

ON POLICY AND LEGAL IMPACTS TO THE FUTURE OF WORK

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Abstract: *Artificial Intelligence (AI) will be the next transformative technology after the internet. As people begin thinking about business incentives for deploying AI technologies into various industrial sectors, the impact on human unemployment, a key issue, needs to be addressed. In our emerging AI society would it be efficient to use policy and law as a tool for governance of beneficial AI? What kind of role is policy and law supposed to have in an AI society? In this paper, we will take a brief look at both policy and legal implications to the future of work.*

1. Introduction

We are accelerating rapidly towards an Artificial Intelligence revolution, with AI applications spanning across banking, transportation, nursing and medical, to name a few industries. In the last several years, we have witnessed the development and growth of Google's (now Waymo) self-driving cars, the expansion of next generation industrial robots supporting collective tasks with human operators, Amazon's mobile fulfillment systems, and even a Japanese insurance company replacing 34 human employees with an IBM Watson¹. As for the legal domain, National Language Processing, Machine Learning, Visualization, Heuristic Search Techniques all include great potential to realize the «Legal AI» technologies, such as ROSS Intelligence's smart agent, which helps lawyers to sort case laws and find relevant information about new cases². Within the following decade, it is expected that the AI revolution will expand its influence into more industrial sectors³. The impact of automation triggered by Industry 4.0 will enable enterprises to spend less in labor costs. Consumers will also benefit, paying less for products or services. Unfortunately, this means jobs in labor industries are under threat.

2. Will AI Steal Our Jobs?

TIM DUNLOP argues that the question «will robot takes our job?» or the possibility of one-to-one replacement of humans by machines is a wrong question. He believes the current way is more about how emerging technologies reshape the way in which work is organized⁴. Before this, Pew Research Center conducted a mass survey on experts' opinions to the question on whether human jobs will be replaced by AI and robotics by 2025. Surprisingly, there was a divergence in answers to this question. 48% of respondents regarded that robots and AI will displace huge numbers of both blue and white workers and causes social problems such as income inequality, mass unemployment, and social order breakdown. The other 52% of respondents predicted

¹ Unsigned Editorial (2016) Insurance firm to replace human workers with AI system, The Mainichi. Available via <http://mainichi.jp/english/articles/20161230/p2a/00m/0na/005000c>.

² JOHN MANNES (2017) ROSS Intelligence lands \$ 8.7M Series A to speed up legal research with AI, TechCrunch. Available via <https://techcrunch.com/2017/10/11/ross-intelligence-lands-8-7m-series-a-to-speed-up-legal-research-with-ai>.

³ Unsigned Editorial (2016) Artificial Intelligence and Life in 2030, Report of the 2015 Study Panel, One Hundred Year Study of Artificial Intelligence, Stanford University. Available via https://ai100.stanford.edu/sites/default/files/ai_100_report_0831fnl.pdf.

⁴ TIM DONLUP (2017) Why the Future is Workless, NewSouth Publishing.

that emerging technology will not replace more jobs than it creates. They believe that new jobs will be created while current human jobs be replaced by technology⁵. It's something similar to DUNLOP's point of view.

Along these lines, it is a big question to verify whether eventually the human labor force will decrease (or increase) accompanying with the AI revolution. In May 2017, researchers from the Oxford Future of Humanity Institute's AI Impacts project released a survey about the timeline of human jobs shifting to AI and autonomous systems. They found that respondents (all machine learning experts) believed there is a 50% possibility of AI exceeding human workers in all fields within 45 years and replacing all human jobs in 120 years⁶. Though some experts believe more jobs will be created when certain tasks will be replaced by automation⁷. ERIK BRYNJOLFSSON and ANDREW MCAFEE – the authors of *The Second Machine Age* – believe that the dynamic of the technology revolution will destroy more jobs than create, causing the reduction of the middle class and rise of inequality in society, calling it «Decoupling»⁸. In this paper, I would like to follow BRYNJOLFSSON's and MCAFEE's assumption⁹, those jobs under clear and present threat from AI technologies are neither Knowledge-Intensive nor Labor-Intensive, but something between them. It's unavoidable that AI will take over some jobs in the short-term. According to a report issued by World Economic Forum, 7.1 million jobs in developed countries will be lost due to AI and automation by 2020; however, 2.1 million new jobs will be created. And yet, there will be an emergency crisis to cover the gap of unemployment due to AI.

3. Policy Debates in AI and Employment

If we hold a cautious attitude to the future of AI and how it changes the balance of human labor force and job market, then the gap of unemployment will become an issue of public policy. Private sectors have an incentive to adopt more AI applications to replace human labors under a cost-effectiveness evaluation. This might cause great imbalance between human and AI workers, thus, it's necessary to consider the governance of employment from the government's side, otherwise we can only pray humans' hand-to-hand struggles can compete machine from the jungle of market mechanism.

In the EU, one of the critical policy guideline for AI & society is the «Draft Report» issued by Committee on Legal Affairs, European Parliament¹⁰. The guideline aims to provide legislative recommendations on laws and rules for AI and robotics in civil usages to European Commission. In terms of the employment issue, the guideline suggests the Commission (1) to start monitoring job trends of knowing job loss/creation in many fields; (2) to draft a roadmap for the use and revision of a Digital Competence framework toward an upcoming shortage of up to 825'000 ICT professionals in Europe by 2020; (3) to launch initiatives of supporting women in ICT as well as enhancing their e-skills; (4) the need to introduce corporate reporting requirements, especially on the economical range and proportion of AI and robotics contributed to the industry. This can help draft new governance on taxation and social security.

⁵ AARON SMITH, JANNA ANDERSON (2014) AI, Robotics, and the Future of Jobs, Pew Research Institute. Available via <http://www.pewinternet.org/2014/08/06/future-of-jobs/> (all websites last accessed in January 2018).

⁶ KATJA GRACE, JOHN SALVATIER, ALLAN DAFOE, BAobao ZHANG, OWAIN EVANS (2017) When Will AI Exceed Human Performance? Evidence from AI Experts, arXiv:1705.08807v2 [cs.AI] 30 May 2017.

⁷ YUEH-HSUAN WENG (2012) (4) Social Robots: Robot Companions for Citizens: with Prof. Dr. Paolo Dario, PKU Internet Law Watch, Vol. 8, No. 5.

⁸ ERIK BRYNJOLFSSON, ANDREW MCAFEE (2016) *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*, W. W. Norton & Company, ISBN 978-0-393-35064-7.

⁹ DAVID ROTMAN (2013) How Technology Is Destroying Jobs, MIT Technology Review. Available via <https://www.technologyreview.com/s/515926/how-technology-is-destroying-jobs/>.

¹⁰ MADY DELVAUX (2016) Draft Report with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)), European Parliament. Available via <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML%2BCOMPARL%2BPE-582.443%2B01%2BDOC%2BPDF%2B01//EN>.

The UK Governance Office of Science published an AI policy guideline earlier than EU Parliament, but with a rather optimistic attitude on the employment issue. They reported that AI and automation will change the type of jobs people do and skills people need, and therefore, the demand of high-skill workers and STEM education will increase as well. Most importantly, the role of government shall facilitate the development of new skills, enable workers to retrain in order to intensify people's competence in the future labor market¹¹.

Japan has a delicate system on drafting public policies from various bodies. The Ministry of Trade, Economy, and Industry (METI) is famous for its robot policy series in innovation and safety. Unlike METI's specific focus on intelligent mechanics, the Ministry of Internal Affairs and Communication (MIC) has its interest in risks and impacts in AI networking. Except to ministries, the Cabinet Office also set up an advisory board on AI and human society to facilitate «Society 5.0». From the report issued by the advisory board, it targeted three groups: individual workers, company, and the Government. To individual workers, they have to acquire the ability to work «creatively» in order to avoid human resources do not meet with future job requirements. In this case, both unemployment and labor shortages could happen. To a company, it should adjust the way of decision making as well as staff assignment in order to take advantage of the flexibility of time and space caused by AI technologies. As for the Government, it should draft policies that enable «labor mobility» for example, providing opportunities for people to learn new skills. Combining labor and employment policies is an option. The Government should also consider macroeconomics and social security issues caused by the AI revolution¹².

Among these debates, we found that they all agreed AI will change the structure of today's labor market. We will need a policy for people to adapt into future labor market by enhancing people's ability in ICT and provide a smooth pathway for job mobility. Some believe establishing a safety net for unemployed workers is important as well. Though AI and employment has been widely discussed at the policy level, it seems that the role of law and its possible implications are not discussed enough. Hence, I would like to go through a follow-up survey in next section.

4. Legal Implications to the Future of Work

To investigate what kind of role the law supposed to have in an AI society, we need to understand how it dominates contemporary labor market. Considering different legal cultural and system between countries, I would like to discuss common cases with a central focus from the Japanese legal system, as below:

4.1. The Constitution

It is the meta-level legislation in each country which properly defines governmental organization and fundamental rights as well as duties to its citizens. The right of work is a recognized human right in most countries. In Article 27 of the Constitution of Japan it defines that «*All people shall have the right and obligation to work. Standards for wages, hours, rest and other working conditions shall be fixed by law. Children shall not be exploited*» and in Article 28 it claims that «*The right of workers to organize and to bargain and act collectively.*» The two articles reflect Japanese Constitution's concern on individual and group labor relations with employers¹³.

¹¹ Unsigned Editorial (2016) Artificial Intelligence: opportunities and implications for the future of decision making, Government Office of Science, The United Kingdom.

¹² YUKO HARAYAMA (2017) Report on Artificial Intelligence and Human Society, Advisory Board on AI and Human Society, Council for Science, Technology and Innovation (CSTI), The Cabinet Office of Japan.

¹³ The Constitution of Japan. Available via http://www.japaneselawtranslation.go.jp/law/detail_main?id=174.

As mentioned before, the European Parliament proposed a policy recommendation to urge the Commission to consider a specific legal status for AI/robots of allowing them having a legal personhood as «electronic persons», so they can have specific rights and obligations, such as making legal decisions to a third party independently¹⁴, it provoked discussion with pros and cons. If it is feasible, a key debate will be on whether AI robots shall belong to legal subject or object. It might be pointless for an electronic person robot to be a legal object, because it loses the capability to make a legal contract or to afford obligations from its own tort action independently. On the other hand, suppose robots belong to a legal subject then they shall deserve equivalent fundamental rights as human beings. Then, the constitution will have to extend its legal protection of the work right to robots. If so, those public policies of enhancing humans' ICT and STEM ability and job mobility will improve human's but invade robot's work right. Also, to create a safety net for human unemployment will violate the spirit of fair treatment to humans and robots.

I hold conservative attitudes towards giving AI/robots full legal personhood as legal subjects. Unless robots can have their own moral standing, it may disturb the stable order of ethics and trust established in human society. However, from the incident of an interactive humanoid robot «Pepper» attacked by a drunken individual in Japan¹⁵, many people may agree that only treating AI/robots as normal properties will not be enough in the near future, because we project our empathy to them from their affective social interactions. Hence, an alternative way is to recognize them as legal object but with extended legal protection, or the «Third Existence». In the history of law, there were some examples of Third Existence, such as animals. Animals are legal objects, some countries adore them a specific legal status that can't be casually mistreated by humans. A difference between animals and AI robots is that Third Existence robots are expected to make legal decision to a third party or to afford liabilities independently, they are more close to the blur boundary of legal subject and object comparing to animals. Some may argue that corporates are artificial legal subjects of making decision and affording obligation independently, but their decision making are always human in-the-loop. For recognizing robots to become legal subjects, we have to first overcome risks of human out-the-loop as well as the butterfly effects to the conflicts with current rules and regulations extended from the Constitution.

4.2. Labor Law

Its role is to realize the right of work from the Constitution by making concrete measurements to ensure working conditions of labors and proper relationships between workers and managers. In Japan, except to the «three laws of labor» – Labor Standards Act, Labor Union Act, and Labor Relations Adjust Act, there are a series of labor regulations like Labor Contract Act, Industry Safety and Health Act, Employment Insurance Act to provide workers a better work environment. We can see that the realization of the Constitution's right of work is presented as a complex taxonomy. This is because legal disputes include many labor issues: right to bargain collectively, right to organize, dispute right, etc. are never suspended, if the employment between workers and managers were to remain. However, when AI is incorporated into our work system, not only will new human-machine work ethics be created, but also the quantity of legal disputes between human workers and their employers will sharply be reduced. Even to agency workers some countries made specific «Agency Worker Act» in order to protect their fundamental rights. Compared to agency workers machines never complain and will not need human rights protection. In the long run, the labor law system will shrink into a simple taxonomy since there will not be so many labor disputes as today. Victims under this trend will be labor law professional lawyers.

¹⁴ See note 9.

¹⁵ LISA ZYGA (2015) Incident of drunk man kicking humanoid robot raises legal questions, TechXplore. Available via <https://techxplore.com/news/2015-10-incident-drunk-humanoid-robot-legal.html>.

4.3. Civil Law

In order to ensure the exercise of private rights and performance of duties that can be done in good faith, the Civil Code of Japan has specific rules for employment. Except for its legal obligations, workers engage in work and employer's payment of remuneration (Article 623), there are some other subordinated obligations, such as «Duty of Confidentiality», «Non-compete Clause» and «Safety Consideration Obligation». From an economic point of view, these subordinated obligations are unwanted costs to employers. If employers consider hiring more robot workers, they will not only be exempt from safety consideration obligations to deploy a safe work environment for robots, but also do not have to worry about robot workers leaking business secrets or joining competitors after resignation. As a result, current legal requirements from the Civil Code increase employer's incentive to hire robot workers, instead of human employees.

4.4. Social Security Law

The targets of Labor and Civil Laws are that workers have contract relations with their employers. Those who are not able to get hired in the competitive job market in the future are not applicable to these laws. Actually, the fundamental legal concern of unemployment in the era of AI will be social security.

For AI Safety, it could cover at least three kinds of issues. The first is existential risk. Some AI Ethics experts like NICK BOSTROM worry that the intelligence explosion might cause the birth of artificial superintelligence¹⁶. There will only be two options given by a superintelligence entity: either very good or super bad. In other words, it's like nuclear weapons. Once the risk has been triggered it will cause catastrophic disaster and threaten the survival of humanity. The second challenge of AI Safety is about human-robot interaction (HRI) safety. Suppose the threat level of existential risk is nuclear weapons, then the threat level of human-robot interaction risk is like a bomb. Robots are a physical extension of AI, or we may call it as embodied AI. It's unavoidable that some harmful actions might be taken by autonomous robots in daily human robot interactions. Nuclear weapons are dangerous, more than any other artificial weapons, but the chances of being attacked by nuclear weapons are low. Only Japan has been attacked by this method of warfare. On the other hand, we frequently hear news reports that terrorists are using bombs to attack people, causing death and injury. In the same way, we'll pay more attention to ensure proper HRI safety rather than paying attention to existential risk. The last AI safety issue is social security. It's similar to alcohol poisoning. The threats of automation to labor market is invisible, it causes the social problem without killing anyone.

The legal framework for social security includes (1) Social Subsidies and Pension; (2) Social Insurance. The former comes from government's tax revenues; it can be an efficient policy tool to solve short-term unemployment. One intriguing idea is the «robot tax» proposed by Bill Gates. Gates believes governments should charge tax to companies who use robots or autonomous systems. Then tax incomes can be used to postpone the speed of automation as well as to generate funds for training workers replaced by AI technology¹⁷. Although a similar idea for robot taxation was rejected by the European Parliament February 2017¹⁸, it is still an alternative way to strengthen the social security net under threat of AI. A worry for social security is not merely structured unemployment caused by AI, but also how it might threaten the operation of an annuity system. Unlike business insurance, which is optional, social insurance should be compulsory. People who qualify for the requirement should participate in social insurance. That way, it can enable risk sharing via the law of large numbers. Suppose AI causes many people to become jobless, a whole population of workers is going to be reduced. Even those who survive the first wave competition with AI may not escape the second wave crisis of

¹⁶ NICK BOSTROM (2014) *Superintelligence: Paths, Dangers, Strategies*, Oxford Press.

¹⁷ KEVIN J. DELANEY (2017) The robot that takes your job should pay taxes, says Bill Gates, Quartz. Available via <https://qz.com/911968/bill-gates-the-robot-that-takes-your-job-should-pay-taxes/>.

¹⁸ Unsigned Editorial (2017) European parliament calls for robot law, rejects robot tax, Reuters Available via <http://www.reuters.com/article/us-europe-robots-lawmaking-idUSKBN15V2KM>.

their annuity after retirement, with the shrinking population of survived workers it will be difficult to support the social insurance fund.

5. Conclusion

The impact of AI and employment can be defined as one of AI safety critical issues. Through comparative policy debates, it helps us to know many big concerns of social impacts from AI to the future of our work. The outcome of our legal analysis also reveals that current laws for employment will be insufficient when faced with the AI revolution. Thus, future revisions to our existing legal systems will need to happen.