DOI:10.1145/2933148

Vinton G. Cerf

Celebrations!

There is a rhythm in the affairs of the Association for Computing Machinery and June marks our annual celebration of award recipients and the biennial election of new

officers. I will end my final year as past president, Alex Wolf will begin his first year in that role, and a new president and other officers will take their places in the leadership. June also marks Bobby Schnabel's first appearance at our annual awards event in his role as CEO of ACM. I am especially pleased that two former Stanford colleagues, Martin Hellman and Whitfield Diffie, are receiving the ACM A.M. Turing Award this year. Nearly four decades have passed since their seminal description of what has become known as public key cryptography and in that time the technology has evolved and suffused into much of our online and offline lives.

In another notable celebration, Alphabet, the holding company that includes Google, saw its AlphaGo system from DeepMind win four of five GO games in Seoul against a world class human player. The complexity of the state space of GO far exceeds that of chess and many of us were surprised to see how far neural networks have evolved in what seems such a short period of time. Interestingly, the system tries to keep track of its own confidence level as it uses the state of the board to guide its choices of next possible moves. We are reminded once again how complexity arises from what seems to be the simplest of rules.

While we are celebrating advances in artificial intelligence, other voices are forecasting a dark fate for humanity. Intelligent machines, once they can match a human capacity, will go

on to exceed it, they say. Indeed, our supercomputers and cloud-based systems can do things that no human can do, particularly with regard to "big data." Some of us, however, see the evolution of computing capability in terms of partnership. When you do a search on the World Wide Web or use Google to translate from one language to another, you are making use of powerful statistical methods, parsing, and semantic graphs to approximate what an accomplished multilingual speaker might do. These translations are not perfect but they have been improving over time. This does not mean, however, that the programs *understand* in the deepest cognitive sense what the words and sentences mean. In large measure, such translation rests on strong correlation and grammar. This is not to minimize the utility of such programs—they enhance our ability to communicate across language barriers. They can also create confusion when misinterpretation of colloquialisms or other nuances interfere with precision.

One has to appreciate, however, the role of robotics in manufacturing in today's world. The Tesla factory in Fremont, CA, is a marvel of automation^a and there are many other examples, including the process of computer chip production that figures so strongly in the work of ACM's members. Automation can be considered an aspect of artificial in-

telligence if by this we mean the autonomous manipulation of the real world. Of course, one can also argue, as I have in the past, that stock market trading programs are robotic in the sense they receive inputs, perform analysis, and take actions that affect the real world (for example, our bank accounts). Increasingly, we see software carrying out tasks in largely autonomous ways, including the dramatic progress made in self-driving cars. Apart from what we usually call artificial intelligence, it seems important to think about software that goes about its operation with little or no human intervention. I must confess, I am still leery of the software that runs the massage chairs at Google—thinking that a bug might cause the chair to fold up while I am sitting in it!

While we celebrate the advances made in artificial intelligence and autonomous systems, we also have an obligation to think deeply about potential malfunctions and their consequences. This certainly persuades me to keep in mind safety and reliability to say nothing of security, privacy, and usability, as we imbue more and more appliances and devices with programmable features and the ability to communicate through the Internet. **□**

Vinton G. Cerf is vice president and Chief Internet Evangelist at Google. He served as ACM president from 2012–2014.

^a <https://www.youtube.com/watch?v=TuC8drQmXjg>

Copyright held by author.