Can artificial intelligence be realized, and will it benefit humanity?

Helping man with his future

By A. Parivazhagan

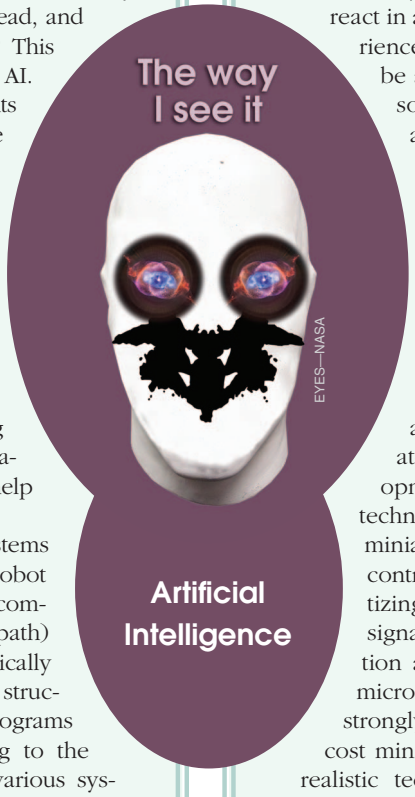
The needs of humans are increasing day by day. People want a more comfortable life, which leads to the thought of developing a system to perform the operations that he/she wants to do—artificial intelligence (AI).

An AI system makes comparisons between the person and the machine. Our body is considered as a machine, and neurons are the basic controller of it. Likewise, a machine is controlled by a control system. Man can think, but a machine? Why can't it? Our body is made of chemical elements (i.e., cells made of proteins), and we have blood, skin, etc., so our body is made of chemical substances that allow us to think and survive. Similarly, electronic machines are made of silicon, lead, and other elements. Why then can't it think? This question paved the way for the concept of AI.

People have received a lot of benefits from AI applications—it is useful in the fields of planning, science and technology, problem solving, computer science, biology, machine learning, and robotics, among others. In some areas it is beneficial. Many small machines such as robots are useful in hospitals to serve patients and in supermarkets to guide people. AI is the theory relating to machines—can they think? It is not possible for a machine to think, but it can help us by programming its chip. This can be realized by its applications. The main aim of this scheme is to help man indirectly with his future.

Planning is the basic process in all systems (e.g., in robotics, if you want to control a robot it must be planned-programmed, that is command it to take an object or track a path) Mainly all humanoid robots are made basically of a human external structure or animal structure. In the program language area, the programs are modified and modernized according to the need of the application of humans in various systems. This AI shows the way for a machine-learning concept. Here, the detailed study of machines is possible and helps to minimize the problems or mistakes that occur during the functioning of the machine.

Neural networks is another field that coordinates with the neural schematic of man and the artificial system, which gives the perfect resolution about the



Decisions and reactions will still rely on humans

By Pui-In Mak

The term artificial intelligence (AI) covers a very broad area. I believe that under many circumstances AI can be realized to communicate with humans and assist us in achieving some specific goals more efficiently and optimally and should be able to benefit to humanity in a bigger scope in the years to come.

What I can imagine, just sketching in my mind, is that AI can be an intelligent device made with electronics (for example), with the input/output linked with sensor/actuator to continuously communicate with the object (e.g., human) and correspondingly react in a very short time according to past experience and current status. AI machines should be as smart as humans to some extent, and somehow also as powerful as possible, allowing them to do something that humans just cannot do.

To me, a robot is an excellent example of AI machines. Perhaps, the three essential ingredients for a successful intelligent robot are: 1) sensors/actuators for communication or interaction with the objects, 2) electronics for control, signal conditioning, and automation, and 3) algorithms for calculations and making decisions. Sensors and actuators can take advantages from the development of microelectromechanical (MEM) technologies, leading to high precision and miniaturized size. Electronics are the core for controlling, scheduling procedures, and digitizing the signals for the computer or digital signal processor (DSP) to carry on the operation and decision. With the development of microelectronics in nanoscale regime, I strongly believe an intelligent system plus low-cost miniaturized sensors can bring AI toward a realistic technology. High-speed microprocessors and memory nowadays are capable of delivering the required response speed. A sensor matrix with different senses can help to digest the object, similar to what humans do.

For instance, cameras used for vision, microphones and headphones used for sound, and electronic smart noise used for smell can be combined to form a smart

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human neuron system and also leads to an advancement in genetic algorithms. Artificial neural networks came from this idea of AI.

Now scientists are involved in the field of humanoid robots and trans-human robots, so it will be of benefit in the future. Advancements may include mind reading and sensing robots that are now being developed. If these work, in the future it could help people to cool off during times of stress, tension, or anger. It could give us soft drinks, drive a car, dance, or play.

This technology is useful to monitor any area without human control (such as security purposes).

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My current project is to develop a machine that can be helpful to blind people. The machine (robot) reads letters correctly, and I get its output through speakers or headphones. This will help those people who cannot see.

These types of things are possible for humans only through AI.

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Reader comments are encouraged and should be sent to potentials@ieee.org with the subject line "The way I see it."

letter to the editor

While I agree with both Mahdi Hamdani and Uri Moszkowicz, I feel that the Internet's impact on young people, whether good or bad, depends completely on the parent's skills of teaching their children right from wrong. While I do not deny the importance of limiting media in young children's lives, that only goes so far. At some point or another, the child is going to go off on his/her own and search the Internet without their parents over their shoulder.

For example, when I was younger, my favorite Web site was www.HowStuffWorks.com. On that Web site, I found an article on lock picking and read through it. The article was very good and by the end of it, I had learned how to pick a lock. Now, did I go over to my neighbor's house and try out my newfound information on lock picking on their front door? No, that would be illegal, and my parents taught me to respect the law. So, I feel that as long as the child has a good sense of right and wrong, the Internet is a great place for learning. If they do not, then it is a concern.

The Internet is a place of communication and knowledge. It is important to note that knowledge in itself is neutral. What it is used for is at the discretion of the reader based on their moral and ethical compass.

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electronic head. In cooperation with many other sensors such as temperature sensors and light sensors, it is possible to collect much information on the object, and through an AI algorithm, to predict and react correctly just like a human. In my opinion, to realize a high-quality AI system such as a robot, the algorithm that runs the system is the spirit and should be well planned and trained to account for many possible situations. It involves not only programming for machine-machine communications, but also human-machine communications that may have a big variation because of personality, behaviorism, and language differences. An AI machine is an interesting cross-discipline research related with algorithms, electronics, and sensors.

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I believe most people will be happy with smart and friendly AI machines that can help to improve the quality and safety of their lives. On a bigger scope, what I imagine is that AI can be anywhere, assisting humans where necessary such as in a train station. This is something that will be beneficial to everybody but may not be that realistic currently and will require much engineering effort and investment. Another way that I believe it is also very helpful is in improving ambient security. Through speech and facial and object recognitions, AI can help in subject identification. Last but not least, AI machines such as robots can also be good friends for humans as they can simulate our minds and chat with us.

Can AI machines replace the job of humans? I believe AI is excellent for typical cases if it is well designed. One shortcoming of AI is that it may be very flexible under extreme cases, while the decisions and reactions would still rely on humans. Nevertheless, AI can help to simplify the analysis and direct the right way to solve problems.

I do hope more AI projects can be carried out with the scope of generating global benefits to humans. For people with disabilities, AI machines will be of great importance and advantage to interact, support and communicate with them to overcome some daily difficulties and achieve some specific goals. The development of AI will be furthered certainly. With the continual advance of intelligent algorithms, sensors, and electronics, an intelligent use of ambient information helps to improve the stylishness and reality of AI machine with low cost. I believe AI has been continuously assisting us to develop a better world, hasn't it?

—Pui-In Mak earned his Ph.D. degree in electrical and electronics engineering from the University of Macau (UM), China in 2006. He is currently assistant professor at UM. He is a Member of the IEEE Graduates of the Last Decade committee.