Artificial Intelligence and Society:

Towards New Paradigms of Social Inequality

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In recent years, major breakthroughs in artificial intelligence (AI) technology have allowed for its rapid diffusion into both the working and commercial sectors of first world societies. Even as I write, millions are using Google's search engine algorithms, while others are travelling on self-driving public transit and using face-recognition software on their smartphone cameras. There is little doubt that AI is making us more efficient and innovative. Nevertheless, some experts have suggested that perhaps "there is a tendency toward excessive optimism when making decisions involving technology" (Clark, Robert & Hampton, 2015, p. 2). In other words, are the successes of using AI causing us to overlook the more nuanced repercussions?

The present thesis is that, due to the nature of contemporary AI techniques and practices, inequalities in the form of income, political influence, and information control will continue to develop. There has been a significant lack of discussion on the correlation between these inequalities and AI itself, and in many cases AI has been addressed as merely a subset of technology. Hence, this essay will address how AI techniques, in isolation, directly promote division in society. I have identified two aspects of AI that may give rise to these inequalities: one being the matter of job automation, and the other is big data collection for machine learning.

Job Automation and Income Distribution

In their book titled *The Second Machine Age*, MIT economists Erik Brynjolfsson and Andrew McAfee (2014) pointed out that median wages have been in steady decline in the United States, despite having increased alongside technological advances for almost two centuries. In 1999 the median income was $54,932, but by 2011 it had fallen roughly 10 percent to $50,054

(pp. 128-129). Moreover, despite an overall increase in average income between 1983 and 2009, "the bottom 80 percent of the income distribution actually saw a net *decrease* in their wealth" (p. 131). In other words, only the elite 20 percent had reaped the rewards of technological advances during that time period. What these statistics show is that income inequality has been growing, and in this section I will show why AI technologies have a significant role in driving this economic rift.

From a simple economic perspective, the incentive to automate human jobs is driven by the desire to improve output while reducing the input resources. By streamlining human cognitive abilities with digitization and computational power, AI technologies have been able to produce more output per worker in terms of quantity and quality. But if AI technologies have been creating more wealth, why are median wages not rising? The issue, it seems, is that generating wealth does not necessarily guarantee equal distribution of it – this is especially true if paid workers could be reduced. For instance, Brynjolfsson and McAfee showed that the creation and maintenance of AI software such as TurboTax, a tax preparing software, takes only "a relatively small number of designers and engineers", in contrast to the "tens of thousands of tax preparers that now find their jobs and incomes threatened" (p. 130). The major increase in productivity due to AI techniques means that entire markets can be dominated by small innovative groups, leaving the previous businesses with little chance for competition.

In addition, MIT Professor of Economics David Autor (2015) argued that routine tasks, such as clerical work and repetitive physical work in fixed environments are more prone to AI automation than skills "demanding flexibility, judgement, and common sense" (pp. 11-12). This is supported by research from economists Nir Jaimovich of Duke University and Henry Siu of the University of British Columbia (2012) that showed that these routine jobs have fallen by 11

percent between 2001 and 2011, whereas non-routine work comprising of both cognitive and physical labor rose by around 22 percent (p. 8). It then follows, that job automation has led to a net polarization of labor demand towards both the highest and lowest paying occupations. That is to say, due to the selectiveness of jobs that can be automated, current AI techniques are pushing workers to both extremities of the income spectrum; thus resulting in less middle-ground between the affluent and the poor. Another implication is that if particular jobs are being replaced, then the skills for the job are also devalued. In some cases, a displaced middle-class worker is able to apply their previous skills to other fields, but it seems more likely that they will be inclined to settle for lower income work.

Hence, the above arguments seem to indicate that AI implementation has been favoring the capital owners, at the expense of the rest of society. Nevertheless, some such as Polytechnic University of Bucharest Professor of Economics Ana Neagu (2015) have contended that AI, in the form of assistive technologies such as certain prosthetics and healthcare advances, create greater job equality for the less fortunate; leading to "higher self-esteem, capacity to earn own money, some independence, wage gains, aggregate cost savings and improved control over resources" (p. 403). While I admit that there have been some improvements for workers with disabilities, on a larger scale the statistics are showing increases in inequality for all workers, not simply those with disabilities. Consequently, these mitigating effects have been fairly insignificant in the face of an overall increase in inequality as a result of AI use in the workplace. In fact, it is also possible that income inequality due to AI integration into the workplace is only a first-order effect. Some studies have shown that there is a tendency for the affluent to have greater political sway in countries that maintain high levels of economic inequality such as the United States (Rosset, Giger & Bernauer, 2013, pp. 829-830). If that is true, then rising

economic inequality due to AI may translate into further inequalities in political influence,

thereby widening the existing chasm between the social classes.

Machine Learning and Data Collection

Recent AI algorithms have implemented methods of "machine learning", a process that

trains machines through statistical analysis of large amounts of data. Thus, there is now great

innovative and economic incentive to store vast amounts of human data that may support the

development of new AI algorithms (Ford, 2015, p. xv). To illustrate, one may consider the

dependence of the Google search engine, personalized advertisements on Facebook, and video

recommendations made on YouTube and Netflix on the personal data that we supply. Previously

trivial or otherwise abstract, nonsensical data, such as writing habits[1], are now rapidly gaining

relevance and value. It would seem inevitable, therefore, that as AI algorithms become more and

more complex, the more closely the behavior of each of us will be scrutinized. In fact, we may

find that we are increasingly losing aspects of privacy as more and more companies compete for

more consumer information.

Yet one might argue that the data is likely to be just a string of various numbers and

symbols in a sea of data, not intended to be accessed in isolation. The issue with this view is that

it assumes that data will still be used in the same way in the future. If we are cynical, we may

point to the flaw that AI algorithms can only be as ethical as their designers (Crnkovic &

Çürüklü, 2011, p. 68). Alternatively, we may also consider the recent terrorist attacks in Paris. If

profiles of individuals potentially related to the terrorist groups could be accurately determined

using the collected data, then perhaps the creation of personal profiles may be justified. Hence,

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[1] For example, the auto-correcting algorithm in smartphones stores words and phrases frequently inputted by users.

the concern is that as long as the data exists, there is the vulnerability of exposure. If somehow

your less flattering personal data could be accessed by a potential employer, needless to say you

will be impacted. Moreover, it should not take another major eBay data leak for us to realize the

danger of identity theft (Wakefield, 2014, para. 19).

There may also be much more at stake in a metaphysical sense. In his book titled *The*

Ethics of Information, Oxford Professor of Philosophy and Ethics of Information Luciano Floridi

(2013) argued that the loss of privacy is effectively the loss of identity:

> Privacy is nothing less than the defence of the personal integrity of a packet of
>
> information, the individual, and the invasion of an individual's informational privacy, the
>
> unauthorized access, dispersion, and misuse of her information … is disruptive …
>
> because our information is an integral part of ourselves, and whoever owns it possesses a
>
> piece of ourselves, and thus undermines our uniqueness and our autonomy from the
>
> world. There is information that everyone has about us, but this is only our public side,
>
> the worn side of our self, and the price we need to pay to society to be recognized as its
>
> members. (p. 260)

As Floridi showed, the consequences of losing privacy are rather grim. There is an unequal

distribution of information control, and to a certain extent, political influence in regards to who

has access to, and is able to use the stored information – and this may very well undermine the

individual's sense of identity.

Conclusions and Future Research

The situation today is that we are heading towards greater differences in income, political

power and access to information due to AI use. Income inequality is worsening largely due to

transformations in labor demand as less workers (especially of the middle-class) are needed, whereas capital owners may increasingly have control over consumer privacy due to the need for greater amounts of human data, whether it is to fuel new innovation or for commercial gain. The alternative, of course, is to not use the services. But in the case of both job automation and user privacy, it seems that this route may not be very feasible – the benefits of AI have revolutionized the way we live, and it may not be so easy to abandon them. But the future may not necessarily be so bleak. My personal view is that as long as sufficient legal boundaries are provided to address the sudden rise of AI in the social and economic sectors, we may be able to mitigate the negative impacts AI may have on society. In this case, more research is needed in regards to how laws might be designed such that we can maximize the benefits of this innovating potential, as opposed to being limited by it. Furthermore, as a relatively young subject, AI developments should continue to be observed in regards to their socio-political impacts. Ultimately, these concerns should not discourage continued AI developments, but rather serve as a reminder that we should remain vigilant towards the potential repercussions of our actions in an age of rapid development.

References

Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. *Journal of Economic Perspectives*, 29(3), 3-30. doi:10.1257/jep.29.3.3

Brynjolfsson, E. & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies.* New York, NY: Norton.

Clark, B. B., Robert, C., & Hampton, S. A. (2015). The technology effect: How perceptions of technology drive excessive optimism. *Journal of Business and Psychology*. doi:10.1007/s10869-015-9399-4

Crnkovic, G. D., & Çürüklü, B. (2012). Robots: Ethical by design. *Ethics and Information Technology, 14*(1), 61-71. doi:10.1007/s10676-011-9278-2

Floridi, L., & Oxford Scholarship Online. (2013). The ethics of information. GB: Oxford University Press. doi:10.1093/acprof:oso/9780199641321.001.0001

Ford, M. (2015). *Rise of the robots: Technology and the threat of a jobless future*. New York, NY: Basic.

Jaimovich, N., Siu, H. E. (2012). Trend is the cycle: Job polarization and jobless recoveries (Working Paper No. 18334). Retrieved from National Bureau of Economic Research website: http://www.nber.org.ezproxy.library.ubc.ca/papers/w18334

Neagu, A., & Mateescu, L. M. (2015). Promoting equality through assistive technologies, a socioeconomic perspective. *SEA: Practical Application of Science*, 1 (7), 401-406.

Rosset, J., Giger, N., & Bernauer, J. (2013). More money, fewer problems? Cross- level effects of economic deprivation on political representation. *West European Politics*, 36(4), 817.

Wakefield, J. (2014, May 23). eBay faces investigations over massive data breach. *BBC News*. Retrieved from http://www.bbc.com