

## Horizon Scanning Series

# The Effective and Ethical Development of Artificial Intelligence: An Opportunity to Improve Our Wellbeing

### *Inclusive Design*

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Prejudice in Binary: A Case for Inclusive Artificial Intelligence

## Centre for Inclusive Design

**Manisha Amin and Georgia Reid**

*“You assume that [the rational mind] gives you the truth, because the rational mind is the golden calf that this culture worships, but this is not true. Rationality squeezes out much that is rich and juicy and fascinating.”*

- Anne Lamott, *Bird by Bird*

### I. Introduction

Proponents of Artificial Intelligence (‘AI’) speak of a Utopian world where the human shortcomings, such as bias, fatigue, limited ability to synthesise big data, emotion and time are transcended. However, the tension in this space is that the design and benefits of AI are predicated on the type of society that we want for the future.

We need to ensure that the design of AI, its inputs, outputs and regulatory framework do not preclude entire subsets of the population from experiencing its benefits.

While the gap between those with privilege and those without is growing, the strength of inclusive design is that it does more than meet the needs of the disabled. It opens up the possibility of creating better products and services for everyone. Emerging technologies can progress inclusion, but there are still inherent challenges. Through analysing inconceivably large datasets, much of AI seeks to find patterns, and correlate phenomena. In doing this, and by ignoring the outliers, AI risks perpetuating a form of inadvertent prejudice.<sup>1</sup>

The intersection between AI and social disability, like the intersection between technology and disability generally, is nuanced and complex. The promise of increased autonomy, dignity, and in some cases orthosis in terms of the ability of AI to realign physically/psychosocially/cognitively – as a corrective is immensely appealing. However, promise must be tempered with consideration of the regulatory framework within which AI exists, its implications for the rule of law, and the weaving of subconscious biases into binary. In an age of Big Data, particularly where Big Data and AI are coeval and coextensive, the risks of inclusion are often commensurate with the risks of exclusion.

This paper approaches AI through the lens of inclusive design, focusing primarily on disability whilst leaning on gender and culture studies to examine the defects in the

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Anthony Furnell, Designing technology to increase inclusion for the disabled Sunday 5 November 2017 10:30AM  
<http://www.abc.net.au/radionational/programs/futuretense/designing-technology-to-increase-inclusion-for-the-disabled/9100392>

technology itself and the regulatory framework within which it operates. Issues like privacy, inclusion and exclusion are balanced against the opportunities, possibilities and dignity that AI promises.

The reality of AI is a “damned if you do, damned if you don’t” conundrum, where people with disabilities, particularly people with intersectional-disabled identities do not have a seat at the table, their voices often go unheard within Silicon Valley, and more worrying still, their voices are often excluded from the datasets relied on by those who *do* have a seat at the table to create this paradigm shifting technology. The outcome is often that the paradigms of people with disability and disadvantage remain static, while those around them are transformed by the opportunities furnished by AI. The paradox is that by listening and engaging in with these often forgotten or ignored voices, the possibilities and benefits for all people are increased.

This paper begins with inputs, and progresses to design, outputs, and the frameworks which house these, in the context of inclusion and AI. The inclusive design philosophy provides a framework to accommodate and involve those experiencing disability or disadvantage, while furnishing greater society with myriad benefits.

While the tone of this paper may appear on its face somewhat pessimistic the opportunities are profound. Philosophically, AI promises the creation of something wholly new, the engendering of new possibilities; the human activity *par excellence*. It promises striving and flourishing. The issue is that these promises have been made overwhelmingly to a specific subset of the population. Innovating often tends this way. However, we are now in a unique position to adjust the rudder, redirect course, and create a truly inclusive AI while it is still arguably in a state of infancy. This paper suggests that the solution to the risk of perpetuating prejudice through the technology itself, and its inaccessibility to people with social disability lies in inclusive design – the idea of designing for individuals rather than a one size fits all approach. Through utilising the principles of inclusive design, ensuring inclusive inputs, processes, outputs and governance, the margins are accommodated, and the entire spectrum of users reap the benefits.

## II. Defining Artificial Intelligence and social disability

AI lacks a universally accepted definition. For the purposes of this paper we take AI to refer to a form of computerised processing of information that more closely resembles organic human thought than technology has been capable of to date.<sup>2</sup> AI is thus used to refer to

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<sup>2</sup> A. M. Turing, ‘Computing Machinery and Intelligence’ (1950) 49 Mind 433–460. Rockwell Anyoha, Can Machines Think? (28 August 2017) Harvard University. At <<http://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/>>.

technologies exhibiting some characteristics and capacities of human thought.<sup>3</sup> The Australian Human Rights Commission delineates between two categories of AI. First, they define ‘narrow AI’ which is capable of specific and relatively simple tasks, which could include searching the internet, diagnosing illness, screening applicants for a position, and operating a vehicle. Machine learning is taken to be a subset of this first category. The second category, ‘artificial general intelligence’ is a largely theoretical form of AI which could accomplish sophisticated cognitive tasks of a similar breadth and diversity to human capabilities. Predictions place the emergence of this category of AI occurring between 2030 and 2100. This paper will focus primarily on the narrow AI.

The social model of disability is now the internationally recognised way to view and address ‘disability’. The United Nations Convention on the Rights of Persons with Disabilities (CRPD) marks and vindicates the paradigm shift in attitudes towards people with disability and approaches to disability concerns. People with disability should not be seen as “objects” of charity, medical treatment and social protection but “subjects” with rights and obligations, capable of claiming those rights and autonomy, and navigate and participate in their worlds based on free and informed consent. This means that social disability is the natural byproduct of a disequilibrium between individual and context or society. This disequilibrium experiences across a spectrum of disabilities creates rich experience to draw on that provides insights for the design of services across the community. While simple text on a webpage, lifts at train stations or an electric toothbrush may have been designed for disability they benefit us all. Social disability ensures that the onus is on the environment rather than the individual. When the word disability is substituted for difficult, the full array of individuals who would benefit from inclusive design becomes apparent.

### III. Inclusive Inputs

Big Data and AI go hand-in-hand. Increasingly large datasets are utilised to correlate, evolve, and develop cognitive computing and deep learning. The Big Data debate has, to date, focused on the risks of inclusion – the threats arising from the collection, analysis and utilization of personal information. However, there is also the paradoxical risk of an individual’s data not being collected, or if collected, that it is absorbed into the leviathan, dismissed as an outlier.

The collection of data is particularly pertinent to people with disability or disadvantage who are often precluded from owning the technology which produces such data as a result

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<sup>3</sup> Centre for Public Impact, ‘Destination Unknown: Exploring the impact of Artificial Intelligence on Government Working Paper’ (September 2017). At <https://publicimpact.blob.core.windows.net/production/2017/09/Destination-Unknown-Aland-government.pdf>

of inaccessibility, prohibitive costs and the corollary issue of high poverty and unemployment rates affecting people with disability.<sup>4</sup> People with disability are three-times more likely to refrain from using the internet and technology than people without disability, only 60% of people with disability have home internet access, and are 20% less likely to own smart-devices, home broadband, and a range of technology that is essential to the creation of data and the utilisation of AI technologies.<sup>5</sup> Elderly Australians use the internet 50% less frequently than their younger counterparts, 98% of this internet usage is done from within the home, creating less utilisable data.<sup>6</sup> An estimated one million Australians over 65 have never accessed the internet.<sup>7</sup> This means much rich and fascinating data isn't collected in the first place, for those people on the edge, who do have internet access and smart technology, their data is even more likely to be cleaned by virtue of being an anomaly. When access to technology is not impeded, the data people with disability create is often an outlier, and is thus algorithmically ignored or adjusted. When considering the bell curve, there is great power of the average to obscure the critical information located at the edges. This information, while subtle, can lead to the illumination of design and system failure.

This has significant economic consequences when considering the use of AI and Big Data in targeted advertisement, trade decisions, and often hiring decisions. There are also significant potential political harms resulting from the exclusion of minority representation in data, particularly when Government promulgates notions of data as a national resource<sup>8</sup> and increasingly uses data in political decision-making.<sup>9</sup> Issues of voicelessness and political exclusion are as inherent in technology as they are in traditional conceptions of political participation.

The reverse is also true; when data *is* collected people with disabilities, ethnic minorities, women, transgender folk and queer folk are in danger of being discriminated against.<sup>10</sup> Recent exposure of the bias in *Compas* and *PredPol* are demonstrative of this.

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<sup>4</sup> Organisation for Economic Co-operation and Development, *Sickness, disability and work: Keeping on track in the economic downturn – Background paper* (2009), p 34. Australian Bureau of Statistics, *4446.0 Disability (Labour Force)*, Australia, 2009 (May 2011)

<sup>5</sup> ABS, 'Personal Internet Use', 8146.0 – Household Use of Information Technology, Australia, 2012-13, At <<http://www.abs.gov.au/ausstats/abs@nsf/Lookup/8146.0Chapter32012-13>>.

<sup>6</sup> ABS, Australian Bureau of Statistics, *Data cube, 81460DO002\_201415 Household Use of Information Technology*, Australia, 2014–15, 18 February 2016. Pew Research Center, *Technology Device Ownership: 2015*, October 2015, At <[www.pewinternet.org/2015/10/29/technology-device-ownership-2015](http://www.pewinternet.org/2015/10/29/technology-device-ownership-2015)> Pew Research Center, 'The Demographics of device ownership' 29 October 2015.

<sup>7</sup> Ibid

<sup>8</sup> Department of Prime Minister and Cabinet, *Public Data* (18 June 2018) Australian Government. At <<https://www.pmc.gov.au/public-data>>. Department of Prime Minister and Cabinet. *Open Government Partnership Australia* (18 June 2018) Australian Government. <At <https://ogpau.pmc.gov.au/>>. Department of Prime Minister and Cabinet, *Strengthening the national data system* (18 June 2018) Australian Government. At <<https://www.pmc.gov.au/news-centre/public-data/strengthening-national-data-system>>.

<sup>9</sup> Department of Prime Minister and Cabinet, *Strengthening the national data system* (18 June 2018) Australian Government. At <<https://www.pmc.gov.au/news-centre/public-data/strengthening-national-data-system>>.

<sup>10</sup> D Danks, AJ London, 'Algorithmic Bias in Autonomous Systems', In *Proceedings of the 26th International Joint Conference on Artificial Intelligence Melbourne, 19 -25 August 2017*. At <<https://www.cmu.edu/dietrich/philosophy/docs/london/IJCAI17-AlgorithmicBias-Distrib.pdf>>. Will Knight, *Biased*

The proliferation of artificially intelligent female personal assistants entrenches gender bias,<sup>11</sup> the use of facial recognition threatens ethnic minorities,<sup>12</sup> and chat bots learn antisemitism, racism and misogyny in a single day.<sup>13</sup> Theorists and scholars warn of the impossibility of creating fairness and equality, even in binary and algorithm.<sup>14</sup> As human creations, they are inevitably biased. Kristian Lum from the Human Rights Data Analysis Group warns of the risk of “automating the exact same biases these programs are supposed to eliminate”. Joanna Bryson warns that “[if] the underlying data reflects stereotypes, or if you train AI from human culture you will [create bias]”. Friedman and Nissenbaum define biased computer systems as those that “systematically and unfairly discriminate against certain individuals or groups of individuals in favour of others”.<sup>15</sup> This has resulted in the unjust refusal of parole and disproportionate prison sentencing of black offenders, the over-policing of neighborhoods with large populations of ethnic minorities, the arrest of a Palestinian man over an incorrect Facebook auto-translation, and the overrepresentation of Aboriginal people on the Suspect Targeting Management Plan in NSW.<sup>16</sup>

Despite these fears, messiness and lack of regulation in Big Data are extolled as virtues. Big Data seeks to distill patterns and trends, and thus has little concern for precision or granularity. However, this mindset tends to see “error” in datasets as just that, they are random, cleanable and absorbable. When data is purchased, it is generally pre-cleaned, eradicating the margins before it is even utilised.

Current research seeking to train AI with “messy” data demonstrates that the opportunity to include the outliers exists. The initial outcomes are encouraging, with AI taking longer in the initial processing phase but outputting richer and more varied results. Additional work is also being undertaken to change the shape of the bell curve to allow AI programs to read and understand the outliers as part of the dataset rather than noise.

Regulating the use of data in AI technologies and the use of an inclusive design framework and testing will support the erasure of data generated by individuals with social

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Algorithms Are Everywhere, and No One Seems to Care (12 July 2017) MIT Technology Review. At

<https://www.technologyreview.com/s/608248/biased-algorithms-are-everywhere-and-no-one-seems-to-care/>

<sup>11</sup> Joanna Stern, ‘Alexa, Siri, Cortana: The Problem with All-Female Digital Assistants’, The Wall Street Journal (online), 21 February 2017. At

<https://www.wsj.com/articles/alexa-siri-cortana-the-problem-with-all-female-digital-assistants-1487709068>

<sup>12</sup> Saqib Shah, ‘China Uses Facial Recognition to monitor Ethnic Minorities’ 18 January 2018. At <https://www.bloomberg.com/news/articles/2018-01-17/china-said-to-test-facial-recognition-fence-in-muslim-heavy-area> Bowles, Nellie, ‘I Think My Blackness is Interfering: Does Facial Recognition Show Racial Bias?’ 9 April 2016 at <https://www.theguardian.com/technology/2016/apr/08/facial-recognition-technology-racial-bias-police>. Steve Lohr, ‘Facial Recognition is Accurate, if You’re a White Guy’ 9 February 2018. At <https://www.nytimes.com/2018/02/09/technology/facial-recognition-race-artificial-intelligence.html>

<sup>13</sup> Paul Mason, ‘The Racist Hijacking of Microsoft’s ChatBot Shows the Internet Teems with Hate’ 29 March 2016. At

<https://www.theguardian.com/world/2016/mar/29/microsoft-tay-tweets-antisemitic-racism>

<sup>14</sup> T Miconi, ‘The Impossibility of Fairness: a Generalized Impossibility Result for Decisions’ (2017) At <https://arxiv.org/abs/1707.01195>

<sup>15</sup> B Friedman, H Nissenbaum, ‘Bias in computer systems’. (1996) *ACM Transactions on Information Systems (TOIS)*, 14(3), 330–347.

<sup>16</sup> Finbar O’Mallon, ‘NSW police visit homes of people on secret watchlist without cause’, Sydney Morning Herald (online), 11 November 2017. At <https://www.smh.com.au/national/nsw-police-visit-homes-of-people-on-secretwatchlist-without-cause-20171107-gzgcwg.html>

disabilities and it will ensure democracy in data rather than imposing voicelessness on those who have already been silenced.

The regulatory framework delimiting and directing the use of such data is made exigent by the increasing use of data sets by government, the judiciary and big businesses in shaping, *inter alia*, policy, judicial and trade decisions.

#### IV. Inclusive Design

Processing these many inputs often results in AI-informed decision making. AI has the capacity to apply and adjust algorithms to these leviathan datasets to, *inter alia*, assess risk in policing<sup>17</sup>, predict rates of recidivism<sup>18</sup>, optimise hospital operations<sup>19</sup>, detect and assist with periods of confusion experienced by people with Alzheimer's and dementia<sup>20</sup>, or the onset of psychosis experienced by people with schizophrenia<sup>21</sup>. The use of AI in the executive, legal and healthcare systems poses ethical questions regarding the interaction between AI, human rights, and the rule of law.

“Garbage-in, garbage-out” oversimplifies the risks of AI and Big Data as emerging solely from bad data. This is not the case, rather decisions made at every stage of development risk inaccessibility, entrenching bias and stereotype. This is particularly true where technology exists within a *laissez-faire* regulatory framework lacking rigorous governance. The solution, we suggest, lies in inclusive design.

Every design decision has the potential to include or exclude citizens. Inclusive design emphasises that understanding user diversity contributes significantly to informing these decisions, and thus to maximizing inclusion. User diversity covers variation in capabilities, needs and aspirations and considers the full range of human diversity with respect to ability, language, culture, gender, age and other forms of human difference.

While the concepts of accessibility, inclusive design, and universal design are often intertwined the goal is always the same – that is the human right to universal access. While the underlying principles of universal and inclusive design are virtually identical, the

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<sup>17</sup> Cathy O’Neill, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy* (Crown Publishing Group, 1st ed, 2016) 75.

<sup>18</sup> Julia Angwin, Jeff Larson, Surya Mattu, Lauren Kirchner, Machine Bias (23 May 2016) Propublica. At <<https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>>.

<sup>19</sup> S Belciug, F Gorunescu, ‘Improving hospital bed occupancy and resource utilisation through queuing modelling and evolutionary computation’ (2015) 53 *Journal of Biomedical Informatics* 261. At <<https://www.sciencedirect.com/science/article/pii/S1532046414002408>>. Luke Oakden-Rayner, ‘Artificial intelligence won’t replace doctors soon but it can help with diagnosis’, ABC (online), 19 September 2017. At <<http://www.abc.net.au/news/2017-09-19/ai-wont-replace-doctors-soon-but-it-can-helpdiagnosis/8960530>>.

<sup>20</sup> Alex Mihailidis, Joseph C. Barbenel, Geoff Fernie, ‘The efficacy of an intelligent cognitive orthosis to facilitate handwashing by persons with moderate to severe dementia’ (2004). *Neuropsychological Rehabilitation*, 14:1-2, 135-171. Alex Mihailidis, Joseph C. Barbenel Geoff Fernie, ‘The use of artificial intelligence in the design of an intelligent cognitive orthosis for people with dementia.’ (2001) *Assist Technol* 13(1):23-39.

<sup>21</sup> C M Corcoran, F Carrillo, D Fernández-Slezak, G Bedi, C Klim, D Javitt, G Cecchi. (2018). Prediction of psychosis across protocols and risk cohorts using automated language analysis. *World Psychiatry*, 17(1), 67-75

difference is a matter of perspective and source.<sup>22</sup> Inclusive design seeks to expand the range and diversity of end users recognizing that one size doesn't fit all. This notion is particularly suited to technological advancement.

The Inclusive Design Research Centre of Toronto, and Centre for Inclusive Design Sydney stress three fundamental principles in inclusive design:

- i. Recognising diversity and uniqueness;
- ii. Inclusive processes and tools; and
- iii. Broader beneficial impact.

These three principles aggregate considerations of outliers and margins throughout the design process, and one-size-fits-one design. Incorporating a diversity of insights and voices in the design process means that nothing is designed for people with social disability without giving those same people a seat at the table. In order to achieve this participation, design and development tools must be accessible. When this is achieved, it is possible for inclusive design to trigger a virtuous cycle of inclusion, leverage the 'curb-cut effect', and recognise the interconnectedness of users and systems. In accommodating for the margins throughout the design process the entire spectrum of users reap the benefits of the technology, and the inputs, processes, outputs and governance are all rendered inclusive and universal.

The following framework outlines the areas and process that inclusive design engages and utilises at a bias, accessibility and systems level across complex and diverse areas.

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<sup>22</sup>Matt May, Breaking Down Accessibility, Universality, and Inclusion in Design (04/02/2018) <https://theblog.adobe.com/different-breaking-accessibility-universality-inclusion-design/>



Source: <http://idrc.ocadu.ca/about-the-idrc/49-resources/online-resources/articles-and-papers/443-whatisinclusivedesign>

Where diversity and uniqueness are recognised and appreciated in data, the input for most AI technologies, rather than being cleaned, and top-and-tailed, AI will progress towards inclusion. With an inclusive design process baked in to creation, the technologies themselves, and accessible outputs, not only will AI be representative of people with disability, it will provide autonomy, dignity, and in some cases orthosis for people with disability.

## V. Inclusive Outputs

*Compas*, *PredPol*, and the *Suspect Targeting Management Plan* are examples of how bad data and a lack of oversight in the design process of AI technology results in racial bias, over-policing of suspect populations, and a lack of justice in parole, bail and sentencing decisions for offenders of BME backgrounds. Recent debate over the emergence of My Health Record has outlined that not only does the system risk marginalisation of people with disability, drug users, and sex workers, but the output itself, the self-managed health record

is largely inaccessible to people with disabilities, who perhaps could benefit from the technology most.<sup>23</sup>

Where neither input nor process is inclusive in its design, the likelihood of creating an inclusive output is diminished. Where diversity is recognised and valued in datasets, AI is designed with and for people with social disability, and design and development tools are accessible, the outputs will not only accommodate for a plurality of users, but more users will derive more diverse benefits from the technology itself.

There are many instances where inclusive AI is done right. And many more instances where inclusively designed AI challenges preconceived notions of violations of privacy and perpetuated prejudice. Studies like that carried out by *Mihailidis et al* demonstrate ways in which AI can furnish people with disabilities greater privacy. Their utilisation of AI in the design of an Intelligent Cognitive Orthosis for people with dementia and Alzheimer's disease would minimise the encroachment of a full-time care team into the personal life of a person with these conditions. The prototype attempts to furnish people with dementia and Alzheimer's with dignity, autonomy and privacy.<sup>24</sup> Prototypes which provide for the monitoring of the onset of psychosis in people with schizophrenia<sup>25</sup> promise greater autonomy and a reduced intrusion of a medical care team into an individual's private life. Speech recognition programs which identify non-standard speech allow for people with a vast spectrum of disability to access applications and technologies previously unavailable to them.<sup>26</sup> Google's DeepMind creates closed captions and audio descriptions with greater accuracy than a human employed to do those tasks, at a markedly lower cost, increasing the access people with hearing and vision impairments have to media.<sup>27</sup> Facebook is collecting data from its disabled-identifying users to address the issue of cleaned, absorbable datasets. Microsoft has invested \$25m in the development of accessible AI. And then there is the prospect of self-driving cars on the horizon, cleaving open new areas of autonomy for wheelchair users and people with mobility and vision impairments.

These are instances where the design process has utilised the principles of inclusive design: outlier data is sought and valued, voices are heard and consultation is sought,

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<sup>23</sup> Inclusion Australia 'My Health Record – More time, better information' (Online) 27 July 2018. At <<https://www.inclusionaustralia.org.au/my-health-record-more-time-better-information/>>.

<sup>24</sup> Alex Mihailidis, Joseph C. Barbenel, Geoff Fernie, 'The efficacy of an intelligent cognitive orthosis to facilitate handwashing by persons with moderate to severe dementia' (2004). *Neuropsychological Rehabilitation*, 14:1-2, 135-171. Alex Mihailidis, Joseph C. Barbenel, Geoff Fernie, 'The use of artificial intelligence in the design of an intelligent cognitive orthosis for people with dementia.' (2001) *Assist Technol* 13(1):23-39.

<sup>25</sup> C M Corcoran, F Carrillo, D Fernández-Slezak, G Bedi, C Klim, D Javitt, G Cecchi. (2018). Prediction of psychosis across protocols and risk cohorts using automated language analysis. *World Psychiatry*, 17(1), 67-75

<sup>26</sup> Micha Breakstone, 'Automatic Speech Recognition: Artificial Intelligence, Big Data, and the race for Human Parity' (2017) <<https://machinelearnings.co/automatic-speech-recognition-artificial-intelligence-big-data-and-the-race-for-human-parity-a68a0350440f>>. Diane Kewley-Port, 'Application of current speech recognition technology to nonstandard domains' (1999) *The Journal of the Acoustical Society of America* 106, 2130

<sup>27</sup> Oriol Vinyals, Alexander Toshev, Samy Bengio, Dumitru Erhan, 'Show and Tell: Lessons learned from the 2015 MSCOCO Image Captioning Challenge' (2016) *IEEE Transactions on Pattern Analysis and Machine Intelligence* 99.

myriads of unexpected users derive benefits from inherently accessible design. While these examples provide immediate benefits to the population of people with disability, it is not hard to imagine how lip-reading AI, non-standard speech recognition, and self-driving cars will benefit businesses and individuals.

Three key areas that need to be addressed in order to engage in a more inclusive practice are:

1. Industry benchmarks and modelling to identify value and supports - the first piece of work is being conducted by the Centre for Inclusive Design. However, a wider and deeper study is needed for a whole of system approach.
2. Funding support for incubation, testing and piloting the resources and methodology in an Australian context, given our specific challenges and learnings including geographical reach, diverse populations and the Indigenous experience.
3. A governance framework that combines technical understanding, community and industry

## VI. Governance and Regulation

The utilisation of Big Data and various other inputs that exclude, marginalise, or pathologise minorities, in an exclusive design processes that often creates biased or inaccessible outputs has significant legal ramifications. Not only is the use of Big Data problematic in a country devoid of a legally enshrined fundamental right to privacy<sup>28</sup>, so too is the use of AI to perpetuate imbalanced power structures in a country devoid of a Bill of Rights. The Age, Sex, Disability and Racial Discrimination Acts fall short of legislating to ensure data and AI are used ethically and inclusively.

AI which is not inclusive, accessible, or universal poses potential threats to the democratic system and the rule of law. Democracy is predicated on a citizen's right to be freely informed and make political choices. Biased AI can produce social fragmentation, and the issue of reduced privacy, increased surveillance, and targeted advertising all threaten this democratic principle of free and informed choice.

Just as the AI informed decision-making in *PredPol*, *Compas*, and the *STMP* is highly susceptible to becoming caught in a feedback loop, AI generally facilitates the creation of echo-chambers. Through AI targeted content, political and social views become self-reinforcing, debate becomes polarised.<sup>29</sup> For individuals who lack a seat at the table from the outset, such as people with disability, people from BME and CALD backgrounds, and

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<sup>28</sup> *Privacy Act 1988* (Cth)

<sup>29</sup> M Smith, S Neupane, G Leonard, C Mendonca. (2018) 'Artificial intelligence and human development: Toward a research agenda' International Development Research Centre

women, transgender and queer folk, echo-chambers increase voicelessness, and squeeze these individuals further from participation in the public sphere.<sup>30</sup> This is heightened for people with disability who have to content with inaccessible technology and content. Not only are people with disability voiceless in this scenario, content essential for informed political choice is impenetrable. The ramifications this is having for democracy are self evident.

And yet, as Graeme Innes stated, “broad statements of rights to equality and non-discrimination seldom implement themselves”. While the risks are known, and so too is the method for amelioration, truly achieving inclusiveness in AI in all of its manifestations is contingent on the establishment of governance and a regulatory framework. Utilisation of the inclusive design principles with oversight to ensure compliance will address many of the issues raised in this paper not only for those experiencing disadvantage and disability but for us all.

The ability to understand and use inclusive design, like any practice, can be taught, but needs to be implemented and embedded in leadership, design and practice. The path to this is known and can be implemented through inclusive design to create a virtuous cycle – by using technology to design for one extreme experience at a time and then including the next. It’s an “*and*” rather than “*or*” model.

While a number of inclusive design tool kits exist, none are unique to the Australian situation, where geographical idiosyncrasies and population demographics, including Australia’s Indigenous population pose unique challenges and opportunities. Centre for Inclusive Design are looking to address this paucity of region specific guidelines and tool kits via the production of a kit that works in the Australian context and is able to link the current market to the social sector.

In addition, there is much still to be done, however work by the Centre for Inclusive Design, alongside PriceWaterhouseCoopers, hopes to provide the necessary research and guidance to ensure the inclusivity of these emerging technologies and markets.

Inclusive design is an emerging idea- particularly in the Australian market. The Centre for inclusive design has commissioned an early economic analysis into the value of inclusive design focusing on three areas of the market.

## VII. Conclusions

AI simultaneously promises and threatens much for all of us. The implications of exclusivity in the inputs, design, outputs, and regulatory framework have significant implications for the

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<sup>30</sup> Jürgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*, 1989. Print. . Hannah Arendt, *Human Condition*. 2nd ed. Chicago: University of Chicago Press, 1998.

ability of people to utilise and benefit from this technology. The threats of exclusive AI extend beyond the margins, and have significant implications for democracy and the rule of law when it is used increasingly by the executive, legislature and judiciary. By weaving the principles of inclusive design into the entirety of the process of creating AI technologies, namely through recognising diversity and uniqueness, utilising inclusive processes and tools, and creating broader beneficial impact AI will innovate more successfully and more inclusively. Where inclusive design is used it engenders some of the most innovative uses of AI. The possibilities are endless, it is now time to ensure that they are universal too.