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Artificial Intelligence and human employment

Singapore Management University

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AI will replace humans in repetitive tasks. Greater value can be created when it augments and complements the jobs people do

A decade ago, a team from the University of Toronto took part in the ImageNet Large Scale Visual Recognition Challenge 2012 (ILSVRC2012). The convolutional neural network (CNN) that the team built halved the existing error rate on ImageNet visual recognition to about 15 percent, paving the way for widespread adoption of CNNs and Artificial Intelligence (AI) systems.

"That was the shot heard around the world that we can do things with machine learning that we couldn't do before," observes **Steven Miller**, Professor Emeritus of Information Systems at the SMU School of Computing and Information Systems (SCIS). "They brought together a bunch of things that had been in the environment for a while and then achieved the ability to recognise images with a higher degree of capability.

"It was not perfect, but rather than a one or two percent increment as had been the case in the last few years prior, boom, in this one year they get a 12 percent increment. And then in the next year they get another 10 percent increment."

Miller recounted that seminal moment at a recent Fireside Chat titled "Automation, Augmentation and AI: Implications on the Jobs we do" that was organised by the Centre of Management Practice and SMU Libraries. The CNN, dubbed "AlexNet" after Alex Krizhevsky, the name of the researcher who designed the CNN, showcased the use of Graphic Processing Units (GPUs) and now commonly used techniques such as rectified linear activation units (ReLU).

AI: REPLACING HUMANS? AUGMENTING HUMANS?

But as AI techniques become ever more sophisticated, more tasks become automated, reducing, or even eliminating the need for human labour.

"The issue of what's going to happen to us as humans [is not] new. We've seen it play out with the evolution of technology over decades and centuries," says Miller. "So, we can automate the task, or we can augment the task. When we automate, we substitute.

"Does that mean we automate the full job, or we only automate a subset task? It depends on how the job is organised. People don't disappear with automation...[b]ecause we know machines drift. They break down [and] everything needs an overseer."

He adds: "The point is: maybe there were a hundred people welding the pieces of metal together to form a car body at a car assembly line. Now I have a handful of maintenance people who can oversee the robots who now do that. I've physically seen...lines of people with welding guns and then they were replaced by robots. That was not a statement of how capable the robots were. It

was more of a statement of how repetitive the work was for the humans. That's what we mean by automation."

With regard to AI automation, Miller cites the example of credit card companies and banks flagging certain transactions and blocking further activity in certain scenarios. Sometimes consumers use their cards overseas without informing their banks of their travel plans, and in the process raise a red flag in the system. "Credit cards produce such a huge volume of transactions. Obviously you can't monitor this stuff unless it's all automated," Miller concedes.

"Automation has a lot of benefits, but undoubtedly, when you use automation in a task area, you reduce the number of jobs in that area."

He adds: "So what's the key point with augmentation? Complement. Augmentation complements the human in doing the job. You've all used spreadsheets. What an enormous complement to the ability to get something done. Augmentation has existed in both manufacturing worlds as well as office and service worlds for a long time."

AUGMENTING FOR PRODUCTIVITY

Miller argues that it is fine to go the automation route, but it must be done to boost productivity to create jobs elsewhere in the ecosystem. The worst outcome, Miller warns, is what he calls "so-so automation".

"Well, I can get the tool in there and I can take out one headcount, or 10, or a hundred. And I stop there. I don't drive it further to get the productivity improvements so I can reduce price by 5 percent and get more customers, or enhance value or make my services better. I don't induce anything that leads to higher demand, that leads at least someone, somewhere getting a job, an existing job. And I don't do anything to create new ways and new things of doing ways."

He adds: "If people in 1960 only thought about automating what they did in 1960, you wouldn't have cell phones. Ironically it's technology and innovations and technology that are driving [change] and create[ing] these issues with job displacement. But as we see from the recent historical record, our ability to create new work is the key, right?

"We need the innovation. It could be in small, medium or large companies. So, there's no way to avoid using the technology, given that we have to use it. We're going to end up using it for a whole host of reasons, driving the productivity and the innovation is what's going to create the opportunities so that there are offsetting ways for people to grow. That's the message."

As it is, the biggest impact will not be on the number of jobs but on the nature of jobs, Miller warns, pointing to the "reduction in the share of the economy comprised of more routine clerical work, administrative work, of production work, operations work". On the other hand, much of the developed countries are experiencing a shortage of skilled that are able to complement the technology and AI that boosts productivity.

"It all comes down to, 'What extent do we drive automation versus augmentation?' And it all comes down to choices. Every employer makes choices about labour institutions and government policies. You cannot divine the future of what impacts automation."

Professor Steven Miller was the speaker at the Fireside Chat titled "Automation, Augmentation and AI: Implications on the Jobs we do" that was organised by the Centre of Management Practice and SMU Libraries on 2 Sep 2022. The moderator was Wong Yuet Nan, Adjunct Faculty at SCIS.

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