

## ARTIFICIAL INTELLIGENCE IN THE WORKFORCE

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### INTRODUCTION

Ever since the Industrial Revolution, when humans went from hand production methods to the rise of factory and machine systems, evolving technologies have stirred fears as well as excitement. When you hear about technology innovations, how do you feel? If you use a smartphone digital assistant, email program that sorts entries by importance, voice recognition system, or digital or virtual assistants (i.e. Amazon Echo and Google Home), you are using Artificial Intelligence (AI) technologies. This Tech Insight provides an overview of AI and machine learning (ML), the differences, the influence that AI and ML are having on the workforce, and the impacts that they can have at the Department of Veterans Affairs (VA).

### OVERVIEW

[AI](#) is the science and engineering of making intelligent machines, especially intelligent computer programs. The term dates back to the 1950s when John McCarthy, a math professor at Dartmouth College, described how “every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it.” Improvements in computing power in the past five years have brought about a revolution in AI, with companies like [Alphabet](#), Amazon, Apple, Facebook, and Microsoft investing heavily in AI. AI systems adapt, predict, and act autonomously while using model-driven systems that teach the model by feeding it content. [Data scientists program the model to operate](#) as either supervised or unsupervised. Supervised AI systems learn via known information or facts inputted in the system, while unsupervised systems model searches for information, reviews different patterns, and then predicts and adapts based on its programming.

[ML](#) is the science of getting computers to act without being explicitly programmed. It generally entails teaching a machine how to complete a particular task, like recognizing numbers, images, or voice recognition. It teaches by feeding the computer historical data, developing training sets to test hypotheses, and then applying those algorithms and test cases to make predictions on new data. ML is growing dramatically because it is getting easier to develop software that can learn over time and become smarter as data availability increases. [Neural networks](#) are a key component of ML as they teach computers to think and understand the world the way humans

do, just more quickly, accurately, and in an unbiased manner. Neural networks are computer systems designed to work by classifying information via a system of probability similar to the human brain. For example, ML applications can read text and decipher whether the person is making a complaint or offering congratulations. On the other hand, ML often requires people to hand-engineer certain features for the algorithm to look for, which can be complex and very time-consuming.

A recent [Forbes article](#) differentiated between AI and ML, with AI as the broader concept of machines being able to carry out tasks in a way that humans would consider “smart,” and ML as the current application of AI based around the idea that humans should be able to give machines access to data and let them learn for themselves.

#### **INFLUENCE ON THE WORKFORCE**

With its promise of automating mundane tasks as well as offering creative insight, industries in every sector from banking to healthcare to manufacturing have the potential to reap the benefits offered by AI and ML. Many business leaders are aware of the potential value of AI and ML, but are not yet ready to incorporate the technology into their operations. In [PwC’s 2017 Digital IQ survey](#) of senior executives worldwide, “54 percent of the respondents said they were making substantial investments in AI today. But only 20 percent said their organizations had the skills necessary to succeed with this technology.”

Although AI can enable productivity, it also has the potential to eliminate jobs and/or change work processes. In the long run, it may have the potential to create jobs. AI is often sold on the premise that it will save companies money by replacing human labor at a lower cost. Professors at Oxford University’s engineering school have [calculated that AI](#) will put 47 percent of the jobs in the United States at risk. On the other hand, [Andrew Ng](#), [Baidu Research](#) head and adjunct professor at Stanford University, recently said, “AI is the new electricity,” meaning that it will be found everywhere and create new jobs that were not imaginable before its appearance.

Professor Ng is not alone in looking on the positive side as to how AI and ML will affect the workforce. In May 2017, Massachusetts Institute of Technology (MIT) assembled a panel of five experts who spoke at the [MIT Sloan CIO Symposium](#) on a panel entitled “Putting AI to Work.” Josh Tenenbaum, a professor in the Department of Brain and Cognitive Sciences at MIT, noted that [most AI applications today](#) are based on pattern recognition. “There are things that robots can’t do, like when the unexpected happens...It’s not like they are going to replace humans any time soon.”

## IMPACT AT VA

Government organizations are adding AI into their platforms, solutions, and products to perform tasks that usually require human-level intelligence, such as visual perception, speech recognition, decision making, or translation. VA is leveraging AI capabilities by using AI and ML algorithms to aid VA in fraud and error detection and image recognition for benefits and disability claims processing. VA is researching how using devices such as robots, Virtual Personal Assistants (VPAs), and smart advisors could help Veterans with physical challenges or those recovering from a medical procedure. In addition, hospitals have utilized robots at reception desks to minimize and eliminate human error. Furthermore, AI and ML can aid suicide prevention by identifying suicidal intent better than state-of-the-art medical approaches by analyzing the text derived from medical records. Finally, AI and ML can reduce the time involved in processing disability claims as AI can reduce the amount of data provided to reflect only the information that is necessary to make timely and accurate decisions.

In 2016, [Flow Health](#) formed a five-year partnership with VA to build a medical knowledge graph with [deep learning](#), a class of ML algorithms, to inform medical decision-making and train AI to personalize care plans. “Developing artificial intelligence which can automatically identify the best diagnostic and treatment pathways will assist clinicians in delivering precision medicine to every veteran,” said Robert Rowley, MD, Chief Medical Officer at Flow Health. “To build artificial intelligence you need huge amounts of data to feed deep learning models. This is why this partnership between the VA and Flow Health is a watershed moment for deep learning in healthcare.”

## CONCLUSION

Despite concerns and anxiety about machines displacing workers, human labor is not going away any time soon. Tasks that cannot be substituted by automation are generally complemented and enhanced by it. According to [Intel](#), “AI promises to transform society on the scale of the industrial, technical, and digital revolutions before it. Machines that can sense, reason, and act will accelerate solutions to large-scale problems in myriad of fields, including science, finance, medicine and education, augmenting human capability and helping us to go further, farther, faster.” How far will AI and ML take us? Where will the job market be in 10, 20, and 50 years? Time will tell!

## **TS TECH INSIGHT SERIES**

*The monthly Tech Insight series aims to help readers make better decisions and be more informed customers (of Office of Information & Technology's products and services) by providing them with high-level overviews of technology issues that impact or will impact VA's Information Technology (IT) environment. Tech Insights introduce topics in an easily digestible fashion by presenting background information on the topic, clearly explaining its importance within VA, and providing recommendations for success from TS. View all TS Tech Insights [here](#).*

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