

Artificial brain project gets \$4.9 million

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"RoboCop" and "I, Robot" may not be as far-fetched as you think, and IBM and five universities including Stanford are teaming up to prove it.

They're receiving a \$4.9 million federal grant Thursday to try to create an artificial brain so small and independently functional it could fit in a backpack and do pretty much the same thing that the glob of gray matter behind our eyes does.

This means a fake noggin that would be able to process information from a huge variety of sources, respond almost as if it were reasoning, learn over time and solve difficult problems as quickly as we do. Or at least as quickly as the smartest among us do.

The goal, said Stanford bioengineering professor Kwabena Boahen, one of the researchers, will be to lay the groundwork for building a machine that mimics the actions of about 100 million brain neurons, and is so compact and low-power it could fit in a shoe box.

"Transistors are too big to do the job, so we have to come up with something new," said Boahen, who is director of Stanford's Brains in Silicon lab. "We're talking about working on the atomic scale."

Artificial brain research has existed for decades, and in an influential 1993 essay, Vernor Vinge, a Hugo-winning science fiction writer and scientist, predicted that computers will become so powerful by 2030 that a new type of superintelligence will emerge. But to date, nobody has been able to create anything on the scale and capability that the IBM-led team is aiming for.

The project is being funded by the federal Defense Advanced Research Projects Agency, an independent research branch of the Defense Department, and one of the ultimate goals would be for the new brain to have military applications. For example, Boahen said, perhaps the brain could be strapped to the back of a soldier, acting "like a buddy, looking out for him to tell him what's happening behind him." Or it could mimic an explosives-sniffing dog, reacting to danger.

In civilian use, the brain could possibly help chart weather around the globe, or help coordinate worldwide financial markets.

Or, in its most fantastical applications if the project is wildly successful in years to come, the new brain could go far beyond 100 million neurons and power an artificial person - perhaps even up to the snuff of the whiz-bang creations in the movies "RoboCop" or "I, Robot."

But that's getting a bit ambitious for now, cautioned Dharmendra Modha, who as manager of cognitive computing at IBM's Almaden Research Center in San Jose will head up the project.

Today's grant merely funds the first nine-month phase of what could wind up stretching to seven or more years, depending on its success. IBM is teamed with five colleges - Stanford, UC Merced, the University of

Wisconsin-Madison, Cornell and Columbia - and for now they are all aiming to draw up plans for a chip that can imitate the actions of 1 million neurons.

Tack about 100 of those chips into the shoe-box-size brain, and you'll be talking about those 100 million neurons. That's about double the hardware of a rat brain - but far short of the 100 billion neurons in a human brain. Ramping up that big will take a while.

But who knows, the scientists said. The sky's the limit, and they're not really thinking of all the applications just yet - just figuring out how to make a light, low-wattage brain work.

"The big question here is, 'What is the mind?' " Modha said. "It's a collection of mental processes dealing with sensation, perception, action, cognition, emotion and interaction. And we have no computers that can even remotely approach what the mind can do."

His project, he said, will attempt to rectify that.

"This is really uncharted territory," Modha said.

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