ARTIFICIAL INTELLIGENCE: A Job Destroyer?

A Wikistrat Crowdsourced Simulation

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Artificial Intelligence: A Job Destroyer?

Technological innovations have often destroyed jobs, but they usually create new ones as well. In Wikistrat’s recent “Artificial Intelligence: Friend or Foe?” simulation, we found that although such technology promises many benefits, it also could indeed destroy jobs requiring routine cognitive skills – thus leading to a further hollowing out of the middle class in developed countries and exacerbating income inequality. Furthermore, our analysts predicted that governments will intervene in response to dynamics set in motion by artificial intelligence (AI) development – e.g., deflationary spirals, greater unemployment and even social unrest.

AI OFFERS MANY PROMISES…

IBM recently announced that its AI engine (dubbed Watson) would soon be analyzing medical records to assist in diagnosing illness and prescribing treatment. Software for this purpose has existed for decades, but first-generation AI was based on hand-coded software that encapsulated expert opinion on a narrow subject. Watson and other modern AIs use machine learning to analyze vast quantities of diverse information in order to discover patterns not yet recognized by any human experts.

In medicine, this could mean not just prescribing treatments that usually work best for a set of symptoms, but applying uniquely customized treatments that work best for individual patients exhibiting these symptoms. Without “big data” and powerful computers to analyze it, such personalization is prohibitively difficult to achieve.

An indication of data size: IBM is collaborating with the Cleveland Clinic, which has data on 50 million patients. In envisioning this data flow, Virginia Rometty, IBM’s CEO, predicts that conventional medical records will constitute a mere 10 percent of the relevant data in any person’s medical record, with individual genomics encompassing another 20 percent and the remainder – 70 percent – derived from real-time monitoring of the body via the “Internet of Things.”
Society spots a glimpse of this future in the increasingly popular fitness devices worn by individuals as they exercise. In just a few years’ time, everyone’s smartphone or watch will perform such monitoring passively, and the nation’s medical system will literally be tracking society’s health on both an aggregate and highly intimate level. This will lead to a lengthy legal and legislative struggle on a global scale to redefine the meaning of personal privacy amidst these developments. Yet the clear potential to both prevent costly medical interventions either too late or after the fact will drive medical and insurance providers to aggressively pursue this technological pathway. As for the individual, increased longevity at higher levels of health is the obvious attraction.

Medicine is but one of many fields that will leverage modern AI to recast their operational structures, products and service delivery.

- Police departments already use crime statistics to allocate resources, but as of yet only periodically and in a retrospective manner. AI will analyze conditions that foretell crime and use real-time monitoring of those environments to prospectively deploy resources to where crimes will most likely occur.

- Self-driving vehicles will drastically reduce deaths and injuries from human-caused accidents, making car-sharing a widespread social practice. Smart routing of those vehicles will eliminate traffic jams, making shared rides all the more attractive and subsequently reducing the number of private cars on roads.

- Al tutors will detect the cognitive areas in which a student is struggling, allowing them to present customized lesson plans shaped by big-data learning of what works best with students of a similar background and achievement level.

- Smart land and sea mines already analyze their environment with sensors to determine when to attack. Making them mobile effectively turns them into unmanned vehicles. Military drones operating in all domains will be upgraded with AI to allow for autonomous targeting, permitting their operators to hunt and kill without being exposed to danger.

### … BUT AI CREATES NEW CHALLENGES

The notion of killer robots induces revulsion in many people, and international bodies are already contemplating ways to outlaw them. Besides the moral and legal quandaries surrounding a machine serving as judge, jury and executioner, experts fear that by making war essentially bloodless for the aggressor, the threshold for starting a conflict will be dramatically lowered.

Success in machine learning depends on the availability of big data. But big data is of great proprietary value to those commercial entities that capture it. Amazon, for example, doesn’t want to share its customers’ preferences, while Google doesn’t want to divulge its users’ interests.

Smart medicine depends on data sharing, and the Affordable Care Act offers incentives for providers to embrace Electronic Medical Records (EMRs). Some hospitals, however, will increasingly recognize the value of the data and may become reluctant to share what they view as a competitive advantage. Meanwhile, the vendors of EMR systems offered physicians to make their proprietary systems non-interoperable – also for competitive reasons. By acting in this way, medical enterprises will make it harder for physicians to switch systems and for patients to switch physicians.

As is widely anticipated, the biggest challenge arising from advances in AI will be its effect on employment. History is replete with such examples – e.g., construction machinery and factory automation reducing the need for manual labor. Until now, however, as economies have advanced, those losses have been largely offset by the shift to service professions that typically require more education. With Al now on the rise, the need for routine cognitive skills in virtually all enterprises is likely to fall sharply.
Of course, any technological progress tends to make certain jobs obsolete even while innovating new ones. The real social issues are the net loss and if/how displaced laborers reintegrate themselves into the altered economy.

The development of self-driving vehicles is a case in point: In the U.S., there are about three million truck drivers and another million taxi drivers, bus drivers and chauffeurs. Except for those relatively few deliverymen who make multiple residential stops, these jobs face extinction. Where will the new jobs be created? Indeed, the cost of the sensors, actuators and microprocessors required to make a vehicle self-driving will only be a few thousand dollars – less than a driver’s salary for a month or two.

This argument applies to most forms of automation, and is typically applied when its cost becomes less than the price of the labor it replaces. Because the cost of automation is overwhelmingly defined by the cost of the labor required to produce the automating apparatus, fewer jobs are gained in producing that apparatus than are lost by its application. Even more intimidating: The cost of the intellectual property in an AI application is spread over many competing enterprises, providing the vendor who sells the most with a cost advantage that inevitably leads to winner-take-all dynamics.

Consider the wider rippling effects: Job losses caused by self-driving vehicles won’t be confined to professional drivers. While passengers will be blessed with fewer accidents, many body shop repairmen and insurance adjusters will lose their livelihood. Total insurance premiums and payouts will go down, as will the profits of insurance companies – but ancillary service providers will see their ranks dramatically thinned out. Those insurance companies will also shed workers. Because automobile accident liability will no longer be purchased by individual drivers, but will instead become product liability insurance purchased by a handful of vendors, the hundreds of thousands of employees engaged in the sales and servicing of individual car liability policies will no longer be needed.

Besides job losses pervasive throughout manufacturing, many service fields will suffer great disruption from AI. Teaching is a prime example. Although some human contact is desirable, particularly in the elementary grades, an AI tutor that not only assesses a student’s knowledge and difficulties but also learns from other AIs with similarly challenged students can do the work performed by many teachers and teaching assistants.

AI will prove disruptive even in the most intimate of services. For example, as developed-country populations age, this vast elder cohort will demand increased services from aides who provide companionship and basic housework. But one look at how aging Japan plans to tackle this issue suggests that increasingly capable AI-driven robot “companions” will effectively compete for many of these jobs.

**A POSSIBLE UNHAPPY FUTURE**

As AI displaces laborers, their diminished opportunities will undermine their collective bargaining power (as in the slow death of unions), leading to ever lower wages for those who are still employed. Meanwhile, the rewards of higher productivity will go to the holders of capital: namely, those with financial capital to equip smart factories and businesses, and those with the intellectual capital to make AI work. This will increase wage disparity and further hollow out the middle class – which defines social and political stability in market democracies.

At this point, our dystopian storyline bumps into a dangerous conundrum: If the vast bulk of consumers are impoverished, then who will buy the products and services that AI helps produce? If displaced workers are so marginalized, then demand will logically plummet. Perhaps prices will stabilize at a lower level, but if the displaced workers have no purchasing power, the deflationary cycle may continue and output will fall. Better and cheaper goods and services delivered by AI will naturally engender new economic activity, just as the introduction of the automobile displaced

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horse-stable attendants but increased travel and demand for road construction and motels. In other words, the line between work and leisure is to be redrawn in favor of the latter. But such a best-case outcome is far from guaranteed.

PREVENTING THE WORST CASE

In historical terms, economics and convenience consistently trump protectionism. Today we see Uber disrupting the taxi industry, while traditional car dealerships fold from the competition of online and direct sales by manufacturers. Occupations anticipating such disruptions tend to seek regulatory protection through schemes such as occupational licensing and other governmental interventions.

As such, it is logical to forecast a similar attempted protectionism aimed at AI applications in the coming years. For example, prudence demands that early self-driving vehicles have a standby driver to manage contingencies, and unions will likely resist lifting this requirement even after the vehicles have proven themselves. Organized labor won’t go down without a fight – but down it will go.

Still, even if AI-enabled machines can provide most needed goods and services, markets will arise for strictly human-provided services, just as “hand/home-made” oftentimes commands a price premium today. A good example is the tremendous rise of the craft beer and liquor industries. Even with the expansion of previously niche markets, the wider labor/consumption quandary will remain: Even if the vast majority of workers occupy themselves by providing services to one another, where can they earn the money to buy the products being produced by these AI-enhanced factories which provide little employment?

Governments will naturally attempt to provide jobs that serve the common good, like those engineered by the Roosevelt administration during the Great Depression in America (e.g., the New Deal’s various public works programs). But this strategy will be opposed by the wealthy – as it was during the 1930s – as an unjustified wealth transfer to the poor. Furthermore, funding such a strategy would require taxing capital as well as income due to the decline in mass employment.

In the end, new economic models of distributing the fruits of production will have to be considered. In times past, when labor was a significant input to production, it made sense to reward labor with money that could be exchanged for some of those fruits. But if the labor input required for the production of those fruits substantially declines, what is the appropriate distribution mechanism?

Minimum wages and refundable tax credits have been used to reduce the misery of the working poor and to increase aggregate demand to keep the economy going. Some decry these policies as unjustifiable wealth transfers, but the social pressure thereto is likely to mount. If a substantial segment of society cannot find meaningful work, and government is unable to provide enough jobs itself, popular support for schemes like a basic income can be expected to rise.

This may prove too radical for the United States, at least in the short term, but other Western economies could move in this direction. Two recent examples suffice: Enough Swiss petitioned for a “basic income” constitutional amendment to force a national referendum, while a recent poll of newly-elected members of the Finnish Parliament found that more than half favor such a social guarantee.

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3 Benjamin Shingler, “Money for nothing: Mincome experiment could pay dividends 40 years on”, Al Jazeera America, August 26, 2014
5 Joanna Perkiio, “FINLAND: More than half of the new MPs support basic income”, Basic Income Earth Network, April 25, 2015
The notion may horrify conservatives and businessmen, but free-market champion Milton Friedman embraced the idea, calling it a negative income tax.\textsuperscript{6} Ironically, many of the libertarians who favor basic income do so on the basis of efficiency. One easy-to-administer government program would replace dozens of overlapping means-tested policies.

\textsuperscript{6} Milton Friedman, \textit{Capitalism and Freedom}, The University of Chicago Press, 1968
ATTRIBUTIONS

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Written by:
Dr. Bruce Wald

Edited by:
Steve Keller & Christian Scheinpfug

This report is based on the collaborative effort of 61 Wikistrat analysts held in April 2015.