Artificial Intelligence: The Road ahead for the accessibility of Persons with Disability

Yogesh Mishra
Assistant Prof. of Law, KIIT School of Law, Bhubaneshwar
Contact Number: 8827035720, Email Id: Yogeshmishra432@gmail.com

Nilanjan Chakraborty
Assistant Prof. of Law, SOAA University
Contact Number: 8013552943, Email: nilanjanchakraborty@soaa.ac.in

Swati Mohapatra
Assistant Prof of Law, KIIT School of Law, Bhubaneshwar
Contact Number: 9437548778, Email: Swati.mohapatra@kls.ac.in

Abstract

According to a recent report of WHO, there is currently more than 2 Billion Person with Disability and which comprises of 37.5% of the World Population. The dependency of human life on technology is outreaching even to the Person with Disabilities. Assistive technologies and devices have been made familiar to us long before the Artificial Intelligence technology has begun to incorporate themselves. The prevailing technological trends have started becoming a current favorite amongst those who need assistance because of any form of Disability. Wheelchairs and Canes are even extremely relevant today with which we were familier long back. While some artificially intelligent technology is still fairly new the potential is all there. The Paper discusses how Artificial Intelligence has helped in improving the living standards of Person with Disability, its future possibilities, potential legal issues concerning the implication of Artificial Intelligence in India. The author tends to portray ways by which life of persons with disabilities can be easier and swift in respect of their day to day activities by using modern technology namely artificial intelligence.

Keywords- *Disability Rights, Public health, Barrier, Science & technology, Physical Environment, Artificial Intelligence*

Introduction

"I believe there is no deep difference between what can be achieved by a biological brain and what can be achieved by a computer. It, therefore, follows that computers can, in theory, emulate human intelligence and exceed it"- Stephen Hawking

The origin of Artificial Intelligence can be traced back from the efforts that were taken to build thinking computers and machines do mathematics. With the financial support from the British Government, Charles Babbage was able to develop a "difference engine", which was able to calculate polynomials value. Charles Babbage developed a machine for general-purpose computing[1]. In 1956, Artificial Intelligence was coined by John Mccarthy. With the advancement and development of technology its usage was found to be more productive as today the data volume has increased, algorithms have advanced and one can also deduce the improvement in the storage and power of the Computer Systems[2]. The reason for the increased usage of Artificial intelligence is to stimulate the reasoning power of Human beings in Computer Programs. Artificial Intelligence is basically about the thought process and reasoning, to act like humans, thinking has to be rational[3].

Artificial Intelligence has turned out to be one of the most game-changing and also most controversial endeavors which science has gifted in our life-time. AI has marked its presence already in some of the areas that are related to the Virtual, Social and Physical realm in which it has helped in the decision-making process of the medical, financial, transportation, and also recreational systems[4]. It has always been evident that some intelligent machines have at times outperformed human experts. This thing particularly raises the question as to why and when this should remain in the decision making. But yes there is one possible answer to all this that of relying on the intuitions and experience that humans are capable to identify the prevailing errors which can sometimes be very disastrous. However in today's context if we look into the same scenario the argument stated above will wear this as the technology has evolved to a much significant level. What we need to realize and analyze is whether our system is ready and adaptative to the technological advancements that we are taking up, can we think of Robbo-judges and robot jury or we are just acting as sci-fi enthusiasts[5].

We have to just think beyond what is portrayed in Hollywood movies and novels related to science fiction which occasionally interpret Artificial Intelligence is something which is just confined to some Human- alike Robots taking over the world and destroying the whole mankind. Artificial

Intelligence is a much smarter thing and its not scary. It has contributed to every industry and especially its contribution to the medical and legal side is very remarkable[6]

Disability Law in India

Definition of 'Disability' under Indian Laws

The Person with Disability (Equal Opportunities Protection of Rights and Full Participation) Act, 1995, has defined '**Disability**' under Section 2(I) - it states "Disability means"-

1. Blindness - Visually impaired
2. Low vision
3. Leprosy Cured
4. Hearing impairment
5. Locomotors Disability
6. Mental Retardation
7. Mental Illness

Since India was also one of the signatories to the United Nation it has to modify the laws to conform with the provisions of the UNCRPD. So in 2016, India has brought into effect new Act named "**Right of Persons with Disability Act, 2016**" it has included within the definition of disability as many as 21 disabilities, they are-

1. Blindness
2. Low-vision
3. Leprosy Cured persons
4. Hearing Impairment (deaf and hard of hearing)
5. Locomotor Disability
6. Dwarfism
7. Intellectual Disability
8. Mental Illness
9. Autism Spectrum Disorder
10. Cerebral Palsy
11. Muscular Dystrophy
12. Chronic Neurological conditions
13. Specific Learning Disabilities

14. Multiple Sclerosis
15. Speech and Language disability
16. Thalassemia
17. Hemophilia
18. Sickle Cell disease
19. Multiple Disabilities including deafblindness
20. Acid Attack victim
21. Parkinson's disease

So by the Act of 2016 disability has been given a vast definition which includes within it more or less all forms of disability prevalent.

Accessibility is one of the major problems related to persons with disability and it gives rise to various discrimination and they feel left apart from society. It is Civil and Human Rights of the people with Disability to have proper access to the contents that are available digitally as it is available for the other person who is without any form of Disability. To this existing problem, technology has its solution that can make this thing a reality and can help in reducing the prevailing social inequality. Also, the digital contents get incorporated with the ICT (Information and Communication Technology) can make things accessible for the Persons with Disability at either no cost or a very little cost[7].

Access to ICT can play a very important role when it comes to education, livelihood, and full participation of persons with disabilities in society and hence playing a critical part. The Disability which interfaces the issue related to reading books is termed as Print Disabilities. Universal Declaration of Human Rights, the Convention on Rights of Persons with Disabilities and various other instruments have recognized print disabilities and also had accepted that there exists equality to access pieces of information that have been contained in books as it's a fundamental requirement[8].

Accessibility Provisions under the Rights of Persons with Disabilities Act, 2016

Accessibility- Section 40 has stated that in consultation with the Chief Commissioner, the Central Government shall make rules with regards to accessibility for the Persons with Disabilities. The Central government must lay down the standards for the accessibility for transportation, information, physical environment, and communication. This also includes the appropriate technologies and system, and other facilities and services that are to be provided to the person with disabilities residing in both Urban and Rural areas.

Access to Transport- Section 41 has stated that the "Government must take all appropriate measures to provide-

(a) Facilities for persons with disabilities at bus stops, railway stations and airports conforming to the accessibility standards relating to parking spaces, toilets, ticketing counters, and ticketing machines;

(b) Access to all modes of transport that conform the design standards, including retrofitting old modes of transport, wherever technically feasible and safe for persons with disabilities, economically viable and without entailing major structural changes in design;

(c) Accessible roads to address the mobility necessary for persons with disabilities.

(2) The appropriate Government shall develop schemes programs to promote the personal mobility of persons with disabilities at an affordable cost to provide for,—

(a) Incentives and concessions;

(b) Retrofitting of vehicles; and

(c) Personal mobility assistance"

Access to information and communication technology- Section 42 states "The appropriate Government shall take measures to ensure that-

i- All contents available in audio, print and electronic media are inaccessible format;
ii- Persons with disabilities have access to electronic media by providing audio description, sign language interpretation and close captioning;
iii- Electronic goods and equipment which are meant for everyday use are available in universal design.".

The increase in the number of types of disability recognized under the Right of Persons with Disability Act, 2016 has covered a good number of populations and its implementation has become a great challenge on the part of the government. However, Artificial Intelligence can prove to be a great call to make the environment accessible for persons with disabilities.

Why Artificial Intelligence for Persons with Disability

As we know technology can act as a force multiplier which can help in unlocking some persisting problems in society be it a climatic issue, water, or agriculture. Likewise, AI can act as a game-changer for persons with disabilities. It is being witnessed that there is an expansion in the usage of computer for hearing, seeing and reasons with impressive accuracy and AI is very promising and have all the potentiality to enable people with vision, learning, hearing, mobility disability, cognitive and also with a mental health condition, so they can perform more in scenarios related to modern life, employment and connections with the human beings. It is very saddened to notice that only one out of ten persons with disabilities is accessible to assistive technologies and its products[9]. If we look into the world-wide scenario 15% of the World's Population is experiencing disability in one form or the other and the prevalence of the persons with disability is found much on developing nations[10]. The number is huge but the exposure to the AI technologies is not up-to-the-mark.

It has been found that technology can be very productive when it comes to making the life of Persons with disabilities much easier. Smartphone apps, in particular, are helping people with navigation, transport, and commerce. The Replacement of Keyboards, the tablets, the conversions of phones from the keypad to touch screen, and also the system of voice assistance and commands with the help of the internet has increased the accessibility environment for the Persons with Disability and also the person of old ages. Various other devices have been launched and brought into usage in recent times like Amazon's Alexa, Apple Homepage, Google's Now which have been used by many people. The Voice-Activated Personal Assistant (VAPAs) has acted as next-generation technologies and is going beyond that. VAPA is now ubiquitously found on Smartphones and IPad devices. Interactions with VAPAs are ever more tailored, more personalized, and friendlier due to the improvements in AI, as we talk to rather than through our phones, computers, tablets, and appliances[11].

Artificial Intelligence has proved to be a remarkable tool for the Persons with Disability when it comes to inclusion and accessibility as stated by the World Institute on Disability (WID). The recognition of images, sound, and expressions of linguistics has now opened a wide opportunity for persons with disabilities. There have been technologies which are designed to have data sets which cover all sort of inclusions[12]. There can be certain positive modifications which can be a blessing for persons with disabilities, like-

a- Artificial intelligence with auto-captioning that can be productive for the person suffering from hearing impairments;

b- Cars of autonomous nature havings features of Universal Design Principles, which can make it useful for the person who has issues related to driving.

c- The technologies like facial recognition, image recognition can be found supportive for the people who are blind or having low visions and are facing issues to interact with the environment.

d- The language technology which facilitates comprehensions can be helpful for a person with cognitive disabilities.

Getting on to the critical side of the Artificial Intelligence is regarding the privacy and ethical issues which are involved with the evolution of AI and that is one the primary reason why it has been the major concern of the Public, Private Sectors, Corporations and also World Institute of Disability (WID). Some of the difficulties that may arise are-

a- A continuation of historical biases can be sensed from Models learning;

b- Data related to training might be under to under-represent the outlier population and it includes persons with disabilities which will ultimately lead to denial or thwart of inclusion in toto.

c- The speed takes up the priority than the criteria of accessibility, security, safety, and bias.

d- The inclusions of the person with disabilities might be ignored when it comes to data collection, machine learning training protocols.

e- The Privacy Rights of Persons with disabilities will also be one of the major concerns.

It has also been recommended by WID that the person who holds expertise in Disability culture and their problems related to accessibility has to be engaged early for the AIs standards development, and also who holds expertise in addressing and recognizing the implicit bias. If all these things get included with proper expertise it will fetch to achieve complete inclusion of the persons with disability in a future set of data[13]

The Paralympics Games- An evolution in Sports

In 2012, the visual language of Paralympic Games was organized which posed a good point of departure as to people's perception related to disability in sports. It has changed people's viewpoints

in recent years regarding the involvement of persons with disabilities in general. The Paralympics has turned out to be the biggest games of their kind and got amazing media covering London Paralympics at that time 146 countries took part in around 4,237 participants. The whole game was organized with various assistive AI technologies which can create a barrier-free environment for persons with disabilities and also help them to get an opportunity to stand with others in the same footings. This game got great public attention and various campaigns were launched such as "Meet the Superhumans" and it got the widest-ranging campaign even launched by a private TV company, Channel 4 of Britain.[14]

The Trung's device

A College Student in Vietnam, Nguyen Thanh Trung has come out with one of the blessings for the person who is blind, as he made a reading machine. The machine however has not named yet but was brought into notice at the 'International Exhibition of Young Inventors'. It was welcomed by many of the participants and the organizers. A blind Student at IIT-Mumbai Tony Kurian believes that this particular device will change the lives of many blind people.

"We are heavily dependent on technology, mainly computers. So this new device that scans books and converts them to Braille is going to be something different. What makes it even more unique is that it is priced low. Hence, people from different walks of life can buy this. Most of the Braille devices are quite expensive. I use a similar Braille device named BrailleMe that was created by a student from my college. It is handy and has helped me a lot", says Kurian.

These steps leap into the interest for more innovation in the field of artificially intelligent devices for persons with disabilities and it can be stated that these developing technologies with make the path easier for the person with a disability in days to come[15].

Major Loopholes

1- **Lack of research innovation**- In today's scenario though the present Indian Government had taken up its leap into the arena of Artificial Intelligence and is setting its eye to counter China in AI. $480 million has been allocated to moot for the modest beginning of the recent work in the field of if you compare the same data we will get to know that where china spends 2% of its GDP on research India spends just 0.6% compared to its economic size. However, as per the Scopus analysis, 70% of the total research on AI that is being conducted by India is done by the non-Indian companies headquarters in India[16]. There is only one Indian Company TCS which contributes to most of the research in India i.e. 13% while the leading companies are Google and IBM. Lack of research means lack of innovation in

India and hence less contribution to be done for the Persons with Disability where AI can be a boon lack of research and innovation will ultimately make the situation the same[17].

2- **Discrimination of Persons with Disability in Employment -** It's not strange to ascertain that in hiring practices also the persons with disabilities face discrimination when it comes to employment. One of the recent field studies has mentioned that the chance of getting a positive response from the employers reduces to 26% when a person discloses his disability no matter whether that disability is directly related to the productivity in that job[18]. Even if the hiring is inclusive, it has been found that the individuals show less interest to work with the person who suffers any form of disability[19]. There are cases where exclusion can be unintentional. Like, if a particular job requires verbal communication skills might lead to disqualification of a qualified deaf candidate who speaks through an interpreter and can do the job efficiently by the use of accommodations.

   The data from the past has also revealed that the level of employment of Persons with Disabilities is already very low. The rate of employment for persons with disabilities was 19.1% in 2018 while the employment percentage stood to 65.9% for persons without disabilities[20]. Nowadays, in hiring practices, employers are relying on technology to a greater extent. AI-driven recruitment is a great solution available in the market today which not only results in the online tests but also helps in analyzing the resumes, online profiles, etc. Although it has been a boon on the other side of the coin it is raising potential concern for Disability Discrimination. There have been various incidents related to disability discrimination in the AI recruitment process too. For eg- if an applicant (a person with a disability) is taking up for an online test using assistive technology, it will take more time to answer the question especially when the test which is being conducted is not well designed to be accessible for the persons with disability. Another very possible assortment can be made if an applicant who is having a low facial effect is prone to the possibility of being screened out by a selection process that is using video analysis of eye gaze, facial movements, or voice characteristics, even though that person possesses high skills[21]. This is a very possible outcome of the AI recruitment process which has nowadays been taken up by many organizations and if the persons with disabilities are not provided with much assistive technology then the percentage of employment of persons with disabilities with further get reduced to a greater extent. So on one side, AI is a boon to the Persons with a disability it can also prove out to deteriorate their conditions further.

3- **Law Implementation failure-** The Right of Persons with Disability Act,2016 has however included the punishment clause within the Act but the Punishment clause has no specific as to what will be done if proper accessibilities are not provided and the punishments have been made generally for all the provisions of the Act. Accessibility needs special attention as it has been neglected from long ago and

hence if any public and private bodies do not follow the directions of the Central Government must be punished and punishment must not be only in nature of fine and even imprisonment must also be done. Although digital accessibility has been brought within the ambit of the Act for availing the Digital facilities certain amount of knowledge is required which must be granted to the person with Disabilities and they must be given proper guidance concerning that. So though the Digital Accessibility has been granted still it need must improvement to user-friendly and properly accessible for the person with Disabilities[22].

Conclusions and Suggestions

Though there are various shortcomings in the field of Implementation of the Technology for the Persons with Disability yes it has posed a way for the improvement of the society as well as the life of the persons with disability as a whole. There has to be more allocation of budgets for persons with disabilities which was less in India in the year 2020. Though the amount was more than the past years still it was found that it is not an adequate amount. The rebate on the taxes in innovative technologies and their selling can boost the society by making the assistive technologies affordable. Artificial Intelligence can prove to be acting as a catalyst in the lives of persons with disabilities. It will not only enhance their participation but also help in bridging the gap that has been created for so long. Even the outlook of others will also change towards them. The contribution of AI towards the lives of Persons with Disabilities is remarkable and also shortly we can expect much more. But yes science has been both a Boon or Bane as warned by Stephen Hawking where he stated that Artificial Intelligence is a new form of Life but there is a threat that AI may replace humans altogether. So assistive technologies should be used with caution.

REFERENCES

[1]Goldberg, S. (1994). Artificial Intelligence And The Essence Of Humanity. In *Culture Clash: Law And Science In America* (Pp. 151-177). New York; London: Nyu Press.

[2] 'Artificial Intelligence' [Internet] Available at:<Https://Www.Sciencedaily.Com/Terms/Artificial_Intelligence.Htm> Accessed 14 June 2020.

[3] Emma Venables, 'Artificial_Intelligence.' (*Medium*, 8 June 2020) [Internet]Available at:<Https://Medium.Com/@Emmavenables/Artificial-Intelligence-E834211801ee> Accessed 14 June 2020.

[4]Chaboud, A., Hjalmarsson, E., & Vega, C. (2015). The Need For Speed: Minimum Quote Life Rules And Algorithmic Trading. *Manuscript, Federal Reserve Board*.

[5]Brennan-Marquez, K., & Henderson, S. (2019). Artificial Intelligence And Role-Reversible Judgment. *The Journal Of Criminal Law And Criminology (1973-), 109*(2), 137-164. Doi:10.2307/48572776

[6] 'Artificial Intelligence – What It Is and Why It Matters' [Internet]Available at:<https://www.sas.com/en_in/insights/analytics/what-is-artificial-intelligence.html> accessed 01 June 2020.

[7]LazarJ. and SteinM. A . "Introduction." In *Disability, Human Rights, and Information Technology*, edited by Lazar Jonathan and Stein Michael Ashley, 1-8. PHILADELPHIA: University of Pennsylvania Press, 2017.

[8]Fruchterman J. "E-Books and Human Rights." In *Disability, Human Rights, and Information Technology*, edited by Lazar Jonathan and Stein Michael Ashley, 143-57. PHILADELPHIA: University of Pennsylvania Press, 2017.

[9]'Using Ai To Empower People With Disabilities' (*Microsoft On The Issues*, 7 May 2018)[Internet]Available at:<Https://Blogs.Microsoft.Com/On-The-Issues/2018/05/07/Using-Ai-To-Empower-People-With-Disabilities/> Accessed 03 June 2020.

[10] 'Disability Inclusion Overview' (*World Bank*) [Internet] Available at:<https://www.worldbank.org/en/topic/disability> accessed 04 June 2020.

[11]Deborah Vollmer Dahlke and Marcia G Ory, 'Emerging Opportunities and Challenges in Optimal Aging with Virtual Personal Assistants' (2017) 27 Public Policy & Aging Report 68 [Internet]<https://doi.org/10.1093/ppar/prx004> accessed on 05 June 2020.

[12] 'AI AND ACCESSIBILITY – World Institute on Disability'[Internet] Available at:<https://wid.org/2019/06/12/ai-and-accessibility/> accessed on 06 May 2020.

[13] 'Artificial Intelligence as a Tool for People with Disabilities | Equal Entry' [Internet] Available at:<https://equalentry.com/artificial-intelligence-as-a-tool-for-people-with-disabilities/> accessed 07 June 2020.

[14]Harrasser, K. (2017). Superhumans-Parahumans: Disability And Hightech In Competitive Sports. In Vaja E. & Tarapata O. (Authors) & Waldschmidt A., Berressem H., & Ingwersen M. (Eds.), *Culture – Theory – Disability: Encounters Between Disability Studies And Cultural Studies* (Pp. 171-200). Bielefeld: Transcript Verlag.

[15]'A New Reading Machine from Vietnam for Blind People Is All Set to Reach India' (*Newz Hook - Changing Attitudes towards Disability*, 31 October 2018) <https://newzhook.com/story/20413/> accessed 07 June 2020.

[16] VempatiS. S. 'India and the Artificial Intelligence Revolution' (*Carnegie India*) [Internet] Available at:<https://carnegieindia.org/2016/08/11/india-and-artificial-intelligence-revolution-pub-64299> accessed 08 June 2020.

[17] SinhaS. 'Where Artificial Intelligence Research In India Is Heading' (*Analytics India Magazine*, 27 March 2018) [Internet] Available at:<https://analyticsindiamag.com/where-artificial-intelligence-research-in-india-is-heading/> accessed 09 June 2020.

[18] MasonA. SchurL. AdyaM.BentleyF.S. McKayP. and KruseD. "The Disability Employment Puzzle: A Field Experiment on Employer Hiring Behavior." ILR Review 71, no. 2 (March 2018): 329–64. doi:10.1177/0019793917717474.

[19]Jones, E. E. *Social stigma: The psychology of marked relationships*. WH Freeman, 1984.

[20]'PERSONS WITH A DISABILITY: LABOR FORCE CHARACTERISTICS—2019' 11.

[21]'Expanding Employment Success for People with Disabilities' (*Benetech | Software for Social Good*) [Internet] Available at:<https://benetech.org/about/resources/expanding-employment-success-for-people-with-disabilities-2/> accessed 15 June 2020.

[22]SRIVASTAVA, S. S. "Report of the International Conference on Disability Studies in India: Reflections on Future [6-7 February 2015]." *Indian Anthropologist* 45, no. 2 (2015): 97-99.