Human Capital and the Future of Jobs

Global Public Policy in the Age of Artificial Intelligence and Robots

Preliminary Draft

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Abstract

Since its origins in the 1950s, the field of Artificial Intelligence (AI) has developed from a mere promise into a reality that is at the same time fascinating and threatening. Early tasks carried out by AI programs included pattern recognition, natural language processing and game playing and overall their performance rarely attained human capacities. Later, so-called expert systems started to be used to assist business, actuarial and medical practices among others. In the recent years, AI has known an extraordinary development and, combined with the development of robots and massive databases, is being applied to a myriad of areas of human activities. Looking at the future, some specialists fret that AI entities might surpass our own intelligence in all of its complexity and start to actually think, in which case they might wonder whether we humans are of any utility within their scheme of things.

Without going that far, though not denying the importance of that threat, this paper will look at a more mundane and immediate issue, namely the potential replacement of human workers by AI programs and robots. In a socially equitable world that prospect would be generally positive, given that wealth creation would go on and humans could devote their time to leisure and other activities. However, in the capitalist system where we all live, the

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outcome of such substitution would lead to mass unemployment, increase in income distribution, and rising poverty. The paper will discuss economic and social issues arising from what is indeed a current trend, both in a national and international context, and national and global public policies to deal with them. In particular, it will dwell on the need for investment in the human capital of individuals so that they will be able to develop other productive lines of activities which could not easily be substituted by AI programs and robots.

1. A Human-Centered View of the Economic System

An economic system, according to the simplest conventional view, operates as a black box with inputs and outputs. Inputs include, most importantly, capital (machinery, infrastructure among others) and labor. More detailed descriptions will allow for a set of interconnected black boxes where intermediate goods are outputs of some of them and, at the same time, inputs for others. Goods may be transient (quickly disappearing in the process) or durable. Still, there still will be primary inputs (capital and labor) and outputs which are, of course, final consumer goods. The description also allows for the introduction of technical progress.

Of course, humans are contemplated in this description in a variety of roles: explicitly as providers of human labor and implicitly (though not a logical implication of the description) as consumers of the goods and owners of the black boxes. But they are not central to these processes and, theoretically, their participation could be eliminated.

Another description is possible, one where the system, instead of being centered on goods is centered on humans. In this alternative description, the totality of our human qualities, labor force, knowledge, creativity, even our dreams, become inputs in sequential transformative processes that include, of course, the production of “intermediate” and “final” goods, but also the reproduction of humans. The system ceases to be purely economic and is a description of the world as an endogenous system working through time with no initial inputs nor final outputs except possibly for our planet earth as substrate and human welfare as a manifestation of the working of the system. It must be noted that this description is also well suited for the introduction of issues related to the conservation of our environment.

2. Robots and Artificial Intelligence

Throughout the ages civilization has led us to improve in the ways we do things, in particular production processes. Increasingly sophisticated tools, elaborate methods and techniques, new technologies and machinery, all of them contributed to large increases in productivity. In the process many activities that used to be carried on by people ceased to exist as human activities, either becoming unnecessary or because they were executed by machines or animals. Whenever this happened there was fear that those people involved in those activities would become redundant. And indeed, that happened often, given that converting to another activity takes time and some people are not good at that kind of change especially later in life. However, over the longer term, new activities emerged, employment was not affected and, overall, societies benefited from those changes (although in the short-term losers were not compensated).

The current wave of innovation, incorporating robots, big data, and artificial intelligence (AI), the so-called "Industry 4.0", has a much wider scope than previous technological revolutions. Already it is apparent that some important activities as diverse as truck drivers and radiology specialists will become obsolete in the near future. AI in particular has the potential to render obsolete high-skilled workers. Theoretically, any human productive activity could at some point be "better" executed by machines or programs, thus making human work largely unneeded for production purposes.

These potential prospects raise several fundamental questions. Is this what we really want? Or are there some activities, such as intellectual and artistic production, that we wish to maintain as a (not necessarily exclusive) human preserve? Even if total physical output were to increase as a result, would this lead to unemployment and an increase in income distribution inequalities? The rise in the presence of AI would not lead to human loss of control of the economic system? And, most disturbing, increasingly sophisticated AI entities could not become sentient and reach conclusions inconsistent with our continued existence? Hard and existential questions that are being voiced everywhere, not only in academia but also in government and by prominent entrepreneurs (representative references are the proceedings of a conference by Agrawal et al (forthcoming), the report to the President of the US (US, 2016), and the recent Founders' Letter by Alphabet's CEO Sergey Brin (Brin, 2018)).

3. A Role for Policy and Action

A substitution of humans by intelligent machines and programs would create an entirely different economic system from the one we live in now as described in the first section above. At any rate, humans would no longer be at the center of the economic system. In the best scenario, assuming wealth and income generated are fairly distributed, humans would not need to care about the economy and could devote their time to leisure and other spiritual endeavors. In the worst scenario, inequalities within and among countries would rise to new levels and the world would move towards a dystopian future of the sort described by many sci-fi movies. Although one the scenarios is worse than the other, both would result in the loss of control over our destiny and would put at risk our future as a species.

There is of course no uniform set of views over these issues. Some entrepreneurs, perhaps most of them, are enthusiastic about higher profits and aa world where they would no longer have to deal with unreliable and over-demanding workers and where everything works well. As the vast literature already extant on the subject shows, economists are divided about the implications of what is now only a trend. Scientists are generally apprehensive and some of them are quite worried indeed as witnessed by the Open Letter signed by more than eight thousand scientists and other personalities (Russell et al). Given the complexity of the issue and its global character this diversity of views and opinions is only natural. And it is precisely this sort of complex issue that demands global decision structures that allow for the participation of all interested parties.

4. Concluding remarks

Progress cannot be stopped and advances in artificial intelligence and other areas of information and communications technology (ICT) will continue. Those advances have already an observable impact on our way of life, social conventions, political life, and nearly all sorts of human and social endeavors. Combined with the advances in other areas such as biology and nanotechnology, just to mention the most visible, they have the potential of transforming not just our world but ourselves, both as individuals and as social beings. It would be useless and shortsighted to try to curtail this potential and to deny ourselves the chance to move to another stage in the progress of our civilization. But we are certainly entitled to select a path that is consistent with the ideals of freedom and global equity and to oppose ways that will privilege short-term interests of a few.

In conclusion, the view in this paper is that we should promote decision structures that represent all segments of our vast global society to confront the complex issue of how best to take advantage of advances in AI. Could this be an opportunity for humanity to reinvent itself and to enter a new period of renaissance where its creativity would be fully unleashed?

References

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