the mental and physical health of human beings. Particular attention should be given to **the use of robots in health care and the care for older people and people with disabilities**, in education, and robots for use by children, toy robots, chatbots and companion robots for children and adults. Furthermore, assistance of AI technologies should be applied to increase the safety and ergonomic use of robots, including in a human-robot working environment. Special attention should be paid to the possibility of using AI to manipulate and abuse human cognitive biases.⁶³

At the regional level, according to Zarra, Favalli and Ceron⁶⁴, various initiatives have been launched to address the intersection of AI and human rights. Notably, the Economic and Social Commission for Asia and the Pacific⁶⁵ and the African Commission on Human and Peoples' Rights⁶⁶ have begun to focus on these issues. In Europe, the Council of Europe is in the process of drafting a Convention on AI, human rights, democracy, and the rule of law. Recommendation on the Ethics of Artificial Intelligence⁶⁷, and the European Parliament resolution of 20 October 2020 with recommendations to the Commission on a framework of ethical aspects of artificial intelligence, robotics and related technologies:

63 UNESCO, 2022.

64 ZARRA; FAVALLI; CERON, 2023, p. 339.

65 ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC, 2017.

66 AFRICAN COMMISSION ON HUMAN AND PEOPLES' RIGHTS, 2020.

67 UNESCO, 2022.

103. Recalls that artificial intelligence, robotics and related technologies used at the workplace must be accessible for all, based on the design for all principle⁶⁸

However, there are other important documents that don't highlight PWD's rights when it comes to AI impact or online design, such as the Organization for Economic Co-operation and Development (OECD)'s Recommendation of the Council on Artificial Intelligence⁶⁹ adopted in May of 2019 and amended in November 2023. And the European Commission for the Efficiency of Justice (CEPEJ) of the Council of Europe's Ethical charter for the use of artificial intelligence in judicial systems and their environment adopted in December 2018.

However, as highlighted by the Special Report on the rights of people with disabilities⁷⁰, there remains a *significant gap* in the evaluation of AI's impact on this demographic. To date, there has been scant detailed analysis of the direct benefits and potential harms that artificial intelligence might pose for the approximately 1 billion people with disabilities worldwide. This oversight underscores the need for more comprehensive assessments to ensure that the development and implementation of AI technologies do not overlook or disadvantage people with disabilities.

Following our conclusion that the most assertive decision when it comes to regulation is not ignoring laws that could serve the purpose of protecting fundamental rights and support innovation, we can state that the CRPD serves as a critical legal framework for evaluating the risks and opportunities associated with AI. The convention is the first

68 EUROPEAN PARLIAMENT, 2020.

69 ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, 2019.

70 UNITED NATIONS, 2021, p. 6.

United Nations human rights treaty to recognize people with disabilities as autonomous holders of human rights, thereby asserting the human rights dimension of disability rights. It also comprehensively lists the human rights of people with disabilities, allowing for the derivation of specific legal obligations for states regarding the development and application of AI. Therefore, the CRPD mandates a strong obligation for state parties to both incentivize and regulate the private sector to *eliminate discrimination against people with disabilities*, encompassing any actions by individuals, organizations, or private enterprises.

The primary concerns relate to *unequal treatment or discrimination based on disability* that may arise from the use of AI. *Algorithmic profiling*⁷¹ can perpetuate and intensify intersectional forms of discrimination and may also lead to the emergence of new discriminatory patterns. Specifically, as previously discussed, AI models often exclude people with disabilities due to the initial failure to directly consider disability during the development of data sets and models. Additionally, issues may arise from inadequate accommodation in the collection and analysis of proxy data, or from barriers related to *digital accessibility*.

Equality and non-discrimination are fundamental principles of the CRPD and are woven throughout it. States parties are obligated under Article 5 to promote equality and prohibit all forms of discrimination on the basis of disability, and under Article 2 to provide reasonable accommodation to enable individuals to fully exercise their rights. Moreover, Article 9 requires states to ensure the *accessibility of information and communication technologies (ICT)* and new technologies as essential conditions for achieving equality for users with disabilities.⁷²

71 XENIDIS, 2020, p. 736.

72 ZARRA; FAVALLI; CERON, 2023, p. 340.

In order to ensure the equalization of opportunities as stipulated in Article 3, the CRPD mandates that all rights must be guaranteed on an equal basis with others. The Convention adopts a substantive model of *inclusive equality*, which expands upon four dimensions of equality: *redistributive, recognition, participative, and accommodating*. This model underscores the comprehensive approach needed to address the complex and layered nature of discrimination that can affect people with disabilities, particularly in the context of emerging technologies such as AI.⁷³

The *fair redistributive dimension* of equality focuses on addressing the socio-economic disadvantages that people with disabilities often encounter within society. In this regard, the CRPD acknowledges the rights of people with disabilities to an adequate standard of living and social protection, and to the continuous improvement of their living conditions, without discrimination based on disability (Article 28). However, the application of AI-enabled technologies that automate the process of determining eligibility for government-funded services presents risks. People with disabilities may be unjustly excluded from such services if the datasets utilized are not properly modeled to include their specific needs.⁷⁴

Similar challenges arise in the use of AI within health-care settings, where the technology might be employed to personalize treatment recommendations or determine access to health insurance. Nonetheless, patients with disabilities could face discrimination in healthcare (Articles 25 and 26 of the CRPD), as AI systems programmed with objectives such as cost reduction might indirectly disadvantage people with disabilities. These examples underscore the necessity for AI systems to be carefully designed and regulated to prevent

73 ZARRA; FAVALLI; CERON, 2023, p. 340.

74 ZARRA; FAVALLI; CERON, 2023, p. 340.

exacerbating existing inequalities and ensure they promote genuine inclusivity and fairness in line with the principles outlined in the CRPD.⁷⁵

The *participative dimension* of equality emphasizes the complete societal inclusion of people with disabilities. In support of this objective, the CRPD underscores the right to freedom of expression and opinion, as well as access to information (Article 21), which are essential for participating in political and public life (Article 29). States are mandated to adopt appropriate measures to ensure that information is provided in accessible formats and to encourage private entities and the mass media to enhance information accessibility.⁷⁶

AI-enabled tools have the potential to facilitate this process by broadening the accessibility of information. Additionally, AI-powered online voting systems could significantly bolster the voting rights of people with disabilities by providing more accessible voting options. However, if these systems are not specifically designed with accessibility in mind, they risk imposing additional barriers for voters with disabilities. Therefore, careful attention to accessibility in the design of AI technologies is crucial to prevent exclusion and promote genuine participatory equality for people with disabilities.⁷⁷

The *accommodating dimension* of equality emphasizes the need to consider individual circumstances in order to develop customized solutions that respect diversity as a fundamental aspect of human dignity. In accordance with this principle, reasonable accommodation must be made for workers with disabilities to ensure their right to work is upheld (Article 27 of the CRPD). This obligation extends from the initial stages

75 ZARRA; FAVALLI; CERON, 2023, p. 341.

76 ZARRA; FAVALLI; CERON, 2023, p. 3.

77 ZARRA; FAVALLI; CERON, 2023, p. 341.

of the recruitment process, which increasingly relies on AI technologies such as video screening and resume-mining tools. Consequently, there is a risk that candidates with disabilities may be prematurely excluded from the selection process due to atypical attributes, even before they have the opportunity to interact with a human interviewer.⁷⁸

Similar challenges are evident in the growing use of AI-enabled worker-management platforms. In compliance with the CRPD, employers are obligated to utilize AI tools in a manner that prevents the potentially discriminatory effects of inaccessible technologies (Article 9) and to implement adequate reasonable accommodation (Article 2) to enable workers with disabilities to fully demonstrate their capabilities.⁷⁹

Likewise, in the educational sector, reasonable accommodation must be made in the use of AI systems to provide individualized support for learners with disabilities, thereby fulfilling the right to inclusive education (Article 24). These measures are essential to ensure that AI technologies enhance, rather than hinder, the inclusion and participation of people with disabilities in various aspects of societal life.⁸⁰

The international regulatory framework for AI is notably fragmented and diverse. Currently, most national approaches rely on soft law strategies, which do not impose legal obligations, and these frameworks typically lack specific legal safeguards PWD. In a significant development, the UN High Commissioner for Human Rights has recognized the need to specifically consider PWD when conducting human rights due diligence to evaluate the disproportionate impacts of AI systems deployed by states and businesses. The report advocates for the implementation of human rights impact

78 ZARRA; FAVALLI; CERON, 2023, p. 341.

79 ZARRA; FAVALLI; CERON, 2023, p. 341.

80 ZARRA; FAVALLI; CERON, 2023, p. 342.

assessments throughout the *AI system lifecycle* and calls for a *moratorium* on the use of high-risk AI systems until the potential threats to human rights are more effectively addressed.⁸¹

As the conclusion comes, the AI Act⁸² has *design implications* for PWD:

AI systems may also otherwise **exploit vulnerabilities of a person** or a specific group of people due to their age, **disability** within the meaning of Directive (EU) 2019/882, or a specific social or economic situation that is likely to make those people more vulnerable to exploitation such as people living in extreme poverty, ethnic or religious minorities.⁸³

In the new regulation, the European Parliament recognizes explicitly the CRPD and the legal obligation of the EU and member states to protect individuals with disabilities from discrimination and to promote equality. The text asserts that this includes ensuring that people with disabilities have equal access to information and communication technologies and systems, and that their privacy is respected. It also states that, with the increasing prominence and utilization of AI systems, it is imperative to apply *universal design principles* to all new technologies and services. This approach guarantees comprehensive and equal access for all individuals affected by or utilizing AI technologies, with particular consideration for the dignity and diversity of people with disabilities. The Parliament demands compliance with the CRPD, especially when it comes to the directives that *should be incorporated by design*, ensuring that *accessibility measures are seamlessly integrated into the development of high-risk AI systems from the outset*. On that matter, according to the general comment No. 2 (2014) on Article 9: Accessibility from the Convention on

81 UNITED NATIONS, 2021.

82 EUROPEAN UNION, 2024.

83 EUROPEAN PARLIAMENT, 2024, p. 16.

the Rights of People with Disabilities that was deliberated during the Eleventh session of the Committee on the Rights of People with Disabilities, which took place from 31 March to 11 April 2014:

A clear distinction should be drawn between the obligation to ensure access to all newly designed, built or produced objects, infrastructure, goods, products and services and the obligation to remove barriers and ensure access to the existing physical environment and existing transportation, information and communication, and services open to the general public. Another of the States parties' general obligations is to "undertake or promote research and development of universally designed goods, services, equipment and facilities, as defined in article 2 of the Convention, which should require the minimum possible adaptation and the least cost to meet the specific needs of a person with disabilities, to promote their availability and use, and to promote universal design in the development of standards and guidelines" (art. 4, para. 1 (f)). All new objects, infrastructure, facilities, goods, products and services have to be designed in a way that makes them fully accessible for people with disabilities, in accordance with the principles of universal design. States parties are obliged to ensure that people with disabilities have access to the existing physical environment, transportation, information and communication and services open to the general public. However, as this obligation is to be implemented gradually, States parties should establish definite time frames and allocate adequate resources for the removal of existing barriers. Furthermore, States parties should clearly prescribe the duties of the different authorities (including regional and local authorities) and entities (including private entities) that should be carried out in order to ensure accessibility. States parties should also prescribe effective monitoring mechanisms to ensure accessibility and monitor sanctions against anyone who fails to implement accessibility standards.⁸⁴

To facilitate AI that yields socially and environmentally beneficial results, the European Parliament recognizes that it

84 UNITED NATIONS, 2014.

is imperative for Member States to proactively support and propel research and development in AI technologies that aspire to these outcomes. This support should focus on AI initiatives designed to *enhance accessibility for people with disabilities*, mitigating socio-economic inequalities, and *meeting environmental targets*. Such projects should be grounded in interdisciplinary collaboration, incorporating contributions from AI developers, experts in inequality and non-discrimination, accessibility, consumer rights, environmental and digital rights, and scholars.⁸⁵

Aligning with the *participative dimension* of AI fairness for PWD, mentioned right above, the European parliament demands that providers and deployers of all AI systems, regardless of their risk classification, be encouraged to voluntarily comply with supplementary requirements. These requirements might encompass adhering to the principles established in the European ethical guidelines for trustworthy AI, advocating for environmental sustainability, improving AI literacy, and promoting inclusive and diverse design and development approaches. It is particularly important to address the specific needs of vulnerable populations and to ensure that AI systems are accessible to individuals with disabilities.⁸⁶

According to the EU legislative body, it is beneficial to include a wide array of stakeholders in the AI system design and development process. This group should consist of representatives from business sectors, civil society organizations, academic and research communities, trade unions, and consumer protection agencies. Additionally, there should be a concerted effort to foster diversity within AI development teams. Achieving gender balance is crucial to broadening

85 EUROPEAN PARLIAMENT, 2024, p. 67.

86 EUROPEAN PARLIAMENT, 2024, p. 77.

the range of perspectives and enhancing the inclusivity of AI development initiatives. This comprehensive approach not only enhances the ethical foundation of AI systems but also ensures they serve the broad spectrum of society effectively.

The regulation employs a *tiered risk-based approach*, specifically, the AI Act prohibits AI practices that pose an unacceptable risk to public safety and rights. Article 5 specifically mentions PWD, outlawing AI systems that exploit vulnerable groups, including those with mental or physical disabilities.

TITLE II

PROHIBITED ARTIFICIAL INTELLIGENCE PRACTICES

Article 5

Prohibited Artificial Intelligence Practices

1. The following artificial intelligence practices shall be prohibited:
(b) the placing on the market, putting into service or use of an AI system that exploits any of the vulnerabilities of a person or a specific group of people due to their age, **disability** or a specific social or economic situation, with the objective to or the effect of materially distorting the behaviour of that person or a person pertaining to that group in a manner that causes or is reasonably likely to cause that person or another person significant harm;

However, regarding the high-risk AI systems and its designs, the Act does not impose *accessibility* obligations on AI systems before they are placed on the market. And it didn't need to, because the text explicitly adopts the CRDP dispositions in order to protect PWD. This kind of measure shows that future regulation of AI systems toward PWD should be cautious and having real participation of disabled people.

As of now, the CRPD promotes the concept of *inclusive equality* as detailed in Article 5, ensuring that all rights are equally secured for everyone. The Committee on the Rights of People with Disabilities interprets this notion of equality broadly, emphasizing the necessity of reasonable accommodation, as specified in Article 2, to enable individuals with disabilities to fully exercise their rights. This accommodation

process is individualized, requiring detailed attention to personal circumstances. In the context of artificial intelligence, the Convention prescribes the need for anticipated measures. This anticipatory obligation means accommodation should be considered before people with disabilities encounter barriers, *particularly with AI-driven services* such as screening tools or biometric technologies used in accessing public services like education, healthcare, and voting. The CRPD also highlights the importance of accessible biometric systems and alternative solutions to ensure that marginalized populations, including those without legal proof of identity, can benefit from such technologies. Failure to adhere to accessibility standards or provide alternatives where technology falls short represents a significant barrier that must be addressed to uphold the rights of people with disabilities.⁸⁷

The CRPD also emphasizes the intrinsic value of human personhood and the associated rights of autonomy and decision-making, as articulated in Articles 3 and 12. These principles underline that individuals should never be used as means to an end and must always give informed, explicit, and genuine consent, which is particularly relevant in the context of artificial intelligence. AI applications, especially in profiling and decision-making processes that affect people with disabilities without their awareness, challenge these principles of autonomy. Additionally, Article 23, which addresses the right to marry and found a family, raises concerns when AI technologies are employed in health and reproductive screenings. This includes the use of AI in DNA and genetic testing, which can infringe upon the rights to family planning and reproductive information, highlighting the need for these technologies to respect and protect human rights as stipulated by the Convention.⁸⁸

87 UNITED NATIONS, 2021.

88 UNITED NATIONS, 2021.

The CRPD highlights core human rights principles that are crucial in the context of artificial intelligence, focusing on autonomy, decision-making, privacy, freedom of expression, and access to information. Articles 3, 12, and 23 stress the inherent value of individuals, underscoring the importance of informed consent and the prohibition of using individuals as means to an end, particularly relevant when AI engages in profiling or making decisions affecting people with disabilities without their consent. Article 23 additionally highlights issues surrounding AI in health and reproductive rights, stressing the importance of access to information for family planning. Articles 22 and 31 mandate robust data protection to safeguard the privacy of people with disabilities, ensuring they maintain control over their personal data in the AI era. Furthermore, Articles 21 and 29 protect the rights to freedom of expression and information, addressing the risks of AI in closing civic spaces, increasing censorship, and potentially impacting the organization and mobilization capabilities of disability advocates. These principles collectively advocate for the integration of human rights into AI development and deployment to prevent discrimination and uphold the dignity and rights of people with disabilities.⁸⁹

According to the AI Act, the deployment of AI systems for *real-time remote biometric identification* of individuals in public spaces, especially for law enforcement purposes, is highly intrusive to the rights and freedoms of affected people. Such technologies can impact the private lives of a substantial portion of the population, engender a perception of continuous surveillance, and indirectly discourage the exercise of fundamental rights, including the freedom of assembly. This level of surveillance raises significant concerns regarding the

89 UNITED NATIONS, 2021.

balance between security measures and the preservation of personal freedom of PWD:

Technical inaccuracies of AI systems intended for the remote biometric identification of natural people can lead to biased results and entail discriminatory effects. **This is particularly relevant when it comes to age, ethnicity, race, sex or disabilities.** In addition, the immediacy of the impact and the limited opportunities for further checks or corrections in relation to the use of such systems operating in ‘real-time’ carry heightened risks for the rights and freedoms of the people that are concerned by law enforcement activities.⁹⁰

Furthermore, the European Parliament agreed that:

As biometric data constitutes a special category of sensitive personal data, it is appropriate to classify as high-risk several critical use-cases of biometric systems, insofar as their use is permitted under relevant Union and national law. Technical inaccuracies of AI systems intended for the remote biometric identification of natural people can lead to biased results and entail discriminatory effects. This is particularly relevant when it comes to age, ethnicity, race, sex or **disabilities**.⁹¹

Consequently, they agreed that remote biometric identification systems should be considered high risk due to the potential risks they entail. This classification, however, does not extend to AI systems intended for biometric verification purposes, such as authentication processes. These systems aim solely to verify that a specific individual is who they claim to be, or to confirm the identity of a person exclusively for accessing a service, unlocking a device, or securing entry to facilities. These applications, due to their limited scope and purpose, are not categorized as high-risk under the same criteria.

90 EUROPEAN PARLIAMENT, 2024, p. 17.

91 EUROPEAN PARLIAMENT, 2024, p. 27.

AI systems deployed in educational or vocational training contexts, particularly those used for determining access or admission, assigning individuals to institutions or programs at any level, evaluating learning outcomes, assessing the appropriate educational level for an individual, materially influencing the level of education and training received or accessible, or monitoring and detecting prohibited behavior during tests, should be classified as high-risk AI systems. This classification is warranted because these systems have the potential to significantly influence the educational and professional trajectory of individuals, thereby impacting their future employment prospects and overall ability to secure their livelihood.

When **improperly designed and used**, such systems can be particularly intrusive and may violate the right to education and training as well as the right not to be discriminated against and perpetuate historical patterns of discrimination, for example against women, certain age groups, **people with disabilities**, or people of certain racial or ethnic origins or sexual orientation.⁹²

AI systems utilized in the realms of employment, workers' management, and access to self-employment – particularly those used for recruitment and selection of individuals, decision-making concerning terms of employment, promotions, terminations, task allocation based on individual behavior, personal traits or characteristics, and monitoring or evaluation within work-related contractual relationships – should be classified as high-risk. This classification is crucial because these systems can significantly affect individuals' career trajectories, their future livelihoods, and workers' rights.

92 EUROPEAN PARLIAMENT, 2024, p. 28.

Throughout the recruitment process and in the evaluation, promotion, or retention of people in work-related contractual relationships, such systems may perpetuate historical patterns of discrimination, for example against women, certain age groups, **people with disabilities**, or people of certain racial or ethnic origins or sexual orientation. AI systems used to monitor the performance and behaviour of these people may also undermine their fundamental rights to data protection and privacy.⁹³

Additionally, AI systems that are utilized to assess the credit score or creditworthiness of individuals should be classified as high-risk. This is due to their significant role in determining access to financial resources and essential services such as housing, electricity, and telecommunications. Such classifications are imperative as they have profound impacts on individuals' economic stability and quality of life. Also, AI systems used for risk assessment and pricing in health and life insurance sectors can significantly affect individuals' livelihoods. If these systems are not properly designed, developed, and utilized, they could violate fundamental rights and lead to severe consequences such as financial exclusion and discrimination. However, the regulation provides two exceptions:

AI systems provided for by Union law for the purpose of detecting fraud in the offering of financial services and for prudential purposes to calculate credit institutions' and insurances undertakings' capital requirements should not be considered as high-risk under this Regulation [...] AI systems used to evaluate and classify emergency calls by natural people or to dispatch or establish priority in the dispatching of emergency first response services, including by police, firefighters and medical aid, as well as of emergency healthcare patient triage systems, should also be classified as high-risk since they make decisions in very critical situations for the life and health of people and their property.⁹⁴

93 EUROPEAN PARLIAMENT, 2024, p. 29.

94 EUROPEAN PARLIAMENT, 2024, p. 30.

The Parliament also stated that certain AI systems designed to interact with natural people or generate content can present specific risks related to impersonation or deception, regardless of whether they are classified as high-risk. Consequently, the deployment of such systems should be accompanied by specific transparency obligations. This is necessary to mitigate the potential risks associated with their use, without undermining the existing requirements and obligations designated for high-risk AI systems. Additionally, targeted exceptions should be considered to address the unique requirements of law enforcement, ensuring that these obligations are balanced with the need for confidentiality and effectiveness in legal and security contexts.

In particular, natural people should be notified that they are interacting with an AI system, unless this is obvious from the point of view of a natural person who is reasonably well-informed, observant and circumspect taking into account the circumstances and the context of use. When implementing such obligation, the characteristics of individuals belonging to vulnerable groups due to their age or disability should be taken into account to the extent the AI system is intended to interact with those groups as well. Moreover, natural people should be notified when they are exposed to systems that, by processing their biometric data, can identify or infer the emotions or intentions of those people or assign them to specific categories. Such specific categories can relate to aspects such as sex, age, hair colour, eye colour, tattoos, personal traits, ethnic origin, personal preferences and interests. Such information and notifications should be provided in accessible formats for people with disabilities.⁹⁵

Instead, Title IX (Article 69) of the Act encourages businesses to voluntarily adopt codes of conduct that include commitments to accessibility. This title also promotes stakeholder participation in the design and development of AI systems

95 EUROPEAN PARLIAMENT, 2024, p. 62.

and calls for diversifying development teams. Despite these provisions, the proposal does not sufficiently ensure the direct involvement of PWD in the development of AI solutions. It acknowledges the risks AI poses to PWD, particularly concerning employment and access to essential services, yet it stops short of integrating them into the development process. Moreover, the Act does not address certain inherent limitations of AI systems, such as the rigid parameters used to define ‘disability,’ which remain unaddressed even with the inclusion of PWD in the development process.⁹⁶

The consultation process for the AI Act, prior to the Commission’s tabling of the proposal, serves as a critical point of reference for understanding the concerns of interest groups representing PWD regarding AI and the proposed regulation. Notably, the European Union of the Deaf, the European Blind Union, and the European Disability Forum submitted responses and position papers during the consultation, expressing shared concerns about AI and the rights of PWD. These groups are particularly skeptical of approaches that rely on voluntary measures and self-regulation. They advocate for human rights impact assessments and oversight by independent bodies and civil society to counteract the risks associated with business-centric approaches. They suggest implementing ex ante conformity assessments to address potential exclusionary and discriminatory risks associated with AI.

Moreover, these stakeholders highlight that the scope of technologies considered high-risk by the proposal may be too limited, particularly in contexts where bias is prevalent throughout the AI lifecycle. This includes the exclusion of PWD from the selection of use cases, among developers, and in training datasets. Two additional areas of concern are

96 ZARRA; FAVALLI; CERON, 2023.

identified that could remain inadequately addressed by the proposed regulation. First, there is an absence of a mandate for *universal design*, which is problematic both for accessibility and due to the stigma associated with being relegated to the use of specialized assistive technology. Second, the use of biometric data poses particular risks for PWD, not only due to potential accessibility issues but also because it could facilitate the disclosure of sensitive information regarding disability status, leading to discrimination.

In light of these concerns, even the most advanced attempts at creating a human-centric approach to AI regulation, as proposed by the European Commission, may not sufficiently protect the rights of PWD. The feedback from these key stakeholder groups underscores the necessity for more robust safeguards and inclusive practices within the regulatory framework to ensure the protection and empowerment of PWD in the age of AI.

Conclusion

The trajectory of Artificial Intelligence, examined throughout this article, reveals profound duality. On one side, it emerges as a force with potential to dismantle historically insurmountable barriers, offering tools that promote autonomy, communication, and social participation for people with disabilities. On the other, it presents itself as a mirror that reflects and amplifies entrenched social prejudices, risking the erection of new architectures of exclusion under the veneer of algorithmic objectivity. Technology is not a destiny, but a field of dispute where the contours of future citizenship are defined.

The analysis demonstrated that “techno-solutionism” – the belief that technology alone can solve complex social

problems – is a dangerously naive approach. The effectiveness of an AI tool cannot be measured solely by its technical performance, but must be evaluated by its impact on human rights and social justice. Concepts like “fairness,” when reduced to mathematical metrics, fail to capture the power dynamics and structural inequalities that marginalize people with disabilities. True innovation does not lie in creating algorithms that force conformity to a standard of “normalcy,” but in designing systems that embrace functional diversity as a pillar of human experience.

In this scenario, regulation, informed by frameworks like the Convention on the Rights of Persons with Disabilities and materialized in efforts like the European AI Act, becomes indispensable. It represents the attempt to inscribe ethical values and fundamental rights into code. However, legislation alone is insufficient without a paradigmatic shift in technological design practice. The transition from the “design for” model to the “design with” model – centering the experience and knowledge of people with disabilities themselves in the development cycle – is not merely a methodological recommendation, but an ethical imperative. The future of AI will be inclusive only if those who are most affected by its risks have the power to shape its design, ensuring that the algorithmic cane is, indeed, an instrument of liberation, and not a new form of control.

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