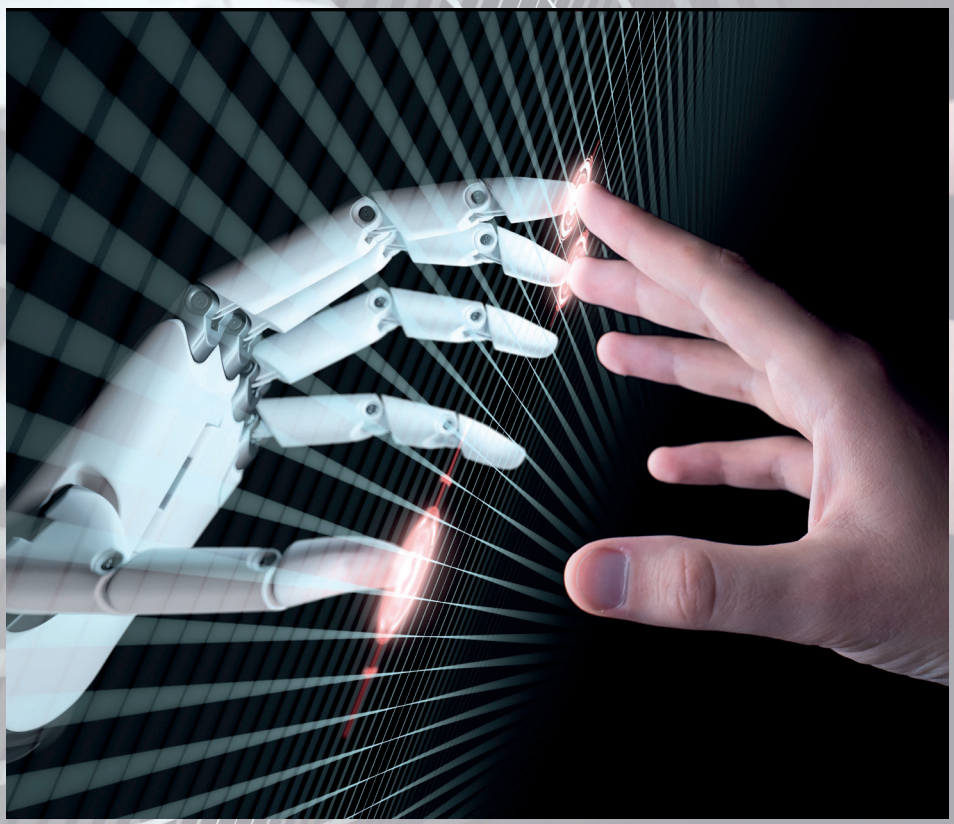
# ARTIFICIAL INTELLIGENCE AND HUMAN RIGHTS: ARE THEY CONVERGENT OR PARALLEL TO EACH OTHER? PROTESTA

Swatilekha Chakraborty
Rishabh Bhojwani



Título: Hands of Robot and Human Touching • Autor: Maxuser

DOI: 10.14718/NovumJus.2018.12.2.2

# ARTIFICIAL INTELLIGENCE AND HUMAN RIGHTS: ARE THEY CONVERGENT OR PARALLEL TO EACH OTHER?

**Swatilekha Chakraborty**
**Rishabh Bhojwani**
**Estudiantes de BBA.LLB, Symbiosis Law School,Pune, India**

## *Abstract*

Artificial Intelligence (AI) has been central to the dialogue engaged in a statutory framework addressing the creation of a balance between AI and human rights by governments across the globe. In 1997, Gary Kasparov, chess Grand Master and world champion, was beaten by Deep Blue, a black rectangular computer developed by IBM Inc. A new era has begun in front of the whole world when a machine defeated one of the brightest and most intelligent people on the planet, in one of the most intellectually challenging games ever created by men. After discussing a plethora of pros and cons of AI regarding human rights, the creation and increasing usage of AI has gained momentum for a necessary regulation of the AI industry. A wider coverage and substantial equity through providing legal recourse to different types of violations of human rights in the service and labor industry has proved to be the need of the hour. AI usage has its proponents and opponents; however, some forms of AI are both important and desirable for a technologically modern human evolution. Nonetheless, the disturbing question that arises today is whether, when transferring the experience of the past to the future, mass unemployment, mass poverty, and social distortions are still a possible scenario for the new world, a world where robots, intelligent systems, and algorithms play an increasingly central role. This paper engages in a critical analysis of the effects of AI on human rights through the lenses of economic structures, working relationships, job profiles, and well-established working time and remuneration models, which will undergo major changes due to increased AI usage. By demystifying recent precedents in the international arena, the paper seeks to throw light on the fundamental impact of new technical developments on the global labor market in the next few years, not just on industrial jobs, but on the core of human tasks in the service sector that are considered "untouchable." Consequently, looking at the two sides of the coin, it concisely discusses the polarity of the absence of any statutory recognition of AI and its impact.

**Keywords**: Artificial Intelligence, human rights, service sector, labor industry, equity.

***About the author:*** E-mail: swatilekha.chakraborty@symlaw.ac.in

***Received:*** December 15, 2017; ***evaluated:*** February 20, 2018; ***accepted:*** March 1, 2018

DOI: 10.14718/NovumJus.2018.12.2.2

# INTELIGENCIA ARTIFICIAL Y DERECHOS HUMANOS: ¿SON CONVERGENTES O PARALELOS ENTRE SÍ?

**Swatilekha Chakraborty**
**Rishabh Bhojwani**
**Estudiantes de BBA.LLB, Symbiosis Law School,Pune, India**

## *Resumen*

La Inteligencia Artificial (IA) ha sido central en el diálogo sobre un marco legal que aborde la creación de un equilibrio entre la IA y los derechos humanos por parte de los gobiernos del mundo. En 1997, Gary Kasparov, Gran Maestro y campeón mundial de ajedrez, fue derrotado por Deep Blue, una computadora rectangular negra desarrollada por IBM Inc. Una nueva era ha comenzado ante los ojos del mundo cuando una máquina derrotó a una de las personas más brillantes e inteligentes del planeta en uno de los juegos más intelectualmente desafiantes, jamás creados por el hombre. Después de una amplia discusión de los pros y contras de la inteligencia artificial con respecto a los derechos humanos, la creación y uso cada vez mayor de la AI ha generado momentum para la necesaria regulación de la industria de la inteligencia artificial. Una cobertura más amplia y una equidad sustancial mediante la provisión de recursos legales contra diferentes tipos de violaciones de derechos humanos en el sector servicios y la industria laboral han demostrado ser una necesidad importante. El uso de la IA tiene sus proponentes y oponentes; sin embargo, algunas formas de IA son importantes y deseables para una evolución humana tecnológicamente moderna. No obstante, la inquietante pregunta que surge hoy es si, al transferir la experiencia del pasado al futuro, el desempleo masivo, la pobreza masiva y las distorsiones sociales seguirán siendo un posible escenario para el nuevo mundo, un mundo donde los robots, los sistemas inteligentes y los algoritmos desempeñarán un papel cada vez más central. Este artículo aborda un análisis crítico de los efectos de la IA sobre los derechos humanos, examinando estructuras económicas, relaciones y perfiles de trabajo y modelos ya establecidos de horarios de trabajo y remuneración, que sufrirán cambios importantes debido al mayor uso de la IA. Al desmitificar precedentes recientes en el ámbito internacional, los autores intentan arrojar luz sobre el impacto fundamental de los nuevos desarrollos técnicos sobre el mercado laboral global en los próximos años, no solo en trabajos industriales, sino en tareas humanas en el sector servicios que son consideradas "intocables". Por lo tanto, considerando las dos caras de la moneda, el artículo discute de manera concisa la polaridad entre la ausencia de un reconocimiento legal de la IA y su impacto.

***Palabras clave:*** Inteligencia Artificial, derechos humanos, sector servicios, industria laboral, equidad.

***Los autores:*** Email: swatilekha.chakraborty@symlaw.ac.in

***Recibido:*** 15 de diciembre de 2017; ***evaluado:*** 20 de febrero de 2018; *aceptado:* 1 de marzo de 2018.

## Introduction

In 1997, Gary Kasparov, chess Grand Master and world champion, was beaten by Deep Blue, a black rectangular computer developed by IBM Inc. A new era has begun in front of the whole world, when a machine defeated one of the brightest and most intelligent people on the planet, in one of the most intellectually challenging games ever created by men. It was the dawn of the fourth revolution of the Industrial Revolution, quoted as "Industry 4.0."[1]

In recent years, extensive research and development has been carried out on Artificial Intelligence (AI). SIRI and Google Assistance, the latest and most advanced AIs, are a few examples to understand how AI can now perform services, which can be classified as the most intellectual understanding of the creativity of technology creators. In modern times, with the rising cost of input and inflation, companies—large and small—want to optimize their business by saving on costs that can be easily eliminated by replacing the human factor and initiating the use of AI.[2] In the 1950s, the usage of a monitor and a keyboard was an unimaginable future in any field, may that be warfare, finance, or diplomacy. However, with the passing of time, computers have taken the center stage. Important tasks, like the education of future generations, have shifted to computers, much away from the traditional human factor, which meant being taught by teachers, a practice in existence since the advent of man.[3] A guru or a teacher has always been there; for example, from Aristotle to Newton to Einstein to Stephen Hawking, teaching has been imparted by humans. Nonetheless, over time, computers have started to eliminate the human factor in the present and in the future. It can be argued that machines are more cost effective and require very little assistance or training for performing a task. However, in a world of humans, it is important to understand that in order to study the benefits of an external member to humanity, we need to analyze it through the eyes of humans.[4] We need to keep the human factor within

1 *AI Now Report. The Social and Economic Implications of Artificial Intelligence Technologies in the Near-Term.* Summary of the AI Now public symposium, hosted by the White House and New York University's Information Law Institute, July 7th, 2016. Version 1.0, 22 September 2016, https://artificialintelligencenow.com.

2 Julia Angwin, Jeff Larson, Surya Mattu, and Lauren Kirchner, "Machine Bias." *ProPublica*, 23 May 2016, https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing.

3 W. Brian Arthur, *The nature of technology: What it is and how it evolves*. London: Allen Lane, 2009.

4 Robby Berloznik, Raf Casert, Robby Deboelpaep et al. (eds.) Technology Assessment on Converging Technologies. Brussels: European Parliament, STOA, 2006.

the equation to understand the impact of machines or AI on humans today and in the future.[5]

With the advancement and progression of AI and the opportunities it offers, it is pertinent to discuss the ethics and morals of this industrial revolution. The philosophy of AI and machine ethics through a better understanding of its impact on human rights should be considered at great lengths too. Currently, human rights are monitored from the grassroots to the highest level, which is governed by the United Nations Human Rights Commission. However, no single organization—domestic or international—has been able to formulate a set of rules or framework for the development of AI.[6] It can be argued that AI is still at a very nascent stage and restriction on it would limit humans in developing a new era of technology. Nevertheless, many forget to consider the cons of AI, including the fact that unleashing a power beyond human control would affect humans directly or indirectly. At present, the United States have seen an average rise of 8% in unemployment rates. This rate is bound to increase further, which will increase income disparity between the poor and the rich, affecting thus the cornerstones of humanitarian rights for every single human. At present, more than a million people have been affected directly or indirectly by the rising usage of AI, and the number is bound to increase further.[7]

Countries like India, Bangladesh, Vietnam, etc., where manual labor is available in abundance, are likely to be affected very soon in the future due to a decrease in man-made assistance of any kind. There has been a number of movies and books on the future of humans and how their reliance on AI is going to affect mankind at the end. These movies depict a change in the control of power beyond humans themselves; however, what is not being depicted is the damage already done by AI.[8] Although everything has its pros and cons, if the AI industry is left unregulated,

5 Frank Biocca. "Media and the laws of mind." Preface to G. Riva, F. Davide & W. Ijsselsteijn (eds.) Being There: Concepts, effects and measurements of user presence in synthetic environments. Amsterdam: IOS Press.

6 Wolfie Christl and Sarah Spiekermann, Networks of Control. A Report on Corporate Surveillance, Digital Tracking, Big Data & Privacy. Vienna: Facultas, 2016.

7 Gabriella Cattaneo, Giorgio Micheletti, Alys Woodward, and David Osimo, *European Data Market SMART 2013/0063 D 3.6 and D 3.7 Data Ownership and Access to Data–Key Emerging Issues.* Final Release, January 29, 2016.

8 Eileen Donahoe, "So Software Has Eaten the World: What Does It Mean for Human Rights, Security & Governance? Part 1." *Human Rights Watch*, March 22, 2016. https://www.hrw.org/news/2016/03/22/so-software-haseaten-world-what-does-it-mean-human-rights-security-governance.

the violation of humanitarian rights would reach its epitome in the future, resulting thus in unemployment as high as 50% of the current standard.[9]

There are always two ways ahead for any technology ever presented before humans. First, there is the option of utilizing the technology to its epitome and in a restrictive manner, thus leading to a positive outcome, for example, the creation of software systems for usage in the daily affairs of an average person.[10] Second, an unregulated and illicit usage of technology, for example, in the financial sector starting from the 1980s until the bubble burst of the 2008 recession that affected every person in the circle of usage of the utilities of the financial sector. The extreme rise in the usage of technology allowed financial managers to manipulate financial records, leading thus to the highest rate of unemployment ever seen.[11]

We, as the present human race, have a duty towards future generations; we owe a duty to future generations for protecting them. For this reason, we have two options.[12] First, to utilize AI to its optimum level of usage and in a regulated manner or, second, to use it in an unrestricted manner, resulting thus in the bursting of a bubble, for instance, a sudden spike in unemployment rates that results in a much larger-scale recession that the one seen by the current generation during the 2008 financial crisis. Every time, the bubble burst is going to involve increasingly larger number of people.[13] The question that remains is whether we as humans in need to modernize ourselves can affect present and future generations by snatching away their livelihood, and place it in the hands of machines that can think and do complex tasks and require no salary or working hours or any humanitarian rights compliance.[14]

---

9 Council of Europe, *Young People Combating Hate Speech On-line*. Strasbourg: Council of Europe, April 15, 2012.

10 Nir Eyal and Ryan Hoover, Hooked: How to Build Habit-Forming Products. New York: Penguin Random House, 2014.

11 Sarah Eskens, Jelte Timmer, Linda Kool, and Rinie van Est, Beyond control - Exploratory study on the discourse in Silicon Valley about consumer privacy in the Internet of Things. The Hague: Rathenau Instituut, 2016. https://pure.uva.nl/ws/files/2779138/176164_Beyond_Control_Final_04042016.pdf

12 Margot E. Kaminski and Shane Witnov, "The Conforming Effect: First Amendment Implications of Surveillance, Beyond Chilling Speech." *University of Richmond Law Review, Vol. 49, 2015; Ohio State Public Law Working Paper No. 288*. https://ssrn.com/abstract=2550385.

13 International Working Group on Data Protection in Telecommunications (Berlin Telecom Group). *Working Paper on Web Tracking and Privacy. Respect for Context, Transparency and Control Remains Essential*. 53rd meeting, Prague, April 15-16, 2013.

14 Mark Coeckelbergh, "Health care, capabilities, and AI assistive technologies." *Ethical Theory and Moral Practice* 13, no. 2 (2010): 181-190.

## 1. Revisiting historical progress in technology to understand present-day advancement in Artificial Intelligence

To comprehend present-day AI and the future pattern of innovation in human time, we have to comprehend historical changes in innovation and its progress since the developments that have initiated the present debate on usage, as well as the pros and cons of present-day AI and its future.[15]

In the nineteenth century, the measurement of coarse material that a solitary weaver in America was able to create in an hour expanded by a factor of 50, while the measurement of work required per yard of fabric fell by 98%. In any case, the outcome was that fabric ended up less expensive, and interest for it expanded. This created four times more occupations over the long haul.[16]

Automated teller machines (ATMs) may have been necessary to essentially lower the number of bank assistants by assuming control over some of their normal duties. In fact, in the US, their normal number tumbled from 20 for every branch in 1988 to 13 in 2004.[17] Similarly, this decreased the cost of running a bank office, which in turn enabled banks to open more branches in response to client request. The quantity of urban bank offices ascended by 43% over a similar period, so the aggregate number of representatives expanded.[18]

In this way, even in later examples, we see that innovation prompts new work openings in a way that we could not envision a couple of decades earlier. The computerization of shopping through online business, along with more precise proposals, urges individuals to purchase progressively, and it has expanded general work in retail. (The yearly development of web-based businesses in Europe is 22%. Likewise, people can generate salary by providing administrative support in community-oriented economy, where section hindrances are low. What is more

15 Jacob Weisberg, "We are hopelessly hooked." *The New York Review of Books* (February 2016): 6-9. http://www.nybooks.com/articles/2016/02/25/we-are-hopelessly-hooked/.

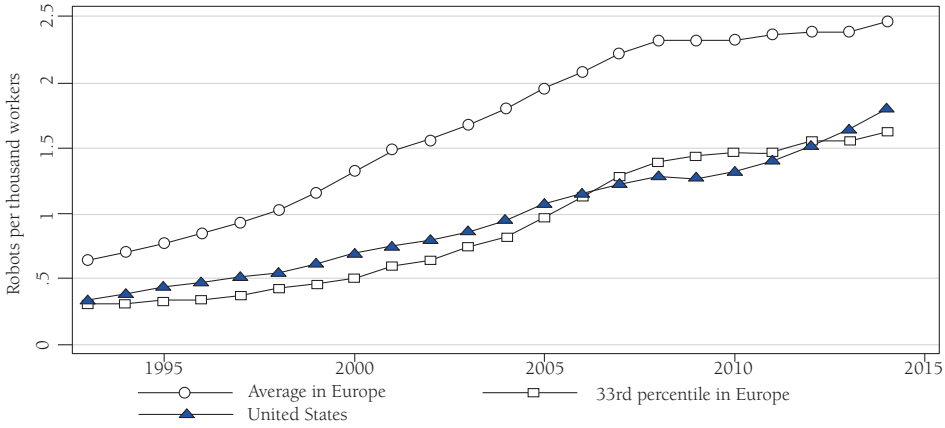
16 Rinie van Est, Jelte Timmer, Linda Kool, et al. *Rules for the digital human park: Two paradigmatic cases of breeding and taming human beings: Human germline editing and persuasive technology.* Background Paper for the 11th Global Summit of National Ethics/ Bioethics Commissions, Berlin, March 16-18, 2016. https://www.rathenau.nl/nl/publicatie/regels-voor-het-digitale-mensenpark.

17 Amanda Sharkey and Noel Sharkey, "Granny and the robots: Ethical issues in robot care for elderly." *Ethics and Information Technology* 14, no. 1 (2012): 27-40.

18 Science and Technology Options Assessment (STOA). *Ethical Aspects of Cyber-Physical Systems. Scientific Foresight study*. Brussels: European Parliament, 2016.

important, individuals can additionally use accessible resources in a proficient way through the supply-request coordinating calculation set up.[19]

Information from the International Federation of Robotics about modern robots in the post-1990 period shows that Europe has presented a greater number of robots in its work advertisement than the US. In European nations, robot utilization began with a number close to 0.6 robots per thousand workers in the mid-1990s, and expanded quickly to 2.6 robots per thousand specialists in the late 2000s. In the US, robot use is lower, yet it has a comparative pattern; it began close to 0.4 robots per thousand specialists in the mid-1990s, and expanded quickly to 1.4 robots for every thousand workers in the late 2000s. Actually, the US trends are closely reflected by the 33rd percentile of robot utilization among European nations.[20]




It can be observed that one extra robot for each thousand workers decreases the US business-to-population ratio by 0.18-0.34%, and compensation by 0.25-0.5%. The business that has been most influenced by computerization is production. In any case, curiously, these numbers indicate a feeble relationship between the expansion of mechanical robots and the decrease of routine employments.[21]

19 Melvin Kranzberg, "Technology and History: 'Kranzberg's Laws'," *Technology and Culture* 27, no. 3 (1986): 544-560.

20 Daron Acemoglu and Pascual Restrepo, "Robots and Jobs: Evidence from US Labor Markets," NBER Working Paper No. 23285, Cambridge: National Bureau of Economic Research, 2017, 17.

21 Colleen O'Manique, "The 'Securitization' of HIV/AIDS in Sub-Saharan Africa: A Critical Feminist Lens," in Sandra J. Maclean, David R. Black, and Timothy M. Shaw (eds.), *A Decade of Human Security: Global Governance and New Multilateralisms*, New York: Ashgate Press: 2006, 161-178, 165.

The huge contrast between an assessment of 9% and the 47% announced by Frey and Osborne[22] can be explained by the fact that Frey and Osborne concentrate on whole occupations instead of single job-tasks (occupation-based approach) when they evaluate the danger of robotization. Regardless of whether a few occupations are marked as high-risk occupations, they may contain a generous offer of tasks that are difficult to computerize. Conversely, Arntz, Gregory and Zierahn[23] present a task-based approach, which focuses on the danger of particular tasks to be robotized. This drastically diminishes the assessed effect of mechanization.[24]

## 2. How is Artificial Intelligence used?

Advances in AI innovation and its usage may help to change the nature of basic administration in instruction, science, social insurance, and government. AI is regularly used to lower costs, present new competencies, and raise personal satisfaction. Progress in AI frameworks has been moderate in recent years and uneven crosswise over various areas, yet it is rapidly quickening.[25]

Applications where AI has had noteworthy effects include the following:

### 2.1 Transportation and coordination

AI is being connected to transportation arrangement, driver help, crash shirking, and other wellbeing frameworks. Auto makers are creating driverless innovations, and advances are being made in insightful open transportation and unmanned airplane projects for freight transportation. This issue was tossed into sharp relief following the passing of a man in the US who had been viewing a motion picture while his Tesla auto drove in "autopilot mode."[26]

22 Carl Benedict Frey and Michael A. Osborne, *The Future of Employment: How Susceptible Are Jobs to Computerization?* Oxford: Oxford Martin School, 2013.

23 Melanie Arntz, Terry Gregory, and Ulrich Zierahn, *The Risk of Automation for Jobs in OECD Countries. A Comparative Analysis.* Paris: OECD, 2016. http://www.ifuturo.org/sites/default/files/docs/automation.pdf

24 Christophe Leroux and Roberto Labruto, *D3.2.1 Ethical Legal and Societal Issues in Robotics. euRobotics The European Robotics Coordination Action* (December 31, 2012).

25 Linda Kool, Jelte Timmer, and Rinie van Est (eds.), *Sincere support: The rise of the e-coach.* The Hague: Rathenau Instituut, 2015. https://www.rathenau.nl/nl/publicatie/sincere-support-rise-e-coach.

26 Sam Levin and Nicky Woolf, "Tesla driver killed while using autopilot was watching Harry Potter," *The Guardian* (1 July 2016). https://www.theguardian.com/technology/2016/jul/01/tesla-driver-killed-autopilot-self-driving-car-harry-potter

## 2.2 Money related administrations

AI innovations assume a developing part in budgetary administrations. Algorithmic and high-recurrence exchanging frameworks have been utilized since the mid-1990s to accomplish faster handling times, research of extensive datasets, as well as estimation and execution arrangements. Machine learning and examination are used in the present to self-remedy and ceaselessly enhance robotized exchange procedures with minimal human communication. Outside of exchange, robot-exhortation stages will enhance the availability of modern budgetary administration devices for financial specialists, and we may see the role of human consultants decrease even under huge pressure.[27]

## 2.3 Internet business

Online shopping and physical stores are helped by AI advances, from item proposal motors (which create roughly 35% of the business income on sites such as Amazon) to focused promotion in light of past purchases. In the US, Lowe's home store is acquiring robots with check stock feature to guide clients to products.[28]

## 2.4 Social insurance

AI is being utilized to process and examine medicinal services information, and to bolster restorative conclusions. Before long, picture acknowledgment AI will have the capacity to dissect huge arrangements of MRI and CT sweeps to recognize and determine harmful tumors with a higher level of exactness than offered by master radiologists.[29] Healthcare examination and AI profound learning procedures will permit fine-grained, more customized findings and treatment. Advances might enhance the life quality, wellbeing, and prosperity of the elderly through easy, computerized innovations in observation and customized wellbeing administration

[27] Antoniette Rouvroy, "'Of Data and Men.' Fundamental rights and freedoms in a world of big data," *Council of Europe, Directorate General of Human Rights and Rule of Law, 1* T-PDBUR(2015)09REV, 11 January 2016, http://works.bepress.com/antoinette_rouvroy/64/

[28] Michal Kosinski, David Stillwell, and Thore Graepel, "Private traits and attributes are predictable from digital records of human behavior," *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* 110 no. 15 (2013): 5802-5805.

[29] Frederik Zuiderveen Borgesius, *Improving privacy protection in the area of behavioural targeting*. Alphen aan den Rijn: Kluwer Law International, 2014.

systems.[30] These AI-based human services frameworks will, in any case, persistently need to adjust security worries against the advantages they guarantee to convey.

## 2.5 Mechanical technology

AI has been connected to mechanical industrial technology for a long time. Overwhelming ventures, for example, vehicle and semiconductor fabricating processes, have used robots for reasons of adequacy, exactness, precision, and speed. Robots work in numerous areas of society, including our homes, such as robot vacuum cleaners and lawnmowers.

## 2.6 Machine learning

AI concentrates on calculations that show that they can learn, comprehend, reason, plan, and act when given new data. One illustration is Netflix's utilization of a machine figuring out how to foresee motion pictures someone may appreciate based on survey history. Worldwide innovation monsters are starting to make their machine learning apparatuses accessible as free open source programming. In April, 2016, Google discharged its Tensor Flow machine learning toolbox, a similar structure it uses for photo acknowledgment and automated email replies.[31] Facebook, Microsoft, and Yahoo have discharged some of their own apparatuses trying to achieve a favorable position by means of a wide selection of their AI stages.

## 2.7 Web of Things

Web-empowered gadgets are progressively associated with different devices (vehicles, ice chests, extensive motors, and power networks). The objective of this innovation is to influence gadgets "to talk" to each other and to settle on choices self-sufficiently. Makers are adding sensors to new or existing product offerings to give new systemic or programming options.[32]

---

30 Anssi Ylimaula, Peter H.M.P. Roelofsma, and Leo Versteeg, *Deliverable 3.2 Ethical and legal requirements.* Amsterdam: Center of Advanced Media Research & Department of Social Gerontology, VUA University, 2010.

31 Bernd C. Stahl, Job Timmermans, and Catherine Flick. "Ethics of emerging information and communication technologies: On the implementation of responsible research and innovation." *Science and Public Policy* 44, no. 3 (2016): 1-13.

32 Eric Tjong Tjin Tai, "Privaatrecht voor de homo digitalis: eigendom, gebruikenhandhaving." In: Moerel, E.M.L. & J.E.J. Prins, M. Hildebrandt, et al. *Homo Digitalis*. Handelingen Nederlandse Juristen-Vereniging 146e jaargang/2016-I. Wolters Kluwer, 2016.

### 2.8 Military frameworks

Governments worldwide are trying to use more refined independent weapon frameworks. The capacity to carry arms will probably end up plainly overwhelmed by AI frameworks, working with people and independently.[33]

## 3. Tending to legal and arrangement issues

AI presents considerable legal and administrative difficulties. These difficulties incorporate issues related to controlling and anticipating the activities of self-governing frameworks. By what method will we dole out lawful and good obligations regarding damage caused via self-sufficient advancements that work with next to zero human intervention?[34]

The across the board selection of driverless or driver help frameworks will pose complex legal difficulties. For instance, how would we decide obligation for a mischance occurring because of an AI framework, and not caused by the driver? AI frameworks may act unusually. One illustration is the "blaze crash" of 2010, where algorithmic exchanging frameworks caused a US$1 trillion dollar securities exchange crash and bounce back in only 36 minutes. On the off chance that the activities of AI frameworks are adequately erratic or outside the ability to be controlled by a human office, it might be unjustifiable to consider the frameworks' originators to be responsible of the damages that their frameworks cause. Casualties might be left with no chance to get payment for the losses.[35]

Worldwide enactments should adjust existing control in the following areas:

- Medicinal services, e.g. whether specific AI frameworks in human services ought to be controlled as therapeutic gadgets or some other way;
- Transport, e.g. how self-governing vehicles ought to be enrolled;

---

33 Matthew U. Scherer, "Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies," *Harvard Journal of Law and Technology* 29, no. 2 (2016).

34 Finders, K., "IPsoft gives automation platform a face," *ComputerWeekly.com* (September 30, 2014). https://www.computerweekly.com/news/2240231755/IPsoft-gives-automation-platform-a-face [Accessed 29 June 2016].

35 Mark Purdy and Ladan Davarzani, "The Growth Game-Changer: How the Industrial Internet of Things can drive progress and prosperity," *Accenture*, 2015. https://www.accenture.com/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Dualpub_18/Accenture-Executive-Summary-Growth-Game-Changer-Industrial-Internet.pdf [Accessed 29 June 2016].

- Fund, e.g. whether lawful administrations ought to be made to manage the usage of AI frameworks.[36]

## 4. Maintaining privacy, ethics, and security

AI innovation is probably going to produce major moral, protection, and security concerns, which should be tended to and illuminated early. Existing AI advances that use design acknowledgment and machine learning combined with facial recognition raise security concerns as of now. A 2014 Carnegie Mellon study exposed robots' capacity to re-distinguish people who are online or are disconnected, with high exactness in close continuous, and to construct touchy data about them, by joining facial recognition and profound examination of online networking data.[37]

Enormous information systems are progressively utilizing AI to make population-scale information and create individualized examination and recommendations.[38] In general, it is not certain who possesses such information, how it ought to be utilized, and who can benefit from it. A few organizations around the globe are chipping away at AI innovation that spotlights social cooperation. As AI frameworks turn out to be more interconnected in our day-by-day lives and are utilized in an increasing number of basic foundation parts, they will take up an expanding extent of the digital assault surface. As of late, digital assaults have focused on the Ukrainian national power matrix and a German atomic power plant.[39] However, AI will likewise be a piece of the arrangement, with machine-learning strategies liable to enhance discovery and protect against cyberattacks.

## 5. How other governments are responding

While some open and private divisions are considering the ramifications of AI and supporting its improvement in particular zones, there is no whole-of-government or whole-of-country approach. This represents an important risk. To fall behind other nations is to lose a chance at creating a world-driven open approach on AI,

[36] Jason Koebler, "Why American Farmers Are Hacking Their Tractors with Ukrainian Firmware," *Motherboard* (21 March 2017). https://motherboard.vice.com/en_us/article/why-american-farmers-are-hacking-their-tractors-with-ukrainian-firmware.

[37] European Parliament Committee on Legal Affairs (JURI Committee), *Report with recommendations to the Commission on Civil Law Rules on Robotics* (2015/2103(INL)), 27 January 2017.

[38] Sherry Turkle, *Reclaiming conversation: The power of talk in a digital age*. New York: Basic Books, 2015.

[39] Cass R. Sunstein, *Echo chambers: Bush v. Gore, impeachment, and beyond*. Princeton & Oxford: Princeton University Press, 2001.

and to be compelled to acknowledge specialized moral and lawful principles and practices set up abroad. The Secretary General of the OECD says "...we need to dissect the digitization of the economy and society from an entire of-government point of view. We have to move out of our strategy storehouses and reach crosswise over them to better see how digitization is changing our lives, how we can abuse it, and how we can help those in peril of being left behind."[40] Governments around the globe are building up approach programs and entrusting organizations to address how AI advancements may be tackled to convey social and financial results.

- In the United States, the White House has established a National Science and Technology Council sub-committee on machine learning and computerized reasoning, entrusted with observing advances and innovation developments in AI and machine learning inside the Federal Government, in private segments, and internationally.[41]
- In Canada, the Government's Information and Communications Technology Council distributed a paper in April 2015 on Artificial Intelligence in Canada, in which it issued an invitation to take action in the country to build up methodologies to stay aware of the pace of AI-related monetary changes.[42]
- In the United Kingdom, the Science and Technology Committee of the House of Commons embraced an investigation on applied autonomy and fake intelligence.
- In Japan, the Government proposed building a universal arrangement of fundamental tenets for creating manmade brainpower innovations at a current gathering of G7 ICT Ministers. The eight standards they established include making AI systems secure, straightforward, and controllable by human beings.[43]
- In Singapore, the Government propelled a world-driven "savvy country" activity in 2014, which aims to use innovation to profit citizens. The Government is rebuilding offices to concentrate on framework advancement and directing new

40 Eli Pariser, *The filter bubble: What the Internet is hiding from you*. London: Penguin Books, 2011.
41 Scherer, "Regulating Artificial Intelligence," 4.
42 International Working Group on Data Protection in Telecommunications (Berlin Telecom Group), *Working Paper*.
43 Roger Strand and Matthias Kaiser, *Report on Ethical Issues Raised by Emerging Sciences and Technologies*. Norway: Centre for the Study of the Sciences and the Humanities, University of Bergen, 23 January 2015. Sunstein, *Echo Chambers*.

advances (with an emphasis on mechanical autonomy, AI, the Web of Things, and enormous information).[44]

- In South Korea, the Government has declared that it will build up a team for AI application and industrialization, and will increase its help for R&D on AI.

The fact that it is hard to foresee the right effect of AI makes it difficult to outline a reaction approach. Nevertheless, some general public-level response is definitely required. It is thus important to start an open discussion of every single gathering, to characterize our approach towards the AI period. This procedure will have different stages.

- The first critical advance is to comprehend what AI is and what its potential will be.

- Then, we have to characterize a structure of guidelines for the operation of machines and AI computerized frameworks. These must go a long way past Asimov's acclaimed *Three Laws of Robotics*.[45] The Civil Law Rules on Robotics proposed by the European Parliament can likewise stimulate social exchange about issues identified with risk, wellbeing, security, and protection in the coming AI time. Embracing clear standards in light of a decent comprehension of this new era could make the progress simpler and relieve potential concerns. However, embracing rules without great comprehension and information of how this new innovation will be actualized (initial step) would be counterproductive.[46]

- As a third step, we have to outline and actualize those strategies that will help us to oblige potential new innovation outcomes. For instance, one approach to push ahead could be to deliberately overhaul instruction and to prepare programs with the purpose of giving the correct abilities to specialists in order to connect with and work productively close to machines. This may limit potential concerns of dislodgment. Such activities will require a close connection of specialists and establishments with major mechanical firms, which have both the know-how and the ability to add to preparation. Enhanced

[44] Manfred Zentner, "Education for participation in a digitalised world." *Youth Partnership – Partnership between the European Commission and the Council of Europe in the field of youth. Report*, Symposium on youth participation in a digitalised world, Budapest, 14 - 16 September 2015. https://pjp-eu.coe.int/documents/1017981/8525351/Education%E2%80%93+participation-digitalised-world.pdf/212f8046-1274-4575-9834-b261bab9697f

[45] European Data Protection Supervisor (EDPS). *Opinion 4/2017 on the Proposal for a Directive on certain aspects concerning contracts for the supply of digital content* (14 March 2017).

[46] European Parliament Committee on Legal Affairs (JURI Committee), *Report with recommendations*.

instruments to pursue employment help and occupation reallocation could likewise be profitable and would alleviate concerns related to the uprooting effect. Without doubt, the Partnership on AI of huge cutting-edge organizations can help advance required social exchange and facilitate the promotion of improvements with the cooperation of multicultural research organizations and instructive foundations.[47]

In any case, we ought not to react hurriedly. The ideal opportunity for strategy will come, but right now, we are still at the initial step of understanding the capability of AI and the different ways it might affect our economy. To further this understanding, we should additionally foment social discourse among all the included parties (specialists, approach producers, industry agents, lawmakers, etc.). This is an imperative initial step to better handle the difficulties and chances of this modern upheaval. Nevertheless, despite the fact that we ought not to hurry to conclusions, we should act quickly. Innovation advances may present problematic powers in the market sooner than a few people may think.[48]

## 6. Artificial Intelligence in a world of rising inequality

Humankind may live on one planet—at any rate, until further notice, but we occupy distinct universes.

On one side, there is prosperity and riches, innovation that is persistently progressing to satisfy any need we can envision, as well as the future prospects of fantastically long and sound life expectancies, space travel, and significantly more. At the opposite end, there is a reality of neediness and unsatisfactory situations, which has barely improved regardless of the advent of internet, mobiles, enormous information,

47 Bryan Tantzen, "Connected Machines: Reducing Unplanned Downtime and Improving Service," *Cisco Blogs* (October 6, 2015). https://blogs.cisco.com/manufacturing/connected-machines-reducing-downtime [Accessed 29 June 2016].

48 Eric Horvitz, "One Hundred Year Study on Artificial Intelligence: Reflections and Framing." *Miscrosoft.com* (January 1, 2014). https://www.microsoft.com/en-us/research/publication/one-hundred-year-study-artificial-intelligence-reflections-framing/ In a subsequent research paper, the 2015-2016 Study Panel appeared to be less concerned about this issue, where they noted that "[w]hile the Study Panel do not consider it likely that near-term AI systems will autonomously choose to inflict harm on people, it will be possible for people to use AI-based systems for harmful as well as hurtful purposes." See "One Hundred Year Study," 10.

and now AI.[49] In between, there is one of the greatest dangers to the soundness of our social orders: disparity.

If we take a gander at worldwide advancement markers, there is an exceptionally positive picture. Extraordinary neediness, undernourishment, and maternal mortality are falling, while access to education and clean water is expanding—the world has accomplished noteworthy advances in the past 25 years. Nevertheless, monetary disparity has been rising as well. When discussing financial imbalance, voice disparity should be discussed too: individuals who are deserted have no voice.

Indeed, even in the OECD nations, including huge numbers of the wealthiest nations on the planet, wage imbalance is at the most elevated rate in a long time. The normal salary of the wealthiest 10% of the population is around nine times that of the poorest 10%. It was up around seven times 25 years earlier. These numbers have been presented earlier and we have seen them. A standout amongst the most peculiar insights is one, which came recently from Oxfam: the wealth of eight people is greater than what half of the inhabitants on the planet have together. 3.6 billion individuals have as much riches as eight people.

## 7. The future of Artificial Intelligence

So what will happen tomorrow? How about we fast forward 20 years? What world will we have in 2038? It is for sure that innovations—computerized reasoning being the most important among them—will shape tomorrow's reality. I would prefer not to offer a paired picture, yet we should envision two situations with the end goal of this discussion.

On the off chance that we proceed as we seem to proceed, a huge number of jobs will be lost to robotization and generally supplanted with uncertain employments with little insurance for specialists' rights. We may have some social insurance plots, they will, however, scarcely enable individuals to make do, with little seek after what is to come.

AI will be used, in all cases, in social insurance, training, and crosswise over open administrations. Robocops will watch our avenues along human cops. Wars will

[49] Bruce Schneier, "The Public-Private Surveillance Partnership," *Schneier on Security* (August 5, 2013). https://www.bloomberg.com/view/articles/2013-07-31/the-public-private-surveillancepartnership.

be battled by Executioner robots, which will decrease the human cost of war for the rich and effective, but not for poor people.[50]

We definitely know how information-driven frameworks—from money-related to prescient policing applications—can wind up oppressing minorities and destitute individuals. What will it look like in 20 years? AI frameworks may turn into guards who decide who can get to human services and who cannot, or who is fit for a job or for a home loan, and who is not. Those with power and access to the products of the information economy—a modest group of organizations and nations—will be those who keep on gaining benefits, while most of the individuals will be deserted. This future new world may result in a global imbalance on a scale not previously envisioned. Furthermore, this will be accompanied by enormous political changes and interruption.[51]

In an alternate world, we must make substantial progress in establishing standards for the moral advancement and utilization of AI. Organizations could pay heed and governments could react. Later on, we could have manmade brainpower frameworks that identify the right predisposition in information, instead of multiplying down on human inclination; we could have computerization that removes individuals from risky and corrupting employments, while offering additional instructive and monetary approaches that make open doors for stately and satisfying occupations. Governments could completely boycott robotized weapon frameworks, so Executioner robots would never come to exist.

This is where the tremendous power and capacity of AI resides for the benefit of humankind, by advancing correspondence, opportunity, and equity. It is where open-source AI enables trailblazers over the world to bridle the energy of innovation and to produce and utilize reasonable AI, taking into consideration AI choices to be investigated and tested, and with clear legal responsibility frameworks to guarantee that the rights and duties of clients and designers are respected.[52]

---

50 Nestor Duch-Brown, Bertin Martens, and Frank Mueller-Langer, "The economics of ownership, access and trade in digital data." *JCR Working Papers on Digital Economy* no. 2017-01. https://econpapers.repec.org/paper/iptdecwpa/2017-01.htm

51 Danielle K. Citron and Frank Pasquale, "The Scored Society: Due Process for Automated Predictions." *Washington Law Review* 89 (2014): 1; *U of Maryland Legal Studies Research Paper No. 2014-8*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2376209

52 Clare Garvie, Alvaro Bedoya, and Jonathan Frankle. "The Perpetual Line-up: Unregulated Police Face Recognition in America." Georgetown Law Center on Privacy & Technology (18 October 2016). www.perpetuallineup.org.

To put it plainly, this is where AI becomes a tool for outlining and utilizing human rights.

Business visionary Elon Musk has cautioned that computerized reasoning could turn into mankind's "greatest existential risk." A more hopeful perspective from futurist Ray Kurzweil is that AI can help us to make "real walks in tending to the [world's] fantastic difficulties." In present, everything relies upon how we deal with the change to a time of AI. To satisfy the guarantee of AI as another generation factor that can reignite monetary development, pertinent partners must be arranged together—mentally, mechanically, politically, morally, socially—to address the emerging difficulties, as counterfeit consciousness becomes more coordinated in our lives. The beginning stage is to understand the multifaceted nature of these issues.[53]

## 7.1 Setting up the framework for the future of AI

Effectively coordinating human knowledge with machine insight, so they exist together in a two-manner learning relationship, will turn out to be more basic than in any other time in recent memory. As the division of tasks among men and machines changes, arrangement producers need to rethink the sort of learning and abilities bestowed upon who and what is to come. At present, mechanical training goes one way: individuals figure out how to utilize machines. Progressively, this will change as machines learn from people, and people learn from machines. For instance, client administration agents without bounds should serve as "good examples" for their computerized associates, and conceivably the other way around. Specialized aptitudes will likewise be required to outline and execute AI frameworks, misusing skill in numerous claims to fame, including mechanical technology, vision, sound, and example acknowledgment. In any case, relational aptitudes, imagination, and passionate insight will likewise turn out to be considerably more imperative than they are today.

## 7.2 Supporting AI-controlled direction

As independent machines assume control of tasks that had only been carried out by humans, current laws should be reviewed. For example, the state of New York's 1967 law that mandates drivers to keep one hand on the wheel was intended to

[53] Bert-Jaap Koops, Angela Di Carlo, Luca Nocco, et al. "Robotic technologies and fundamental rights: Robotics challenging the European constitutional framework." *International Journal of Technoethics* 4, no. 2 (2013): 15-35.

enhance security, yet it may hinder the take-up of semi-independent wellbeing frameworks, for example, programmed path centralization. In different cases, new regulations are necessary. For instance, although AI could be immensely helpful in supporting therapeutic judgments, doctors abstain from utilizing these advancements, fearing that they would be used in allegations of malpractice. This vulnerability could repress take-ups and upset further development.[54]

## 7.3 Promoting a code of morals for AI

Astute frameworks are quickly moving into social territories once occupied only by people. This is opening up moral and social issues that can hamper the advance of AI. These issues range from how to react to racially one-sided calculations to whether self-sufficient autos should incline to their driver's life over others in case of a mischance. Given how common savvy frameworks will become later on, strategy producers need to guarantee the improvement of a code of morals for the AI environment. Moral verbal confrontations should be supplemented by unmistakable gauges and best practices for the improvement of clever machines. As a part of AI, the mechanical technology industry is ahead, as of now, in setting all-inclusive measures for its operations. Business guidelines in regards to robots created by the British Standards Institution (BSI) are a positive development.[55]

## 7.4 Addressing the redistribution effects

Numerous reporters are worried that AI will kill employments, worsen imbalance, and dissolve wages. This explains rising dissent worldwide and discourses promoting a general essential wage in different nations, for example, in Switzerland. Arrangement creators must perceive that these worries are substantial. Their reaction ought to be twofold. In the first place, arrangement producers should consider how AI can bring about substantial advantages. For example, AI can enhance work fulfillment. An Accenture review featured that 84 percent of directors felt trust that machines will make them more successful and their work more interesting. Beyond work environment, AI guarantees to mitigate a portion of the world's most prominent issues, for example, environmental change (through more productive transportation)

[54] Won-Kyung Song and Jongbae Kim, "Novel assistive robot for self-feeding." In: Ashish Dutta (ed.) *Robotic Systems - Applications, Control and Programming*. 2012. https://www.intechopen.com/books/robotic-systems-applications-control-and-programming/novel-assistive-robot-for-self-feeding

[55] Rinie van Est, Virgil Rerimassie, Ira van Keulen, and Gaston Dorren, *Intimate technology: The battle for our body and behaviour.* The Hague: Rathenau Instituut, 2014. https://www.rathenau.nl/en/publication/intimate-technology-battly-our-body-and-behaviour.

and poor access to human services (by diminishing the strain on over-burden frameworks). Advantages like these ought to be plainly enunciated to energize a more uplifting point of view toward AI's potential. Second, arrangement producers need to effectively address the drawbacks of AI. A few tasks will be influenced unevenly by these progressions. To keep a kickback, arrangement creators ought to recognize tasks at high risk of removal and make procedures that focus the attention on reintegrating them into the economy.[56]

## Conclusion

Current dialogue about AI concentrates on transient dangers posed by its extension, for example, work misfortunes. Studies have discovered that up to half of all employments are presently defenseless to mechanization, including customarily "safe" callings, for example, law, bookkeeping, and prescription.

A current open address communication by Gresham College Professor Martyn Thomas cautioned that if dislodged specialists are not sufficiently retrained—and if the state does not reasonably disperse the wealth produced by a blast in AI—, "social disturbance could be colossal." From a human rights viewpoint, this could jeopardize individuals' financial and social rights.

Past this, machine learning in view of human conduct risks transmitting the mentioned inclinations in our general public to machines. This could mean, for instance, that AI utilized as part of prescient policing or advance endorsement frameworks would establish separation on the ground of race or sex—a conduct restricted by Article 14 of the Human Rights Convention.[57]

The end of mankind? If an extension of AI, and movement towards AI, represents a risk to human rights, should not something be said about the formation of fake super-knowledge? Before the possibility of an intelligence explosion, we people are like small kids playing with a bomb. Such is the contrast between the energy of our toy and our youthfulness.[58] Nick Bostrom, Professor in AI Ethics and Philosophy at the University of Oxford, who has spent years researching AI, shares the concerns of Stephen Hawking, Bill Gates, and Tesla-organizer Elon Musk. All of them have expressed worry that AI represents an existential peril to people, undermining the

[56] Schneier, The Public-Private Surveillance.
[57] James C. Scott, *Seeing Like a State*. Yale University Press, 1999.
[58] Kranzberg, "Technology and History."

most fundamental human right of all: our entitlement to life. This risk originates from machines creating rightness, instead of malevolent purpose, clarifies Hawking: "A super-smart AI will be to a great degree great at achieving its objectives, and if those objectives aren't lined up with our own, we're in a bad position."[59]

For each tragic forecast, AI can possibly make genuine increases with regards to human rights. This includes removing individuals from perilous and debasing employments and providing extra time with family, a privilege revered by Article 8 of the Convention. Likewise, AI could help to find an answer for environmental changes, one of the primary drivers of constrained relocation, and encourage the creation of dinners without any preparation, to annihilate nourishment neediness, which is an infringement of Article 11 of the International Covenant on Economic, Social, and Cultural Rights. According to a few specialists, it may even be conceivable to change maturing, stretching out our entitlement to life. For those building up this innovation, to stop progress due to "doomsday" expectations risks postponing these improvements. We did not hurry to set up rules about how planes should function before we made sense of how they would fly in any case, commented Facebook's maker Mark Zuckerberg on AI.[60]

Talking at the AI for Good Global Summit a month ago, Amnesty International's Secretary General presumed that there are "tremendous potential outcomes and advantages [to be gained] from counterfeit consciousness" if "human rights is a center outline and utilize rule" of this innovation. This mirrors the reasoning of a growing beneficial AI development, supported by Musk and others. In January 2017, he and many AI specialists embraced an open letter distributed by the Future of Life Institute. This set down 23 standards to guarantee that AI remains a power for human greatness, including the idea of "significant worth arrangement." Regardless of whether these standards will be sufficient to shield humankind from machines, the issue is truly overwhelming upon mankind.[61]

---

59 The Senior Project, "Ethics of e-inclusion of older people." Senior Discussion Paper No. 2008/01 (April 2008). http://www.cssc.eu/public/Ethics%20of%20e-Inclusion%20of%20older%20people%20- %20Bled%20%20Paper.pdf.

60 Sherry Turkle, *Alone together: Why we expect more from technology and less from each other.* New York: Basic Books, 2011.

61 Michael Fuchs, "Session 2 - Technology, Intervention and Control of Individuals." *Emerging technologies and human rights*. International Symposium, Strasbourg, 4-5 May 2015.

## References

Acemoglu, Daron and Pascual Restrepo. "Robots and Jobs: Evidence from US Labor Markets," NBER Working Paper No. 23285, Cambridge: National Bureau of Economic Research, 2017.

*AI Now Report. The Social and Economic Implications of Artificial Intelligence Technologies in the Near-Term.* A summary of the AI Now public symposium, hosted by the White House and New York University's Information Law Institute, July 7th, 2016. Version 1.0, 22 September, 2016, https://artificialintelligencenow.com.

Angwin, Julia, Jeff Larson, Surya Mattu and Lauren Kirchner. "Machine bias." *Pro-Publica* (23 May 2016). https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing.

Arntz, Melanie, Terry Gregory and Ulrich Zierahn. *The Risk of Automation for Jobs in OECD Countries. A Comparative Analysis.* Paris: OECD, 2016. http://www.ifuturo.org/sites/default/files/docs/automation.pdf

Arthur, W. Brian. *The nature of technology: What it is and how it evolves.* London: Allen Lane, 2009.

Berloznik, Robby, Raf Casert, Robby Deboelpaep et al. eds. *Technology Assessment on Converging Technologies.* Brussels: European Parliament, STOA, 2006.

Biocca, Frank. "Media and the laws of mind." Preface to G. Riva, F. Davide, andW. Ijsselsteijn, eds. *Being There: Concepts, effects and measurements of user presence in synthetic environments.* Amsterdam: IOS Press, 2003, v-ix.Bostrom, Nick y Vincent C. Millar. "Future progress in artificial intelligence: A survey of expert opinion". En *Fundamental Issues of Artificial Intelligence.* Vincent C. Muller (ed.). Berlin, Springer: Synthese Library, 2016.

Bozdag, Engin. "Bias in algorithmic filtering and personalization". *Ethics and Information Technology* 15, no. 3 (2013): 209-27.

Cattaneo, Gabriella, Giorgio Micheletti, Alys Woodward, and David Osimo. *European Data Market SMART 2013/0063 D 3.6 and D 3.7 Data Ownership and Access to Data–Key Emerging Issues.* Final Release January 29, 2016.

Christl, Wolfie and Sarah Spiekermann. *Networks of Control. A Report on Corporate Surveillance, Digital Tracking, Big Data & Privacy*. Vienna: Facultas, 2016.

Citron, Danielle K., and Frank Pasquale. "The scored society: Due process for automated predictions". *Washington Law Review* 89 (2014): 1; *University of Maryland Legal Studies Research Paper No. 2014-8.* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2376209

Coeckelbergh, Mark. "Health care, capabilities, and AI assistive technologies". *Ethical Theory and Moral Practice* 13, no. 2 (2010): 181-90.

Council of Europe. *Young people combating hate speech on-line.* Strasbourg: Council of Europe, April 15, 2012.

Donahoe, Eileen. "So Software Has Eaten the World: What Does It Mean for Human Rights, Security & Governance? Part 1." *Human Rights Watch* (March 22, 2016). https://www.hrw.org/news/2016/03/22/so-software-haseaten-world-what-does-it-mean-human-rights-security-governance.

Duch-Brown, Nestor, Bertin Martens, and Frank Mueller-Langer. "The economics of ownership, access and trade in digital data". *JRC Working Papers on Digital Economy* no. 2017-01. https://econpapers.repec.org/paper/iptdecwpa/2017-01.htm

Eskens, Sarah, Jelte Timmer, Linda Kool, and Rinie van Est. *Beyond control. Exploratory study on the discourse in Silicon Valley about consumer privacy in the Internet of Things.* The Hague: Rathenau Instituut, 2016. https://pure.uva.nl/ws/files/2779138/176164_Beyond_Control_Final_04042016.pdf

European Data Protection Supervisor (EDPS). *Opinion 4/2017 on the Proposal for a Directive on certain aspects concerning contracts for the supply of digital content* (14 March 2017).

European Parliament Committee on Legal Affairs (JURI Committee). *Report with recommendations to the Commission on Civil Law Rules on Robotics* (2015/2103[INL]) (27 January 2017).

Eyal, Nir and Ryan Hoover. *Hooked: How to Build Habit-Forming Products.* New York: Penguin Random House, 2014.

Finders, Karl. "IPsoft gives automation platform a face". *ComputerWeekly.com* (September 30, 2014). https://www.computerweekly.com/news/2240231755/IPsoft-gives-automation-platform-a-face [Accessed 29 June 2016].

Frey, Carl Benedict and Michael A. Osborne. *The Future of Employment: How Susceptible are Jobs to Computerization? Oxford:* Oxford Martin School, 2013.

Fuchs, Michael. "Session 2 - Technology, intervention and control of individuals". *Emerging technologies and human rights.* International Symposium, Strasbourg, 4-5 May 2015.

Garvie, Clare, Alvaro Bedoya, and Jonathan Frankle. *The perpetual line-up: Unregulated police face recognition in America.* Georgetown Law Center on Privacy & Technology (18 October 2016). www.perpetuallineup.org.

Horvitz, Eric. "One Hundred Year Study on Artificial Intelligence: Reflections and Framing." *Microsoft.com* (January 1, 2014). https://www.microsoft.com/en-us/research/publication/one-hundred-year-study-artificial-intelligence-reflections-framing/

International Working Group on Data Protection in Telecommunications (Berlin Telecom Group). *Working Paper on Web Tracking and Privacy. Respect for Context, Transparency and Control Remains Essential.* 53rd meeting, Prague, April 15-16, 2013.

Kaminski, Margot E. and Shane Witnov. "The Conforming Effect: First Amendment Implications of Surveillance, Beyond Chilling Speech." *University of Richmond Law Review* 49 (2015); *Ohio State Public Law Working Paper No. 288*. https://ssrn.com/abstract=2550385.

Koebler, Jason. "Why American farmers are hacking their tractors with Ukrainian firmware". *Motherboard* (March 21, 2017), https://motherboard.vice.com/en_us/article/why-american-farmers-arehacking-their-tractors-with-ukrainian-firmware.

Kool, Linda, Jelte Timmer, and Rinie van Est, eds. *Sincere support: The rise of the e-coach.* The Hague: Rathenau Instituut, 2015. https://www.rathenau.nl/nl/publicatie/sincere-support-rise-e-coach.

Koops, Bert-Jaap, Angela Di Carlo, Luca Nocco, et al. "Robotic technologies and fundamental rights: Robotics challenging the European constitutional framework". *International Journal of Technoethics* 4, no. 2 (2013): 15-35.

Kosinski, Michal, David Stillwell, and Thore Graepel. "Private traits and attributes are predictable from digital records of human behavior". *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* 110, no. 15 (2013): 5802-5.

Kranzberg, Melvin. "Technology and History: 'Kranzberg's Laws'." *Technology and Culture* 27, no. 3 (1986): 544-60.

Leroux, Christophe, and Roberto Labruto. *D3.2.1 Ethical legal and societal issues in robotics. euRobotics The European Robotics Coordination Action* (December 31, 2012). http://www.eurobotics-project.eu/cms/upload/PDF/euRobotics_Deliverable_D.3.2.1_ELS_IssuesInRobotics.pdf

Levin, McCorduck, Moerel E.M.L. and J.E.J. Prins. "Privacy voor de homo digitalis". En: *Homo Digitalis*. E.M.L. Moerel, J.E.J. Prins, M. Hildebrandt, T.F.E TjongTjin Tai, G-J. Zwenne and A.H.J. Schmidt (eds.). Handelingen Nederlandse Juristen-Vereniging 146e jaargang/2016-I. Wolters Kluwer, 2016.

Levin, Sam, and Nicky Woolf. "Tesla driver killed while using autopilot was watching Harry Potter," *The Guardian* (1 July 2016). https://www.theguardian.com/technology/2016/jul/01/tesla-driver-killed-autopilot-self-driving-car-harry-potter

O'Manique, Colleen. "The 'Securitization' of HIV/AIDS in Sub-Saharan Africa: A critical feminist lens." In *A Decade of Human Security: Global Governance and New Multilateralisms,* Sandra J. Maclean, David R. Black, and Timothy M. Shaw (eds.). New York: Ashgate Press, 2006, 161-178.

Pariser, Eli. *The filter bubble: What the Internet is hiding from you.* London: Penguin Books, 2011.

Purdy, Mark, and Ladan Davarzani. "The Growth Game-Changer: How the Industrial Internet of Things Can Drive Progress and Prosperity," *Accenture*, 2015. https://www.accenture.com/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Dualpub_18/Accenture-Executive-Summary-Growth-Game-Changer-Industrial-Internet.pdf [Accessed 29 June 2016].

Rouvroy, Antoinette. "'Of data and men.' Fundamental rights and freedoms in a world of big data." *Council of Europe, Directorate General of Human Rights and Rule of Law* l, T-PD-BUR(2015)09REV (2016). http://works.bepress.com/antoinette_rouvroy/64/

Scherer, Matthew U. "Regulating artificial intelligence systems: Risks, challenges, competencies, and strategies". *Harvard Journal of Law and Technology* 29, no. 2 (2016).

Schneier, Bruce. "The Public-Private Surveillance Partnership". *Schneier on Security* (August 5, 2013). https://www.schneier.com/blog/archives/2013/08/the_publicpriva_1.html

Science and Technology Options Assessment (STOA). *Ethical Aspects of Cyber-Physical Systems. Scientific Foresight Study*. Brussels: European Parliament, 2016.

Scott, James C. *Seeing like a State*. Yale University Press, 1999.

Sharkey, Amanda, and Noel Sharkey. "Granny and the robots: Ethical issues in robot care for elderly." *Ethics and Information Technology* 14, no. 1 (2012): 27-40.

Song, Won-Kyung, and Jongbae Kim. "Novel assistive robot for self-feeding". In: *Robotic Systems - Applications, Control and Programming,* edited by Ashish Dutta, 2012. https://www.intechopen.com/books/robotic-systems-applications-control-and-programming/novel-assistive-robot-for-self-feeding

Stahl, Bernd C., Job Timmermans, and Catherine Flick. "Ethics of emerging information and communication technologies: On the implementation of responsible research and innovation". *Science and Public Policy* 44, no. 3 (2016): 1-13.

Strand, Roger, and Matthias Kaiser. *Report on ethical issues raised by emerging sciences and technologies*. Norway: Centre for the Study of the Sciences and the Humanities, University of Bergen, 23 January 2015.

Sunstein, Cass R. *Echo chambers: Bush v. Gore, impeachment, and beyond.* Princeton & Oxford: Princeton University Press, 2001.

Tantzen, Bryan. "Connected machines: Reducing unplanned downtime and improving service." *Cisco Blogs* (October 6, 2015). https://blogs.cisco.com/manufacturing/connected-machines-reducing-downtime [Accessed 29 June 2016].

The Senior Project. "Ethics of e-inclusion of older people." Senior Discussion Paper no. 2008/01. (April 2008). http://www.cssc.eu/public/Ethics%20of%20e-Inclusion%20of%20older%20people%20- %20Bled%20%20Paper.pdf.

Tjong Tjin Tai, Eric. "Privaatrecht voor de homo digitalis: eigendom, gebruik en handhaving". In *Homo Digitalis.* E.M.L. Moerel, J.E.J. Prins, M. Hildebrandt, et al. Schmidt Handelingen Nederlandse Juristen-Vereniging 146e jaargang/2016-I. Wolters Kluwer, 2016.

Turkle, Sherry. *Alone together: Why we expect more from technology and less from each other*. New York: Basic Books, 2011.

Turkle, Sherry. *Reclaiming conversation: The power of talk in a digital age.* New York: Basic Books, 2015.

United Nations Development Program. *The Human Development Report.* Oxford: Oxford University Press, 1994.

Van Alsenoy, B., V. Verdoodt, R. Heyman, E. Wauters, J. Ausloos y G. Acar. *From social media service to advertising network. A critical analysis of Facebook's revised policies and terms*. KU Leuven Center for IT & IP Law - iMinds,

Working Paper, version: 1.3 (2015). https://www.law.kuleuven.be/citip/en/news/item/icri-cir-advises-belgian-privacy-commission-in-facebookinvestigation.

Van de Poel, Ibo, and Lamber Royakkers. *Ethics, technology, and engineering: An introduction.* Oxford, UK: Wiley-Blackwell, 2011.

Van Est, Rinie, and Dirk Stemerding (eds.) *European governance challenges in bio-engineering – Making perfect life: Bio-engineering (in) the 21st century. Final report.* Brussels: European Parliament, STOA, 2012. https://www.rathenau.nl/nl/publicatie/making-perfect-life-final-report.

Van Est, Rinie, Dirk Stemerdink, Virgil Rerimassie, Mirjam Schuijff, Jelte Timmer, and Frans Brom. *From bio to NBIC – From medical practice to daily life. Report written for Council of Europe, Committee on Bioethics.* The Hague: Rathenau Instituut, 2014. https://www.rathenau.nl/nl/publicatie/bio-nbic-convergencemedical-practice-daily-life.

Van Est, Rinie, Jelte Timmer, Linda Kool, et al. *Rules for the digital human park: Two paradigmatic cases of breeding and taming human beings: Human germline editing and persuasive technology*. Background Paper for the 11th Global Summit of National Ethics/ Bioethics Commissions, Berlin, March 16-18, 2016. https://www.rathenau.nl/nl/publicatie/regels-voor-het-digitale-mensenpark.

Van Est, Rinie, Virgil Rerimassie, Ira van Keulen, and Gaston Dorren. *Intimate technology: The battle for our body and behaviour*. The Hague: Rathenau Instituut, 2014. https://www.rathenau.nl/en/publication/intimate-technology-battly-our-body-and-behaviour.

Wachter, Sandra, Brent Mittelstadt, and Luciano Floridi. *Why a right to explanation of automated decision-making does not exist in the general data protection regulation.* (December 28, 2016). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2903469.

Weisberg, Jacob. "We are hopelessly hooked". *The New York Review of Books* (February 2016): 6-9, http://www.nybooks.com/articles/2016/02/25/we-are-hopelessly-hooked/

Ylimaula, Anssi, Peter H.M.P. Roelofsma, and Leo Versteeg. *Deliverable 3.2. Ethical and legal requirements.* Amsterdam: Center of Advanced Media Research & Department of Social Gerontology, VUA University, 2010.

Zentner, Manfred. "Education for participation in a digitalised world". *Youth Partnership – Partnership between the European Commission and the Council of Europe in the field of youth. Report.* Symposium on youth participation in a digitalised world. Budapest (14-16 September 2015). https://pjp-eu.coe.int/documents/1017981/8525351/Education%E2%80%93+participation-digitalised-world.pdf/212f8046-1274-4575-9834-b261bab9697f

Zuiderveen Borgesius, Frederik. *Improving privacy protection in the area of behavioural targeting.* Alphen aan den Rijn: Kluwer Law International, 2014.