How Artificial Intelligence Affects the Work Force

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February 19, 2016

This White Paper was written for WR 1011 at Worcester Polytechnic Institute

1 Introduction

"Advanced Robotics", or in other words, artificially intelligent machines (AI), was identified by the McKinsey Global Institute as one of seven emerging technologies they expect will have a one trillion dollar or greater impact on the economy.[1] Given McKinsey's prediction, AI will significantly influence much of the world economy. However, the impact of these changes on employment, wages, and productivity remains to be seen. Much of the impact of AI will depend on how well executives prepare their companies for the changing circumstances.

In a *NarrativeScience* study, over 90% of respondents said that their company uses AI primarily for automation.[2] In general, intelligent machines are used for automating repetitive tasks. The present economic impact of AI is clear in the manufacturing industry. Employment of manufacturing workers costs around $6 trillion, representing 19% of global employment costs.[1]

With the advent of true AI, much more sophisticated work will be able to be automated by machines. A truly intelligent machine would be able to replace most knowledge workers. That is, people whose job it is to think. This includes academics, engineers, insurance underwriters, lawyers, teachers, and physicians. The projected economic impact to knowledge workers could be even greater than in the manufacturing industry. Approximately $9 trillion is spent on employing knowledge workers, representing 27% of global employment costs.[1] Experts at McKinsey predict that autonomous tools will be able to do the work of 110 to 140 million full time employees by 2025.[1]

As is usually the case with emerging technology, corporate executives have two options: resist, or adapt. In this scenario, it seems advantageous for those involved to adapt. True AI is inevitable, and any company that refuses to adapt to the changing circumstances will be unable to compete in their market. Furthermore, if effected companies determine how to best use these tools (which do the work of 110 million people) in unison with the employees they have now, their productivity will increase exponentially.

2 Types of Intelligence

Current applications of AI can be seen in airport kiosks, Siri, and Google's autonomous car. Yet, it is difficult to define exactly what artificial intelligence is. AI can be categorized into three distinct groups: Dumb intelligence, simulated intelligence, and true intelligence.

> Dumb Intelligence: These machines automate a simple task, usually by requesting data from a user and performing a task based on that data; hence, the oxymoronic name "dumb" intelligence. A simple example of this type of AI is an airport kiosk used to check in before a flight. They are not intelligent at all, they just follow a simple computer program. However, they are well known and relevant to the discussion of AI.

Simulated Intelligence: These machines analyze the data that they receive in a way that makes them appear intelligent. For example, a GPS can find a route between two points, and even figure out what to do if there's a detour along the path. However, in reality it is just a simple algorithm processing a relatively small amount of data.

True Intelligence: The machine should be able to perform some action, assess the consequences of its action, and, ultimately, learn from its successes and failures.

Figure 1 shows results from a *NarrativeScience* survey of 200 C-Suite executives about what they believe constitutes artificial intelligence. Respondents worked in a range of fields including technology, health care, and finance. Almost one third of people surveyed believe that artificial intelligence is a combination of the things listed in the graphic on the following page.

The ability to learn and adapt is the hallmark of AI. However for AI to feel "real" to most people, it must be able to communicate in a reasonable manner. All of these components will come together in the next few decades as artificial intelligence continues to advance.

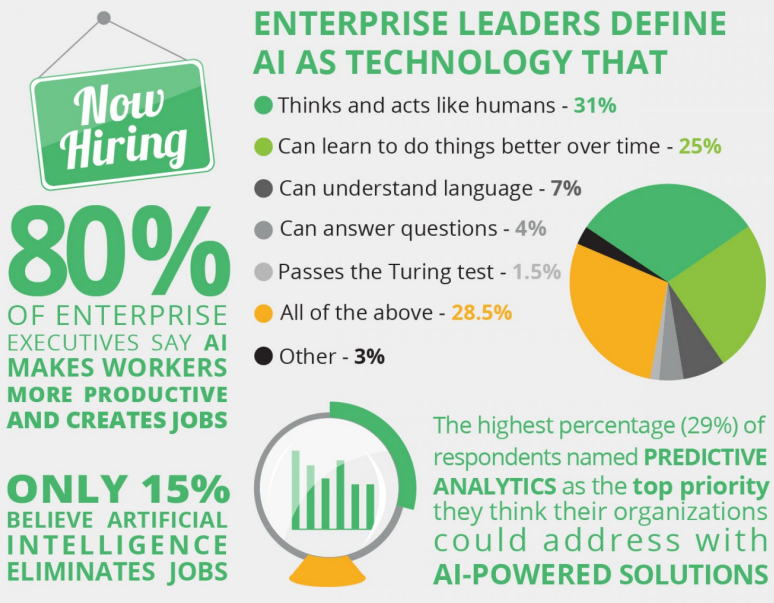

Figure 1: Enterprise leaders are surveyed on their perceptions of AI in the workforce. **Source**

3 Current Effects

According to *NarrativeScience*, "only 15% [of people surveyed] believe that AI eliminates jobs".[2] This statistic may initially appear counter to popular opinion. A Google search using the key words "Artificial Intelligence Destroys Jobs" produces more than a half million articles. However, this particular study from *NarrativeScience* found that corporate leaders believe that AI may actually play a very positive role in the workplace. As the *NarrativeScience* report wrote,

> "...many executives are learning that AI-powered solutions can step in to solve the data-use and comprehension problem, provide a competitive advantage, free their employees to focus on strategic initiatives and even create jobs."[2]

While this outlook is more positive, other studies still believe that AI has the potential to hurt the job market. Figure 2 compares the labor productivity in the US to the relative level of private employment. There is a strong correlation between both factors until the early 2000s, where the trend stops. Many economists, including Erik Brynjolfsson, believe this could be cause for concern. In an interview with TechRepublic, Brynjolfsson commented on this trend:

> "Unlike much of the 20th century, we're now seeing a falling ratio of employment to population ...[we think] that many of the underlying trends in technology are likely to accelerate this so its something we need to pay some serious attention to."[3]

Figure 2: Labor Productivity vs. Private Employment. **Source**

It is difficult to claim that AI was the sole cause for the disparity between labor productivity and private employment. Indeed, it is difficult to single out the effects of AI, especially because it is such a new development. The results of the *NarrativeScience* study should be more closely considered. Even if, and in some cases, especially if, AI reduces employment and increases productivity, companies which utilize AI will have an advantage over their competitors who do not.

4 Collaboration of Man and Machine

If companies are to improve their productivity by introducing intelligent machines to the workplace, how can these machines and humans best collaborate? More importantly, what will be the place of humans in the workforce, with robots doing a lot of the work that humans do now?

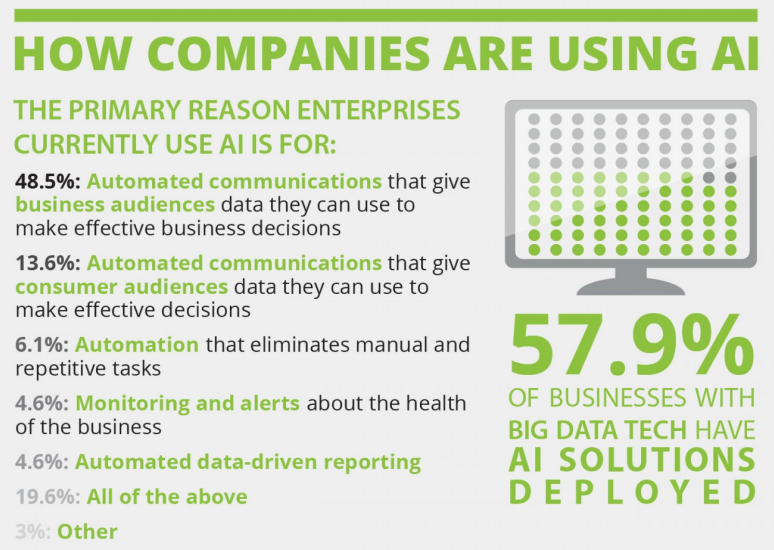

Figure 3: Over 90% of companies surveyed currently use some form of AI for automation. **Source**

Figure 3 highlights another statistic from the *NarrativeScience* study referenced earlier. They found that over 90% of respondents use AI primarily for automation. Many repetitive, mundane tasks can easily be done by intelligent machines. However, soon they will be able to take over more complex tasks as well.

Journalists Martin Dewhurst and Paul Willmott of McKinsey & Company speculated that human workers "...will be able to make the biggest difference through the human touch."[4] In other words, humans will be needed to analyze the findings of intelligent machines and make critical decisions, like deciding the direction for the future of the company.

There is also a basic need in industry for soft skills, which Dewhurst and Willmott believe robots will never attain. At least in the foreseeable future, it is difficult to imagine humans willingly taking orders from a robot. Similarly, it seems unlikely that a robot leader could inspire the same drive into workers as a human leader. Emotion will likely be one of the most difficult things for intelligent machines to capture. Even once they do, conveying it in a way that is received well by humans is a whole other battle. Ultimately, the integration of AI will likely be similar to many other technological advances; it will change the way we work, but won't replace us.

5 Moving Forward

Alert the presses, yell from the rooftops, robots are *not* coming for your jobs. While it may seem that intelligent machines are going to replace us, a machine is as likely to replace the human worker as a printer is. On one hand, a printer takes the job of a scribe who would have written the documents that it now prints. On the other hand, it frees up humans to do more important work. This is what intelligent machines will one day do as well.

Business leaders need to prepare their companies to adapt to changing tides, understanding that the role of humanity in the workforce is changing. However, humans will always have skills that robots do not. Eighty percent of respondents to the *NarrativeScience* study believe that "AI improves worker performance and creates jobs."[2] If executives determine how to integrate AI and human workers in their company, there will be a twofold effect. First, it will keep most people employed, making money, and contributing to a healthy economy. Second, it will make our companies more productive, further stimulating the economy.

6 Citations

[1] James Manyika, Michael Chui, Jacques Bughin, Richard Dobbs, Peter Bisson, and Alex Marrs (May 2013). "Disruptive technologies: Advances that will transform life, business, and the global economy" *McKinsey&Company.* **Link** Last Accessed 2/11/16
Note: Some of the statistics I use are from the full report. There is a PDF download link to it on the webpage linked above.

[2] NA (2015). "2015 State of Artificial Intelligence & Big Data in the Enterprise" *NarrativeScience.* **Link** Last Accessed 2/11/16

[3] Heath, Nick (ND). "Why AI could destroy more jobs than it creates, and how to save them" *TechRepublic.* **Link** Last Accessed 2/11/16

[4] Martin Dewhurst, Paul Willmott (September 2014). "Manager and machine: The new leadership equation" *McKinsey&Company.* **Link** Last Accessed 2/11/16