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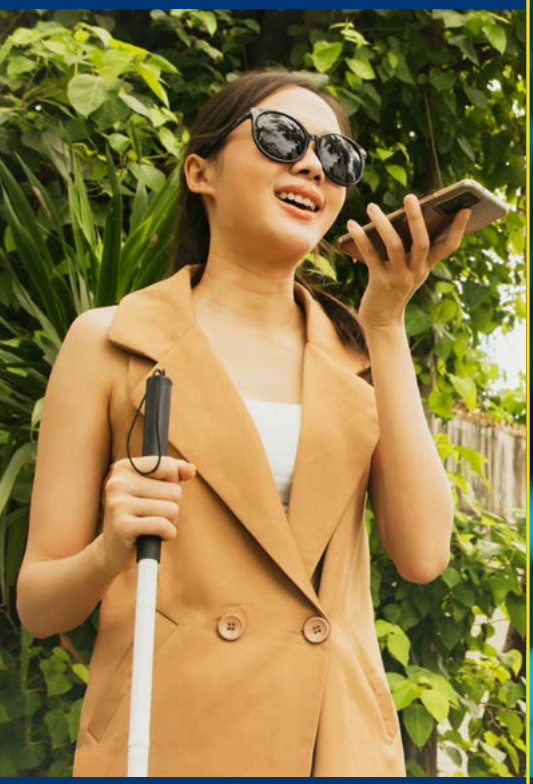

EMPOWERING OR EXCLUDING:

Expert Insights on Inclusive Artificial Intelligence for People With Disabilities

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Executive Summary

In recent years, artificial intelligence (AI) systems have grown in capability and versatility. As the capabilities of AI and automated systems expand, there is much excitement about the potential for autonomous vehicles, AI-enabled tools at school and in the workplace, and other innovations that could increase human efficiency. Many of these innovations have the potential to expand access and inclusion for people with disabilities, particularly the myriad of AI-based assistive applications being specifically developed to support users with disabilities. Alongside these benefits, however, AI industry members, advocates and scholars have identified risks these AI systems could pose for

people with disabilities, including risks of bias and discrimination, a lack of equitable access, and privacy concerns.

Researchers at the American Foundation for the Blind (AFB) conducted a Delphi study to synthesize expert opinions about the current and future impacts of AI on people with disabilities.

A total of 32 experts across industry, policy analysis, academia, and government roles participated. They provided anonymous feedback via individual interviews and then participated in two rounds of questionnaires to build consensus.

AI innovations have the potential to **expand access and inclusion** for people with disabilities.

KEY FINDINGS

The experts agreed on several opinions related to AI's current and future impacts on people with disabilities, as well as recommendations for optimizing benefits and minimizing risks. Some of these included:

- **Benefits of AI:** On-device text recognition AI apps will be especially beneficial to blind and low-vision users, who may perceive these apps as more private than using a human reader. In the transportation domain, AI will improve wayfinding support and sidewalk accessibility for pedestrians with disabilities.

- **Accessibility concerns:** Mainstream AI systems coming to classrooms will not be fully accessible for students with disabilities, and software used to teach people how to use AI will also have significant accessibility limitations. Additionally, image-generating tools are not currently usable by blind users, because there is no way yet to check the accuracy of an image.

- **Bias and discrimination concerns:** "Automation bias," the belief that machines make fairer decisions than humans, is itself a bias that may lead to over-trust of AI systems. AI may show biases against people with "non-average" characteristics, including people with disabilities. For example, AI may deny healthcare to people with disabilities who have unusual or complex care needs.

- **Need for human oversight:** Humans should review decisions made by an AI system, especially in the context of hiring or education. Employers should also notify job applicants when an AI system is being used for screening.

- **Need for disability community involvement:** People with disabilities should be involved in all stages of AI development and deployment.

- **Need for regulations:** AI regulations should be proactive, informed by the disability community, and specifically protect the rights and privacy of people with disabilities.

AI industry members, advocates and scholars have identified risks AI systems could pose for people with disabilities, including **risks of bias and discrimination, a lack of equitable access, and privacy concerns.**

- **Using AI to expand inclusion:** It is not enough to avoid harm to people with disabilities; AI should also be utilized to actively expand access and inclusion.

The experts also voiced differing opinions on some meaningful issues, such as the following:

- **Autonomous vehicles:** Some experts felt that autonomous vehicles will soon provide unparalleled transportation access to nondrivers with disabilities, while others cautioned that financial challenges, technological limitations, and safety concerns will likely limit their benefit.

- **AI as a benefit to workers with disabilities:** Some experts believed that AI will boost productivity and workplace inclusion for workers with disabilities. Others felt that AI will not overcome physical and attitudinal barriers in the workplace.

PRINCIPLES FOR CHANGE

Based upon the findings, AFB developed a series of principles to guide AI developers, deployers, users, and policymakers in ensuring that AI minimizes harm and expands inclusion for people with disabilities, including people who are blind or have low vision. A summary of the principles includes the following:

- When AI has a significant impact on people's civil rights, health, safety, freedom, or opportunity, both deployers and developers have an obligation to ensure that the AI models in use are not discriminatory either intentionally or unintentionally.

- AI systems should be designed and audited to ensure that they do not amplify harmful stigmas about people with disabilities.

- Producers of AI training datasets should evaluate whether their datasets represent a sufficiently diverse range of people with disabilities, including diverse disability types and people with intersecting identities, and modify their data sets accordingly.

- AI developers should actively recruit people with disabilities into their workplaces, and AI workplaces should be fully accessible. This includes ensuring that AI programming and training tools are accessible and that there are accessible avenues for people with disabilities to learn AI skills.

- Developers of software that incorporates AI models should provide transparent information about the extent to which the software has been tested for representativeness, bias, and accessibility for people with disabilities.

- AI software should fully conform with international accessibility standards, such as the Web Content Accessibility Guidelines 2.2, Level A and AA.

- The use of AI in software and decision-making tools should be clearly disclosed to people impacted. Particularly in cases where an AI tool could screen out people with disabilities, such as in hiring, impacted people should understand how to request reasonable accommodations or how to appeal decisions to a human reviewer.

- AI should not entirely replace human educators when delivering instruction or developing educational plans for students with disabilities.

- Students and employees with disabilities should be able to use AI as assistive technology. School administrators and employers should consult with the disability community in developing policies for the use of AI as a reasonable accommodation.

- When using AI with sensitive or private information, users should be able to choose where the information is stored and who can access it.

AFB developed a series of principles to guide AI developers, deployers, users, and policymakers in ensuring that **AI minimizes harm and expands inclusion** for people with disabilities, including people who are blind or have low vision.

Background

INTRODUCTION

Artificial intelligence (AI) systems can be defined as "machine-based systems that can make predictions, recommendations, or decisions influencing real or virtual environments" (U.S. Department of Justice Civil Rights Division, 2024). There is increasing attention to AI's potential to mitigate barriers for people with disabilities. Examples include autonomous vehicles (AVs) for non-drivers, generative AI to assist with communication or cognitive tasks, and AI systems used for image description. However, these systems, along with other mainstream applications of AI, may also present new barriers for people with disabilities. For example, the datasets that are being used to train and develop AI systems have been shown to embody bias that disadvantages marginalized groups based on race and gender characteristics (Kamikubo et al., 2022; Lewicki et al., 2023; Shelby et al., 2023). These biases may also disadvantage people with disabilities who are impacted by automated decisions (Disability Rights Education and Defense Fund, 2022; Glasgo et al., 2024; Tyson, 2024).

Governmental regulation is one way to ensure audits and transparency efforts are applied consistently. Several efforts are underway to develop regulations at both the state and federal level to incentivize AI research and development as well as to prevent outcomes that perpetuate discrimination. During the first Trump administration, the Federal government first issued an executive order on AI intended to promote American research into and use of the technology (Exec. Order No. 13859, 2019). The Biden administration issued an executive order and subsequent directives and guidance from the Office of Management and Budget focused on how the government uses AI and addresses some of the rights- and safety-impacting uses of AI (Exec. Order No. 14110, 2023). Several states have considered or passed legislation that gives state agencies or attorneys general the power to assess and audit AI models and tools for bias. Regulatory proposals range from simply clarifying that current discrimination prohibitions apply to the use of AI to crafting specific auditing regimes that require both deployers and developers of this technology to assess whether AI tools are fair for people with disabilities and other protected classes.

The following sections include a brief review of academic and policy literature on the benefits and risks of AI for people with disabilities. Then, this paper will present consensus findings from a panel of experts, including representatives from private industry, policy analysis, academia, and government roles. The findings encompass consensus opinions on the current and future state of AI accessibility and fairness for people with disabilities, especially people who are blind or have low vision. The paper concludes with a series of principles derived from the literature and the study findings.

BENEFITS OF AI FOR PEOPLE WITH DISABILITIES

By using automation in place of human capabilities to perform tasks, AI systems hold promise to make activities and environments more accessible for people with disabilities. In the transportation domain, there is much anticipation of the ongoing development of autonomous vehicles (AVs), which are currently on the road in several US cities (Hampshire, 2024; Ray, 2023). Fully autonomous vehicles (sometimes referred to as Level 5 AVs; SAE International, 2021) could support independent transportation for individuals who cannot drive an automobile because of visual, physical, or other disabilities (Hampshire, 2024). AI also holds great potential to assist in personalizing education to diverse learner needs (Morrison et al., 2021, 2023) and to boost accessibility and accommodation options for workers with disabilities (PEAT, 2023).

By using automation in place of human capabilities to perform tasks, AI systems hold promise to **make activities and environments more accessible** for people with disabilities.

A growing body of literature explores the promise of AI-enabled assistive technologies or AI systems explicitly created to "increase, maintain, or improve the functional capabilities of people with disabilities" (Assistive Technology Act, 2004). Prominent examples include AI applications built for image description, image generation, object recognition, captioning, and communication and cognitive supports (Bennett et al., 2021; Bianchi et al., 2023; Gamage et al., 2023; Theodorou et al., 2021). Other innovative applications of assistive AI include the development of systems that aid blind and low-vision people in locating lost items (Morrison et al., 2023) or accessing visual information on clothes shopping websites (Stangl et al., 2018).

RISKS AI POSES FOR PEOPLE WITH DISABILITIES

As AI evolves, researchers and advocates have begun to raise concerns about risks AI systems may pose for marginalized groups, including people with disabilities. Regarding AVs, some advocates have identified potential safety risks for pedestrians with disabilities. For example, an AV might not recognize and properly avoid colliding with a pedestrian who uses a mobility aid such as a wheelchair, walker, or guide dog (Moura, 2022). In one experiment, a simulated AV consistently collided with a person propelling herself backward in a wheelchair (Treviranus, 2018). If designed and trained well, AVs can potentially improve safety relative to human drivers, but some argue that the safety standard set for AVs should be higher than that set by human drivers (Ray, 2023).

More broadly, AI systems are trained on people with "average" characteristics. Since disability and the diverse range of conditions that cause disability are statistically unusual characteristics, AI systems used in healthcare or benefits decision making may make inaccurate diagnostic judgments or disproportionately flag disabled people for denials of services (Brown et al., 2020; Disability Rights Education & Defense Fund (DREDF), 2022; Edwards & Machledt, 2023; NAIAC, n.d.). Similarly, AI systems used to screen job applicants may disproportionately reject disabled applicants based upon resume characteristics or behaviors during automated screening (Glasgo et al., 2024; PEAT, 2023; PEAT, 2023b; Wiessner, 2024). Furthermore, AI systems used to monitor students or employees may flag the atypical work behaviors of disabled students or employees (such as not looking at a camera, not clicking a mouse, or taking frequent movement breaks) as warranting

closer surveillance or disciplinary action (Center for Democracy & Technology [CDT], 2022; Tyson, 2024; Woelfel et al., 2023). In addition to placing disabled students and employees at risk for discriminatory discipline, these systems may also threaten the privacy of disabled students and employees by potentially "outing" their disabilities (CDT, 2022). Another study found that current large-language model (LLM) chatbots mirror predominant cultural stereotypes about disability, such as telling stories featuring disabled people as inspirational or passive (Gadiraju et al., 2023).

A final set of concerns revolves around current limitations of assistive AI systems and the biases they may perpetuate. In one study, prompting an image-generating algorithm to produce an image of a "thug" tended to generate images of dark-skinned people (Bianchi et al., 2023). Bennett et al. (2021) recommended caution in using and interpreting AI-generated image descriptions of people, whose identities may be misrepresented by the AI. Finally, assistive AI research may not adequately involve feedback from potential users, resulting in products that do not align with users' actual needs. Demonstrating this issue, Gamage et al. (2023) reviewed 646 studies of assistive AI for blind and low-vision users and found that only 38 of these studies involved blind and low-vision participants in the design, ideation, or requirements gathering stages of the research. This resulted in AI development priorities that diverged from the stated priorities of potential users. Specifically, a majority of these studies focused on assistive AI for object handling or personal mobility, but a group of blind and low-vision participants reported that they most desired AI assistance with text recognition and obstacle detection (Gamage et al., 2023). There is thus a need to involve people with disabilities in the data sets used to train AI systems as well as in the design and development of such systems.

THE CURRENT STUDY

In the spring and summer of 2024, researchers at the American Foundation for the Blind conducted a Delphi study to gather expert opinions about the current and future impact of AI on people with disabilities. A Delphi study is a rigorous research technique for achieving consensus among a group of experts on a specific topic through multiple rounds of questions, using both qualitative and quantitative methods (Dalkey & Helmer, 1963; Falzarano & Zipp, 2013).
This study expanded upon the existing literature in at least three ways. First, the expert panel included the voices of professionals working in private industry at companies that develop AI technologies to integrate industry perspectives with those from academia and policy analysis. Second, this study explored intersections between AI and disability across five application domains: transportation, education, employment, healthcare and benefits decision making, and assistive AI. Third, in addition to capturing experts' views on how AI might both benefit and harm people with disabilities, the study captured recommendations from the experts on specific ways to optimize opportunities and mitigate risks. These recommendations were incorporated into a set of principles for AI developers and policymakers.

A total of 32 experts participated in the study, including 13 people employed in private industry, 9 employed in the nonprofit sector, 7 employed in academia, and 3 employed in the federal government or by a federal contractor. Each expert provided feedback through an interview and two follow-up questionnaires. Following best practices for Delphi studies, the experts participated anonymously, which minimizes bias and promotes honest feedback. The interviews were coded to derive opinion statements, which were shared with the experts in two rounds of questionnaires to identify which opinions were consensually adopted by the panel. Appendix A contains a detailed description of the research study methods and Appendix B contains details on the demographics of participating experts.

In addition to capturing experts' views on how AI might both benefit and harm people with disabilities, the study captured recommendations from the experts on specific ways to **optimize opportunities and mitigate risks.**

In the section below, a summary of the expert panel's consensus opinions and recommendations is presented, along with some opinions upon which the expert panel generated pertinent insights but did not reach consensus. First, specific findings are presented related to AI use in the five focus domains. Then, more general findings are presented regarding concerns about AI's implications for privacy and discrimination. Finally, a series of proposed solutions and mitigation measures are presented. After presenting findings for the full expert sample, findings will also be summarized from the 13 experts from private industry. Appendix C includes all opinion statements with which the experts agreed, while Appendix D lists the statements with which the experts varied in their level of agreement.

Narrative and Findings

AI USES IN TRANSPORTATION AND AUTONOMOUS VEHICLES

The experts generally agreed that, in the next 5 years, AI could potentially improve access for disabled pedestrians by benefiting both sidewalk accessibility and wayfinding. The experts were divided, though, when anticipating the potential widespread use of AVs. While some of the experts were optimistic that AVs will support transportation access for nondrivers with disabilities, others expressed skepticism about how widely available AVs will become. Concerns revolved around the limitations of AV technology, potential expense and limited sustainable funding, and potential regulations limiting their use. Some experts also voiced concerns about the safety risks AVs could pose for disabled pedestrians, although they emphasized that much is still unknown about the likelihood of AV-pedestrian collisions or if they are more likely to collide with disabled than with nondisabled pedestrians. When asked whether robust public transportation was a better investment than AVs, some experts said that investing in public transit and investing in AVs do not need to be mutually exclusive. However, one expert was skeptical that AV investments would be as effective long-term as investing in public transit. Finally, the experts disagreed on whether or not AI will improve data collection in the transportation space to promote data-driven decision making. Concerns were expressed about the lack of disability representation in data, as well as the restrictions private companies place on access to transportation data.

AI could potentially **improve access for disabled pedestrians** by benefiting both sidewalk accessibility and wayfinding.

AI USES IN EDUCATION

The expert panel was united on three broad points related to AI and education. First, they agreed that AI should not replace human educators when delivering instruction or when writing administrative documents such as Individualized Education Plans (IEPs). Second, experts were skeptical that students with disabilities will be able to fully participate in the use of new AI systems brought into classrooms. They predicted that many new AI systems brought into classrooms will be inaccessible, creating new barriers to classroom inclusion and exacerbating existing ones. Finally, the experts concurred that training methods for developing AI literacy are likely to present access barriers for users with disabilities, due to inaccessible components such as drag and drop interfaces. To mitigate risks related to inaccessible interfaces, the experts further agreed that the National Institute of Standards and Technology (NIST) risk management framework ought to be applied to AI systems in education before adoption. The experts had differing opinions on how effectively AI will be used in the future to deliver individualized instruction to students with disabilities.

AI USES IN EMPLOYMENT

Experts shared concerns about the disproportionate negative impacts of algorithmic job candidate screening systems on candidates with disabilities. To mitigate harm, they unanimously recommended that AI used in applicant screening should be disclosed to all job applicants to promote transparency, and that a human should review AI-generated screening decisions. The experts further agreed that new job categories, such as AI supervision, may not be fully accessible to candidates with disabilities. Experts were more uncertain about the benefits of AI for current employees with disabilities, though. While some experts acknowledged that AI embedded in workplace technologies could help people keep their jobs after becoming disabled, others emphasized that this depends on the specific system and its design. The experts also disagreed on whether or not AI will result in people with disabilities being better integrated into their workplaces. Skeptics of this concept emphasized that AI cannot mitigate barriers in the physical workplace or negative attitudes humans hold toward workers with disabilities. Overall, the expert panel advised caution and vigilance toward the potential for AI to worsen bias and discrimination in the workplace.

AI USES IN HEALTHCARE AND BENEFITS DECISIONS

In the healthcare domain, the experts voiced strong concerns about the potential for AI to flag people with disabilities for denials of care. In particular, it was expressed that since people with disabilities often need both a greater quantity of care and more unusual care, algorithms built to reduce or economize healthcare utilization could disproportionately threaten access to care for patients with disabilities. Experts emphasized that algorithms are trained on the "average" cases, so people with disabilities may stand out negatively to an algorithmic system because they do not fit an "average" or "typical" health profile. This risk might be amplified for people with multiple minority identities, including disability, because those people's specific combinations of characteristics are statistically less likely to be represented in training data. Additionally, the expert panel slightly agreed with a concern about the harms of using AI in prenatal genetic testing, specifically that it could contribute to eugenic actions preventing the birth of children with disabilities.

The experts also considered whether or not AI will reduce wait times and expedite approvals for people waiting to receive disability benefits. Some experts believed this should happen, but others worried that in practice, AI will instead be used to expedite benefits denials. There was also disagreement on whether or not AI will be used to ration scarce medical resources in ways that will disadvantage people with disabilities. Some experts felt this will be a significant risk, but others cautioned that we do not yet have clear evidence of this possibility.

AI USES IN ASSISTIVE TECHNOLOGY

The experts reached agreement on two issues related to the use of AI as blindness-related assistive technology. First, they agreed that AI can sound confident even when making mistakes in image descriptions. Such false confidence, they contended, makes it difficult for users who are blind or have low vision to judge the accuracy of visual descriptions, and thus to know whether they could trust AI-generated descriptions at all. Secondly, they agreed that although blind and low-vision users can employ AI to generate images for them, these text to image generation tools cannot describe the images they generate, so blind and low-vision users cannot verify the accuracy of AI-generated images nonvisually.

In healthcare, experts voiced strong concerns about the potential for **AI to flag people with disabilities** for denials of care.

Some rich debate arose regarding the issue of how much AI should be able to describe images of people. Some experts voiced the view that AI should be designed to provide unrestricted descriptions of all images, including those of people. Others felt that image descriptions of people should be limited, particularly the ability to recognize people by name from their images, to protect the privacy of the people being described or to avoid the harm of describing people in biased ways. Specifically, one expert advocated for descriptions of people to be considered separately from descriptions in general, as it is easier for human biases to affect descriptions of people than of animals, plants, objects, or landscapes.

AI AND PRIVACY CONCERNS

The expert panel reached consensus on three points related to AI and privacy. First, blind and low-vision people may perceive text-reading AI as more private than a human reader, if the images of text are stored locally and not in the cloud. This may make on-device AI reading apps especially attractive to blind and low-vision users. Second, balancing privacy standards with accessibility is critically important when considering the impacts of AI on people with disabilities. Finally, the panel agreed that there should be strong AI privacy laws at the federal level that are directly informed by people with disabilities.

AI AND BIAS CONCERNS

Several opinions arose from the expert panel related to algorithmic biases across domains. The term “automation bias” was suggested to describe the common assumption that decisions coming from an algorithm (as opposed to a human decision maker) are unbiased. This assumption, described as being a bias of its own, can lead people to over-trust the accuracy and impartiality of algorithmic decisions. The panel also agreed that AI can oversimplify the disability experience, missing the variability within the disability community and differences between impairment groups. Further, experts believed that when an AI system makes biased decisions, businesses deploying those systems should be held accountable.

AI auditing **must account for biases related to disability** as well as those related to race and gender when making decisions regarding solutions involving AI.

While the experts generally believed that AI developers ought to be held accountable for biased decisions made by the AI systems they build, several experts noted that, currently, AI developers are not adequately held accountable for those biases due to a lack of enforcement. Two experts also questioned whether AI developers should be held accountable for the biased decisions of AI, as biases are entrenched in the culture and the data used to train the systems.

EXPERT RECOMMENDATIONS FOR SOLUTIONS

The experts agreed on the following with regard to solutions involving AI. Firstly, they agreed that AI auditing must account for biases related to disability as well as those related to race and gender when making decisions; that the regulatory process needs to proactively involve people with disabilities; and that people with disabilities need to be involved in the tech industry to ensure accessibility of new systems. The experts felt that currently, there is insufficient involvement of people with disabilities in AI research and development, leading to a gap between the development of technology and the lived experiences of its users.

Regarding AI regulation, experts highlighted the cumulative harm from a large number of issues considered too small to need regulation, i.e. death by a million small cuts. They further concurred that reactionary regulation, where regulation is only implemented after something bad has happened with an AI system, is common in the AI space. The experts contended that this is a problem and that AI regulation should be implemented as soon as possible and have as one of its goals the specific protection of people with disabilities from algorithmic biases.

Experts had some differing opinions on the question of whether or not regulation will hinder AI adoption. Generally, experts felt that regulation and innovation are not mutually exclusive and that regulation can co-exist with responsible innovation and adoption of AI. Though the experts do want to see AI utilized for the improvement of accessibility in everyday life, they also want to ensure AI's risks do not outweigh its rewards. The experts further asserted that AI is ultimately under the control of humans, who retain the power to decide what impact it has on the experience of living with a disability.

Ultimately, the experts achieved consensus on the idea that AI should strive not just to refrain from doing harm to people living with disabilities but should actively strive to expand access and inclusion. They also emphasized considering the uniqueness of each experience of living with a disability; there are as many experiences of disability as there are people living with disabilities on Earth. They highlighted here just how important it is to keep individuality of AI users in mind and demonstrated the nuance of working within the context of disrupting accessibility barriers. They charged humans with the work of ensuring responsible AI adoption because ultimately humans develop it and can choose its impact on all people – with and without disabilities.

OPINIONS OF INDUSTRY EXPERT SUBSAMPLE

Since prior studies have not captured the views of AI industry representatives, a separate analysis was conducted with the questionnaire responses from the 13 experts who reported working in private industry. Response patterns were similar overall, with the industry subsample reaching consensus on all of the opinions described earlier that were adopted by the full panel. For example, the industry experts agreed that AI regulation should come soon and should specifically protect people with disabilities; that the tech industry needs more diversity and disability representation in its workforce; and that a human should review decisions made by AI used in employment screening.

The industry experts also agreed on some opinions that were more controversial in the full sample. Compared with the full sample, the industry experts were more optimistic that AI will help people remain employed after acquiring disabilities and that AI will help employees with disabilities become more integrated in workplaces. The industry experts also agreed that AI will introduce sweeping changes to the way society operates, including transformations in workplace productivity within the next 1–2 years.

Industry experts also agreed that AI will **introduce sweeping changes** to the way society operates, including transformations in workplace productivity within the next 1–2 years.

Discussion

The experts in this study largely found consensus around measured assessments of the capabilities and harms of AI. As a tool for increasing computing power and expanding the capability of numerous technologies, AI presents both opportunities and risks for people with disabilities. As with image description software and wayfinding, AI may power tools that allow people with disabilities to live, work, and travel more independently. At the same time, AI models, such as those used in employment screening or healthcare decision-making, also run the risk of standardizing individual biases against people with disabilities in a way that is not always transparent to users of the technologies. As a result, this research finds that both developers and deployers of AI technologies should thoughtfully and proactively validate AI models for accurate and fair representations of people with disabilities.
In addition, humans will continue to play an important role in setting parameters for, reviewing outputs of, and authorizing final decisions informed by AI tools. AI users will need skills development opportunities that prepare them to use AI in a way that does not discriminate against people with disabilities. At the same time, people with disabilities should be actively trained for and recruited into roles that develop and deploy AI in a wide variety of contexts.
Finally, government regulations must protect people with disabilities from harm and balance access to these tools with protections for individual privacy.

However, this research identifies only the areas in which the participating experts agree. Additional research is needed to understand, with greater clarity, many of the questions that were raised by some of the experts who participated in this study but that were not affirmed by the consensus panel. For example, was the lack of consensus about the benefits of autonomous vehicles due to opinions about the capability of the automated driving system or about other barriers that people with disabilities face in using autonomous vehicles, such as cost, physical vehicle design, or geographic dispersion?
In addition, while this research addresses what experts in academia, industry, and disability organizations currently know about the impact of AI on people with disabilities, it does not directly present a more comprehensive understanding of the lived experience of AI users with disabilities in a variety of domains. Further research should elucidate how individuals with disabilities are using AI tools for greater access as well as where they have experienced direct and indirect barriers or harms.

AI may power tools that allow people with disabilities to **live, work, and travel more independently.**

Guiding Principles for More Disability-Inclusive AI

The literature review and research presented in this white paper respond to the promised societal transformations of Artificial Intelligence. The experts in this study agreed that AI must focus on expanding access and inclusion while avoiding harm to people with disabilities. To that end, the American Foundation for the Blind proposes the following non-exhaustive principles to guide developers, deployers, users, and policymakers in crafting beneficial AI for people who are blind, have low vision, or have other disabilities:

- AI has the potential to increase access to assistive technology by automating services, like captioning, image description, and wayfinding, and integrating those technologies into mainstream devices and software that are widely available to the general public.

- Investments in AI research and development should maximize the capabilities of human users to provide opportunities and services to people with disabilities such as in educational and transportation settings, rather than replacing human professionals altogether.

- Some uses of AI demand greater scrutiny. When AI has a significant impact on people's civil rights, health, safety, freedom, or opportunity, both deployers and developers have a greater obligation to ensure that the AI models in use are not discriminatory either by intent or happenstance.

- AI systems should be designed and audited to ensure that they do not amplify harmful stigmas about people with disabilities. The outcomes should be measured for specific negative effects against people with disabilities.

- In order to be representative of people with disabilities, the data used to train AI models should include sufficiently diverse data to be representative of people with a range of disability types and with other characteristics, including gender, age, race, and income.

- Producers of AI training datasets should evaluate whether their datasets represent a sufficiently diverse representation of people with disabilities or incorporate stigmas, modify the datasets as needed, and provide transparent information to guide data users and researchers to understand the limitations of the dataset.

- AI chatbots, especially those used in customer service settings, should be provided training information and resources to answer questions relevant to people with disabilities and their unique accessibility needs.

- Investments in AI research and development, including grants from government agencies, should incentivize and prioritize research into AI that is representative of and produces fair outcomes for people with disabilities.

- Additional resources should be invested in producing validation and auditing practices that ensure that people with disabilities are accurately and sufficiently represented by AI models and that decisions produced or influenced by algorithms are fair and appropriately attuned to the experiences of people with disabilities.

The principles are to guide developers, deployers, users, and policymakers in **crafting beneficial AI** for people who are blind, have low vision, or have other disabilities.

- People with disabilities should have equal access to STEM education and careers. Improving the accessibility of K-12 and higher education STEM curricula as well as career training programs should be a priority to create pathways for students with disabilities to be able to enter careers creating and using AI technologies.

- AI developers should actively recruit people with disabilities and ensure that workplaces are accessible.

- Development tools used to program and train AI models should be accessible to and usable by people with disabilities.

- Training courses designed to prepare existing workers to develop AI skills should be fully accessible to people with disabilities, including by incorporating accessible interfaces, captions, audio description, plain language, and alternative formats of graphical information where appropriate.

- AI literacy and skilling training should prepare people with and without disabilities to understand automation bias as well as potential sources of disability bias and how to correct for it. Deployers of AI should provide employees with ample agency, training, and time to question the results of AI decision-making tools and identify whether they present bias against people with disabilities.

- Developers of software that incorporates AI models should provide transparent information about the extent to which the software has been tested for representativeness, bias, and accessibility for people with disabilities.

- Developers of AI models should consider creating technical manuals that guide users and deployers of those models in understanding the limitations of the model and how to correct for biases that may be discovered after the fact, such as by incorporating human oversight into decision-making processes supported by AI.

- Training should be made available to guide users in understanding prompt creation for generative AI that produces results that are accurate and representative of people with disabilities.

- Software that incorporates AI may discriminate against people with disabilities if people with disabilities cannot use all aspects of the software interface, including with assistive technology like screen readers. AI software should be designed to fully conform with international accessibility standards, such as the Web Content Accessibility Guidelines 2.2, Level A and AA.

- The use of AI in software and decision-making tools should be clearly disclosed to users. Particularly in cases where the use of AI could screen out people with disabilities, users should understand how to request reasonable accommodations or how to appeal decisions to a human reviewer.

- Deployers of AI in employment and educational screening should carefully consider whether the AI model may explicitly or implicitly discriminate against people with disabilities, for example by discarding applications with employment gaps or judging candidate videos for certain eye movements or speech patterns. To the greatest extent possible, human reviewers should have access to all applications and should confirm that the screening tool appropriately recommended qualified candidates, including those with disabilities.

- In general, educational technology, regardless of whether it incorporates AI, should be fully accessible to and usable by students with disabilities. The U.S. Department of Justice has issued regulations for public schools and universities requiring educational websites and mobile applications to be accessible to both students and parents with disabilities.

- When used in educational technology, AI agents and chatbots should be designed to provide information in accessible formats and to produce pedagogical outputs and means of instruction that are appropriate for students with disabilities. Trained educators of students with disabilities, including teachers of students who are blind or have low vision, as well as students themselves, should be consulted in validating the appropriateness of these educational tools.

- AI may support teachers in reducing planning, documentation, and paperwork burdens, but it should not entirely replace human educators when delivering instruction or developing educational plans for students with disabilities.

AI used in software to surveil employee and student performance and productivity **should not disproportionately affect** people with disabilities.

- Students and employees with disabilities should be able to have access to AI as an assistive technology that supports their educational and employment opportunities. School administrators and employers should consult with people with disabilities in developing appropriate policies and procedures for the use of AI in employment and educational settings, including as a reasonable accommodation.

- AI used in software to surveil employee and student performance and productivity should not disproportionately affect people with disabilities. Employers and educational institutions should carefully evaluate whether such tools may discriminate, such as by flagging employees who need breaks for personal needs or to care for a service animal or by categorizing certain involuntary eye movements as cheating or inattention.

- Collaboration between the assistive technology industry, AI developers, and the disability community could result in more accurate and neutral representation of individuals in image descriptions that balances privacy, concerns about bias, and accuracy of the image descriptions.

- To the extent that AI powers assistive technology for people with disabilities, it may be given greater access to more personal information than a nondisabled user would provide. Access to assistive technology uses of AI should not be contingent upon people with disabilities relinquishing either their privacy or data security, especially in situations where people without disabilities do not have to exchange privacy for access.

- To enable people with disabilities to use AI in sensitive situations, such as reading mail, users should be able to choose where user data is stored and to what extent it is shared with an AI developer. When data must be uploaded to the cloud to provide greater processing power, users should be able to control whether that data is stored and accessible by companies using the data.

- Terms of agreement should offer users the choice whether to allow companies to access and use the images that are uploaded to assistive technology tools.

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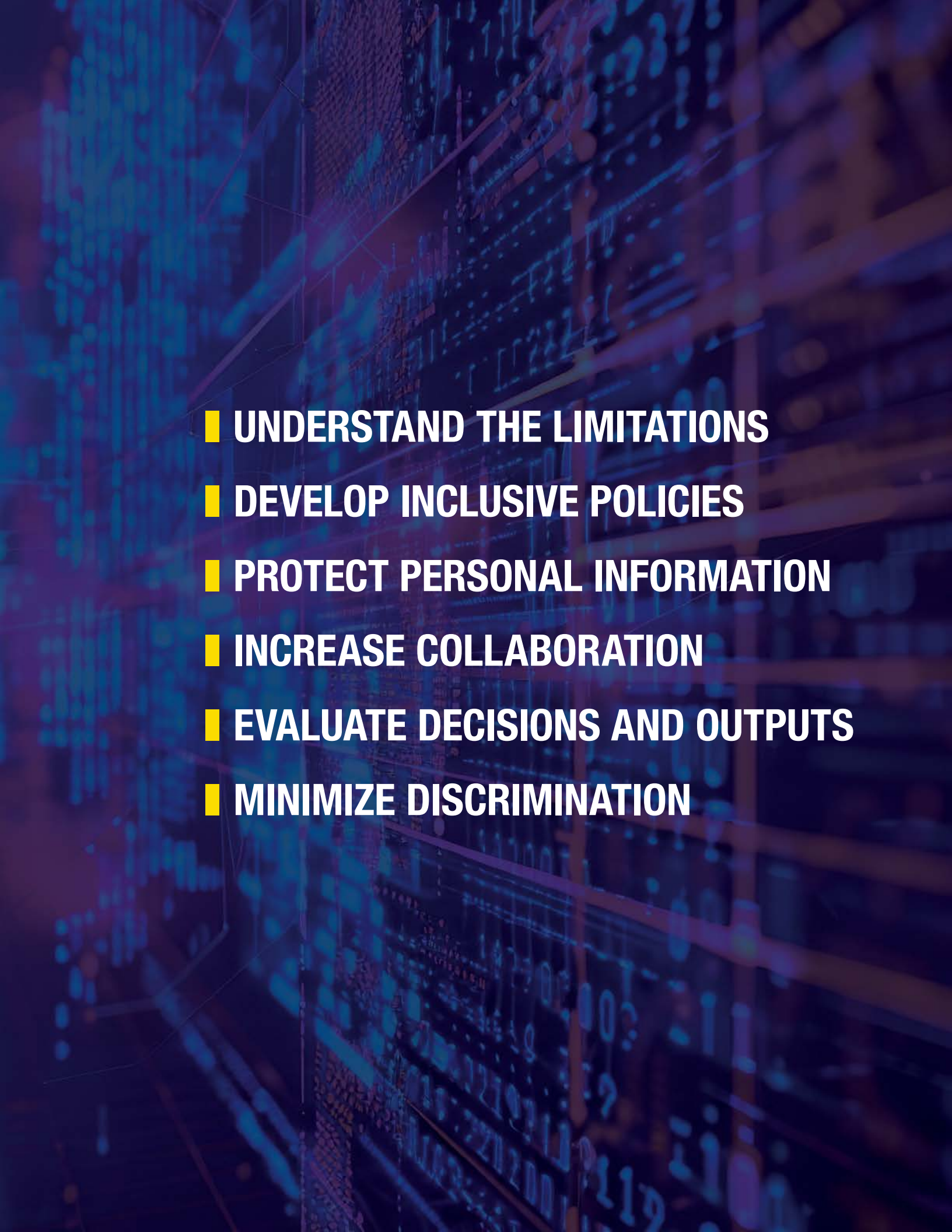
UNDERSTAND THE LIMITATIONS
DEVELOP INCLUSIVE POLICIES
PROTECT PERSONAL INFORMATION
INCREASE COLLABORATION
EVALUATE DECISIONS AND OUTPUTS
MINIMIZE DISCRIMINATION

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Appendix A:

DELPHI METHODOLOGY

This study employed a Delphi methodology to achieve consensus among experts from diverse fields of industry, policy, and academia. The Delphi process is an established iterative research method designed to gather insights and refine expert opinions through a structured sequence of data collection and analysis rounds (Falzarano & Zipp, 2013). In this study, three rounds were conducted: an initial qualitative phase involving semi-structured interviews, followed by two rounds of quantitative web-based surveys. The study was conducted with Institutional Review Board (IRB) approval, and all participants provided informed consent.

The first round consisted of semi-structured interviews aimed at identifying key themes and issues relevant to the research topic. Experts were selected based on their expertise and representation of the fields of industry, policy, and academia. This diverse knowledge base of participants ensured that the study incorporated a broad range of perspectives. Each interview was scheduled for approximately one hour and was conducted in a semi-structured format to allow for both guided discussions and the exploration of emergent ideas. Interviews were transcribed verbatim, and real-time notes were taken to ensure accurate capture of responses. The data gathered during this phase were analyzed thematically, with emergent themes serving as the foundation for the subsequent survey rounds. This process of qualitative synthesis was critical in generating meaningful, contextually relevant questions for the surveys.

The second and third rounds of the Delphi methodology were conducted using web-based surveys administered through Qualtrics, with data analysis performed using R. Themes from the interviews were used as survey questions, with revisions to wording made to ensure participant anonymity and avoid threats of influence of reputation. The same pool of experts from the interview phase was invited to participate in these rounds, ensuring continuity and consistency throughout the iterative process. Participation in each survey round was voluntary, and experts were informed of the study's goals and processes at every stage.

The second-round survey was designed to quantify the level of agreement with the themes and insights identified in the interviews. Seven-point scales similar to Likert scales of agreement were used as the primary mechanism for gathering quantitative data, enabling participants to rate their level of agreement or priority for various items. To contextualize the quantitative findings, the survey also included open-ended fields where participants could provide justifications or elaborate on their ratings. This qualitative feedback was instrumental in understanding the rationale behind expert opinions and informed the development of the next round.

The third round built directly on the results of the second round. In this round, participants were provided with aggregated data from the previous survey, including the mean Likert scores for each item. This step allowed participants to consider the collective responses of their peers while maintaining anonymity. Additionally, anonymized justifications from the second round were shared to provide context for differing perspectives. This iterative process encouraged reflection and refinement of responses, ultimately fostering a deeper level of consensus. Items that did not achieve consensus in the second round but demonstrated close agreement, as measured by a standard deviation approaching the defined threshold, were included again in the third round for reevaluation.

Consensus was pre-defined as a standard deviation (SD) of 1.0 or less in seven-point scale responses, with consideration of the most recently published best practices for analysis in Delphi studies (Franc et. al., 2023). This metric was chosen to ensure a rigorous and statistically sound measure of agreement among participants while allowing for diverse perspectives to be represented. The use of a standard deviation threshold provided an objective criterion for determining which items were considered areas of consensus and which required further deliberation.

- MAXIMIZE ACCESS
- ADDRESS BIAS
- IMPROVE REPRESENTATION
- TRAIN PEOPLE
- REMOVE BARRIERS
- BE TRANSPARENT

APPENDIX A

Throughout the study, the research team strived to protect participant identities, to facilitate experts sharing their candid opinions, uninfluenced by their employers or political winds. Participants were informed of their rights and provided with clear explanations of the study's purpose, methodology, and potential applications. Informed consent was obtained at the outset, ensuring that participation was fully voluntary.

The use of the Delphi methodology in this study was particularly suited to addressing complex, multi-faceted issues that benefit from expert deliberation. By beginning with qualitative interviews, the research team was able to ground the study in the lived experiences and professional insights of a diverse group of experts. This approach ensured that the themes and questions explored in subsequent survey rounds were both relevant and comprehensive. The iterative survey rounds allowed for the refinement of ideas and the identification of areas of strong agreement, providing a clear pathway to actionable conclusions.

The reliance on a consistent pool of experts across all three rounds was a key strength of this study. Maintaining the same group of participants allowed for continuity and movement toward consensus when feedback and rationale were provided. Additionally, the integration of qualitative and quantitative methods at each stage ensured a balanced approach that leveraged the strengths of both types of data.

Appendix B:

PARTICIPANT DEMOGRAPHICS

Employment Sector	Count
Academia	7
Contractor	1
Federal government	2
For-profit/private industry	13
Nonprofit	9

Expertise Area	Count
Generative AI	21
Large language models (LLM)	17
AI use in school settings	9
Education of students with disabilities in K-12 or postsecondary settings	12
Employment issues affecting people with disabilities	13
AI in the workplace	17
Autonomous vehicles	6
Transportation policy	6
AI used for visual descriptions (image/video descriptions) or visual interpretation	18
Algorithmic decision making in healthcare settings	9
AI use for determining benefits eligibility	3
Policy issues around regulation of AI technologies	13
Other	4

Gender	Count
Cisgender female/woman	13
Cisgender male/man	15
Genderqueer, gender-nonbinary, or gender fluid	3
I prefer not to provide this information	1

Race	Count
Asian/Asian American	7
Black/African American	2
I prefer not to provide this information	3
Middle Eastern/North African (ME/NA)	1
White non-Hispanic	19

Years in role	Count
Less than 1 year	4
1-2 years	3
2-5 years	13
6-10 years	4
11-20 years	5
More than 20 years	3

Location	Count
California	4
Colorado	1
England	1
Florida	2
Kansas	1
Maryland	3
Massachusetts	4
Michigan	1
Minnesota	1
New York	2
Texas	1
Toronto	2
Virginia	2
Washington	1
Washington, D.C.	6

Appendix C:

CONSENSUS TABLES

Items shown here reached consensus after the second or third round of consultation and are presented in rank order of strength of agreement. For statements that did not reach consensus on the second round, Participants were shown the group mean before responding to the third round, so that they could consider moving closer to the group consensus or provide their justification if they disagreed with the group. Justifications were used for the dissent analysis on all topics.

CONSENSUS ITEMS

- Q43 A human in the loop is necessary for candidate screening.
- Q79 The tech industry needs more diversity in its own employees to be able to spot and guard against the many types of bias that AI can generate.
- Q7 AI auditing must account for anti-disabled biases in addition to racial and gender biases.
- Q3 AI needs to focus on expanding access and inclusion; it is not enough to only avoid harm to people with disabilities (PWD).
- Q19 AI should be a partner, not a replacer, in writing Individualized Education Plans (IEPs) for students with disabilities.
- Q75 There should be strong privacy laws at the federal level that are i nformed by the disabled community.
- Q6 Automation bias (belief that if it comes from the algorithm it must be true and unbiased) leads to an over trust of AI for tasks it is not particularly accurate for.
- Q72 Balancing privacy standards with accessibility needs is critical in AI development for PWD.

- Q76 Regulation needs to ensure individuals with disabilities are proactively considered in AI development.
- Q42 AI used in resume screeners or hiring decisions need to be disclosed to all applicants.
- Q16 AI should not replace interactions with human educators.
- Q78 PWD should be involved at every stage of creating, procuring and deploying algorithmic decision-making.
- Q10 Skills like curiosity, empathy, and critical thinking will remain the most relevant after AI adoption.
- Q65 Training methods for AI literacy, such as drag-and-drop interfaces, pose barriers for people with disabilities.
- Q84 Reactionary regulation, where actions are taken only after something bad happens, is common in AI.
- Q74b There is a gap between technology development and user experience as it relates to disability needs.
- Q30 For patients who have a “non-average” characteristic, AI could fail in ways that are difficult to detect.
- Q74a There is a lack of involvement of people with disabilities (PWD) in research.
- Q5 Businesses that deploy AI solutions are accountable for the bias when AI makes biased decisions.
- Q85 Regulation of AI should come sooner rather than later and specifically protect individuals with disabilities.
- Q82 The National Institute of Standards and Technology (NIST) risk management framework should be applied to educational AI software before adoption (evaluates privacy, security, etc).

There is a **cumulative harm** from things viewed as too minor to need regulation — death by a million small cuts.

- Q52 AI can be used to track sidewalk accessibility to create better routes.
- Q73 Blind users may perceive AI for reading as more private than a human reader, if images are not stored in the cloud.
- Q70 AI tools oversimplify disability and miss the variability within the disabled community.
- Q61 Text-to-image tools are currently not accessible as blind users are unable to review generated images non visually.
- Q27 Many people with disabilities need more unusual healthcare, which is likely to get flagged by AI for denial.
- Q51 AI will revolutionize wayfinding accessibility for blind people in the next 5 years.
- Q60 AI models often sound confident when making mistakes, making it almost impossible for blind users to identify if an image description is wrong.
- Q83 There is a cumulative harm from things viewed as too minor to need regulation — death by a million small cuts.
- Q22 Many AI tools coming to classrooms will be inaccessible.
- Q44 New job categories, like AI supervision, could be inaccessible to people with disabilities (PWD).
- wQ31 AI driven prenatal screening tools will create actions of eugenics.

Appendix D:

NON-CONSENSUS TABLES

These statements were expressed by at least one member of the expert panel, but the whole panel did not feel the same way about each statement. This can occur if some panel members strongly agree with a statement while others disagree, or if some members agree while others have more neutral opinions. Since people are generally more willing to express agreement than disagreement, statements that at least some experts viewed as false were likely to generate varied opinions. Other possible reasons for non-consensus include differing interpretations of the statement, having different predictions of where the future is headed, or the statement assuming a premise that other experts are not willing to take as true at this time.

NON-CONSENSUS ITEMS

- Q4 AI developers are accountable for the bias when AI makes biased decisions.
- Q8 AI advancements increase disability stigma; e.g. artificial vision creates pressure for all bodies to conform.
- Q9 We are currently experiencing a lot of hype marketing AI that over promises to the layperson what AI is doing.
- Q11 AI will introduce sweeping changes to how society operates, more drastic than the introduction of the mobile phone.
- Q12 Large Language Model (LLM) technology will plateau in 1–3 years.
- Q15 AI applications in education are likely to become punitive, involving monitoring software, high-stakes testing, and tools that flag AI use.
- Q17 Students with disabilities are accused of cheating at an unfair rate because generative AI is built into relevant assistive technologies.
- Q18 AI will effectively tune curricula to individuals with disabilities' needs.

- Q20 Relying on AI for IEPs could be harmful to disabled students due to its lack of interactivity and collaboration.
- Q21 In 5 years, AI will have student data from curricula and be able to write better IEPs for students than professionals can.
- Q22 Many AI tools coming to classrooms will be inaccessible.
- Q25 The rollout of faulty AI systems for determining benefits eligibility is a life-or-death issue for disabled people.
- Q26 AI should be used to make benefits applications easier to fill out and expedite approvals.
- Q28 Healthcare AI is rapidly being adopted with insufficient supporting data.
- Q29 AI tools to ration scarce medical resources are likely to discriminate against people with disabilities.
- Q34 AI embedded in mainstream systems can help people with new disabilities remain employed.
- Q35 AI will result in people with disabilities being more employable and integrated in workplaces.
- Q36 Boss ware / employee surveillance software violates reasonable accommodations.
- Q37 Boss ware / employee surveillance software disrupts accessibility.
- Q38 Boss ware / employee surveillance software interferes with privacy about disability status, disclosing to employers what accommodations an employee utilizes.
- Q39 AI use in workplace accommodation determinations is problematic for disabled workers because it interferes with the employee/employer collaborative process.

- Q40 In the next 1–2 years, AI will significantly transform productivity, creating new opportunities and necessitating retraining.
- Q41 In the hiring context, AI detects disabled behavior as “abnormal” in a negative way.
- Q47a I believe there will be many level 4 or 5 autonomous vehicles on the road within 10 years. (vehicles which can drive without any driver in certain settings/ vehicles which never need a driver).
- Q47b More level 4 or 5 autonomous vehicles on the road will provide accessible transportation without needing to schedule rides or have a driver’s license.
- Q48 Society is not yet ready for mass adoption of autonomous vehicles.
- Q49 The rise of autonomous vehicles (AV) will disproportionately threaten the safety of disabled pedestrians.
- Q50 Driver’s licenses should not be a requirement for owning or operating a fully autonomous vehicle (level 4 or 5).
- Q53 Robust public transit systems would be a better investment than further autonomous vehicle development.
- Q54 AI will improve data collection in the transportation space so that future decisions can be data driven.
- Q57 AI automated notetakers and AI proxies create conflict between their use as an accommodation and privacy and consent concerns.
- Q58 Assistive AI is under-regulated because it falls under assumptions of beneficence.
- Q59 Camera bans in schools and workplaces will unfairly limit access to image description AI.

- Q62 AI should only describe people who have consented to be described.
- Q63 People should be able to get unrestricted descriptions of images, up to the level AI can technically provide.
- Q64 Inaccessible AI features are being layered on top of mainstream tools creating new barriers.
- Q66 AI-generated documents will improve accessibility and reduce dependence on third party software.
- Q69 Advertisers or tech companies should not be allowed to detect disability in the data they routinely collect from their users to better tailor advertising to the interests of that disability community.
- Q71 If AI can recognize people by name, that is a threat to privacy.
- Q77 Companies with a lot of money are less interested in accessibility than smaller companies with less money.
- Q80 Disabled people may need to be exempted entirely from some algorithmic systems (e.g., eye tracking).
- Q81 The language of the ADA does not cover AI (AI sits in a loophole).
- Q86 Regulation will be a main hindrance of AI adoption.
- Q87 AI is already appropriately regulated, if you discriminate using AI it's still discrimination and you're still accountable.
- Q88 AI development is outpacing our control over it.

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