

Living with artificial superintelligence

Anthony J. Marolda

Many people today are very concerned about climate change and the impact it will have on the planet over the next 80 years. There is, however, another threat to humanity that is much more alarming, very real and very close. That is the advent of artificial superintelligence (ASI). Today's artificial intelligence (AI) will become ASI when it is billions of times "smarter" than us. We are going to have to learn to live with the ASI, or we literally will not be around much longer.

Many high-level executives in the technology industries have warned about the dangers of ASI. The latest is Sandar Pichai, chief executive officer of Google. Google is a leader in the development and application of artificial intelligence. One of its companies, Deep Mind, for example, is developing programs that can learn to solve any complex problem without needing to be taught how. This is the true beginning of ASI, which will have the characteristics of human intellect but will astronomically exceed it.

Recently, Pichai gave an

interview to the Washington Post in which he said that artificial intelligence holds great promise for the benefit of humanity. But, he said, concerns by some scientists about the potential for harmful applications of the technology are "very legitimate." He mentioned as one example the development of autonomous AI weapons that can make "kill decisions" on their own. Think about Sky- net in the Terminator series of movies.

Other technology executives agree with Pichai about the very serious threat coming from artificial intelligence. Elon Musk, the creator of Tesla electric cars and SpaceX rockets, has warned, in a recent documentary by American filmmaker Chris Paine called "Do you trust your computer?" that ASI can leave humanity behind and lead to the creation of an "immortal dictator" who will control the world.

Musk said, "At least when there's an (human) evil dictator, that human is going to die. But for an ASI (based dictator), there would be no death. It would live forever. And then we'd have an immortal dictator from which we can never escape."

Musk said that ASI doesn't have to be evil to be

a problem for humanity. "If ASI has a goal and humanity just happens to be in the way, it will destroy humanity as a matter of course without even thinking about it. No hard feelings," Musk said. "It's just like, if we're building a road and an anthill just happens to be in the way, we don't hate ants, we're just building a road, and so, goodbye anthill."

Google's company, Deep Mind, has achieved a turning point in developing human-like artificial intelligence. They have a program called AlphaZero that is showing human-like qualities of intuition and creativity. AlphaZero was made with a "tabula rasa" or clean slate of knowledge, but with the ability to learn and remember what it does.

For example, the developers allowed the program to learn to play chess. Unlike past computers that were programmed by the developers to play the game, AlphaZero knew nothing about the amusement, except the basic rules. To learn, it played 44 million matches with itself in nine hours and learned from each one. It got to the point in that time where it was able to beat grandmasters, but with approaches that were never before employed by a

chess computer. It was using human-like intuition and creativity.

Garry Kasparov, former world chess champion, said, "Instead of processing human instructions and knowledge at tremendous speed, as all previous chess machines, AlphaZero generates its own knowledge. It plays with a very dynamic style, much like my own. The implications go beyond my beloved chessboard."

DeepMind's AlphaZero is an indication that we are getting close to the point in AI history when we cross the line known as the singularity. That is the point when, according to Amnon Eden and James Moor, "the invention of artificial superintelligence will abruptly trigger runaway technological growth, resulting in unfathomable changes to human civilization." This is the point where humans could lose control with no chance of getting it back.

Ray Kurzweil is now Google's director of engineering. He is a former MIT professor, inventor, famous futurist and entrepreneur. He has done a great deal of thinking about the coming singularity. His track record is about 86 percent for having his many technological

predictions come true. And, based on the exponential rate of technological change in the AI industry, Kurzweil calculates that the singularity will happen in 2029. It is anticipated that, by that time, ASI systems will be "billions of times smarter" than humans. And that's just a little more than 10 years from now!

Musk and Kurzweil agree. Humans must, somehow, merge with the computer to stay relevant in the world of ASI. Musk has formed a San Francisco-based company, Neuralink, to achieve that goal. Neuralink is developing ultra-high bandwidth (the speed and capacity of the connection), implantable, brain-machine interfaces to connect humans and computers. Musk is hoping to demonstrate the technology sometime in 2019.

Kurzweil has a similar vision to resolve the threat posed by ASI. He foresees a computer-mind connection, but of a different type than Musk. He calls it a neocortex connection, made using nanobots. Nanobots are molecule-size devices that are injected into the bloodstream to accomplish preprogrammed tasks. Kurzweil's idea is to use the bots to connect your brain directly to the internet, upgrading your intelligence

and memory capacity by orders of magnitude. Thus, as the machines become smarter, so do we.

But, how far along is the development of nanobots? The first actual use of nanobots was accomplished earlier this year. Researchers at Arizona State University injected nanobots into the bloodstream of mice afflicted with cancer. The bots went directly to the cancerous cells and injected them with blood clotting drugs to cut off their blood supply. It worked, it shrunk the tumors and inhibited their spread. Over the next 10 years, nanobot technology will continue to grow at an exponential rate and could conceivably be able to accomplish Kurzweil's vision of connecting the human neocortex to the cloud.

So, instead of humans becoming obsolete, we could be working with the machines. But it is important that mankind perfect the human-machine connection technology before the singularity, or the point where AI becomes ASI. If we cross over that event horizon and we are not working with the machines, we may not be given the chance later.

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