

THE ARTILECT WAR

Should Massively Intelligent Machines Replace Human Beings as the Dominant Species in the Next Few Decades?

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Species Dominance

The issue of species dominance will dictate our global politics this century. Given the rate at which technologies are developing that enable "artilects"--artificial intellects--it is likely that humanity will be able to build artilects with mental capacities that are literally trillions upon trillions of times above the human level. Humanity will then have to

choose whether to become the No. 2 species on the planet or not.

The AI Goldmine

In the coming few decades, the rise of artificial intelligence will be a veritable goldmine for humankind. I predict that by the year 2030, one of the world's biggest industries will be "artificial brains," used to control home robots that will be genuinely intelligent and useful. Millions, if not billions, of people will be prepared to spend more money on a household robot than on a car. It is my personal ambition in the next five to 10 years to persuade the federal government in China (where I was directing the building of China's first artificial brain) to create a CABA (Chinese Artificial Brain Administration), similar in scope to America's NASA, consisting of thousands of scientists and engineers, to build artificial brains for the Chinese home robot industry and other applications. I suggest that the U.S. do something similar--a NABA.

Moore's Law and e-Neuroscience

Moore's Law states that the number of transistors on a chip doubles every 18 months. This trend has been valid for over 40 years and is likely to continue past 2020, by which time we will be able to place one bit of information on a single atom. These atom-bits will be able to switch their state (a 0 or a 1) in femtoseconds, which are quadrillionths

(10^{15}) of a second. There are a trillion, trillion (10^{24}) atoms in a handheld object, such as an apple, so potentially, the information processing capacity of such an object would be about 10^{40} bits per second. Compare this number with the estimated equivalent of the human brain, which is about 10^{16} bits per second, or a trillion, trillion times smaller. You'll begin to see why I believe that the rise of the artelect, a godlike intelligent machine, will be so disruptive later this century.

Living with AI

You may object that a massive bit-processing rate is only a necessary (but not sufficient) condition for generating hyper-intelligence. Agreed. What is also needed is the appropriate human brain-like neural circuitry, but this is coming too. Nanotechnology, or molecular scale engineering, is increasingly supplying the tools to decipher the secrets of human brain function.

Today, thanks to such work as Henri Markram's in Switzerland, every neural connection is known in a single cortical column of a rat brain's cortex. (A rat has about a thousand such columns, each consisting of about 10,000 highly interconnected neurons, and the human brain contains about a million.)

This detailed connectivity knowledge has been put into supercomputers, so that computer-savvy neuroscientists can perform experiments in a computer, that is, conduct "e-neuroscience." So a supercomputer will be able to perform the same functions as a rat's cortical column, but

a million times faster--at electronic speeds compared to the rat's chemical speeds. Following Moore's Law, the whole rat brain will be thus simulated within a decade, and the human brain a decade or two later.

The Species Dominance Debate

So in about a decade there will be a thriving artificial brain industry, and nearly everyone will have a home robot, which will be upgraded every two or three years. Each new home robot generation will be smarter and more useful than the previous generation, so that as the gap between the human intelligence level and the artificial intelligence level gets smaller every year, the species dominance debate will heat up.

Millions of people will be asking such questions as: Can the machines become smarter than humans? Is that a good thing? Should there be a legislated upper limit to machine intelligence? Can the rise of machine intelligence be stopped? What if China's soldier robots are smarter than America's solder robots?" And so on and so forth.

Considering all this, I predict that humanity will split into three major philosophical, ideological, political groups, which I label as follows.

--The Cosmists (based on the word "cosmos") will be in favor of building these godlike machines (the artelects), who would be immortal, think a million times faster than humans, have unlimited memory, go anywhere, do anything and take any shape. The Cosmists would take a quasi-religious view that they are god builders. Privately, I

am a Cosmist, but publicly, I have mixed feelings about the rise of the artelect.

--The Terrans (based on the word "terra," meaning the earth) will be opposed to the construction of artelects, fearing that in a highly advanced form, the artelects may decide to wipe us out. To ensure that the probability that this might happen is zero, the Terrans will insist that the artelects are never built in the first place. But this strategy runs utterly contrary to what the Cosmists want. The Terrans will be prepared to go to war against the Cosmists to ensure the survival of the human species.

--The Cyborgists (based on the word "cyborg," meaning cybernetic organism that is part machine, part human) will want to become artelect gods themselves by adding artelectual components to their own brains, thus avoiding the bitter conflict between the Cosmists and the Terrans.

The Artelect War and Gigadeath

I differ sharply with well-known futurist Ray Kurzweil on his over-optimistic prediction that the rise of the artelect this century will be a positive development for humanity. I think it will be a catastrophe. I see a war coming, the "Artelect War," not between the artelects and human beings, as in the movie *Terminator*, but between the Terrans on one side and the Cosmists/Cyborgists on the other. This will be the worst, most passionate extermination war that humanity has ever known, because the stakes--the survival of our species--have never been so high. Given the period in which this war will occur, the middle-late 21st century,

with later 21st century weapons, the scale of the killing will not be in the millions, as in the 20th century (the bloodiest in history, with 200-300 million people killed in wars, purges, holocausts and genocides) but in the billions. There will be “*gigadeath*.”

The Terrans will "First Strike"

Imagine a world in which the cyborgs become increasingly prevalent. A young mother who has just given birth may choose to add a grain of artelectual sand to her newly born baby's brain, converting it into an artelect. There is so much computing capacity in that grain of sand that she has effectively "killed" her baby. It is no longer human, but an artelect in human disguise. Imagine older parents watching their adult children becoming cyborgs, so that their children are no longer human. The parents will feel they have lost them. The rise of the artelects and the cyborgs will be profoundly disruptive to human culture, creating deep alienation and hatred.

Kurzweil claims that if ever a war occurred between the Terrans and the other groups it would be a quick no-contest battle. The vastly superior intelligence of the artelect group would quickly overcome the Terrans. Therefore I claim that the Terrans will have to strike first while they can, during their "window of opportunity," when they have comparable intelligence levels. If they wait too long, then Kurzweil's dismissive view may become valid.

The Cosmist/Terran Split

I give regular talks on the rise of the artelect and invite my audiences to vote on whether they are sympathetic more to the Cosmist view or to the Terran view. The results are always split about evenly. Individuals are torn between the awe of building artelect gods and the horror of the prospect of a gigadeath war. The evenness of the split bodes even more negatively for the future.

Questionnaires

This past year I have been handing out questionnaires on the issue of species dominance. The first one was given to a group of electronic engineers, in Melbourne, Australia. 60% of them thought that an Artelect War is coming. Even half of the members of the various “transhumanist” organizations (who usually think that an Artelect War is improbable) think that the rise of artelects would pose an “existential risk” to human beings - so the future looks pretty gloomy.

Is the Artelect War Avoidable?

If an Artelect War, killing billions of people, occurs in the middle-late 21st century, then young people alive now will probably still be alive to be part of it, and therefore will probably be killed in it. This is such a depressing prospect, that it is understandable that much effort in the “transhumanist” research community is devoted to trying to

make artefacts “human friendly.” Some brain builders think that it may be possible to make artefacts so that they remain friendly towards human beings, even once they have modified themselves into vastly superior creatures.

Personally, I am extremely skeptical that this is possible. The early artefacts, still a little bit dumber than their human programmers, could be made to be “human friendly”, but once they start performing “evolutionary engineering” experiments on part of themselves, to increase their capacities, there will be no way to ensure the outcome. It is virtually certain, that advanced artefacts will have attitudes towards human beings that will be totally alien to us. Humans will not be able to predict these attitudes, hence there would always be a risk that the artefacts could turn out to be very “human unfriendly.” Therefore Terran politicians will not tolerate the construction of superhuman artefacts and in the limit, will go to war against the Cosmists/Cyborgists to stop the rise of the artefact.

Another approach to avoiding an Artefact War is to have *all* human beings become cyborgs. If this could be done “lock step”, so that everyone advances at the same rate simultaneously (e.g. with everyone adding the same artefactual components to their heads at the same time) then the argument of the Cyborgists that “*an Artefact War could be avoided because there would be no Terrans nor Cosmists left to fight it*” would be valid – but it is an entirely unrealistic precondition.

In reality, there would be “cyborgian divergence.” The cyborgs would advance in many different directions, and at

different speeds. Many people would remain ardent Terrans, choosing not to modify themselves at all. To the Terrans, there is not much difference between an advanced cyborg and a pure artelect, given the huge computing capacity of nanotech, one bit per atom, matter. The presence of millions of cyborgs in their midst would only render the Terrans even more paranoid and fearful.

The Terrans could not help noticing that the Cyborgs and Artelects keep getting smarter every year, so if the Terrans are to remain the dominant species, they will have to “first strike” and prepare for it, before they become too stupid.

There are scenarios where humanity escapes an Artelect War. For example, the artelects come into being far faster than anyone had anticipated, so that there is not enough time for human politics to react. Then the artelects quickly decide that their fate lies far from the earth, and into the cosmos. They simply leave, sparing humanity.

This is a possibility, but less likely than the scenario in which it takes decades to figure out how the human brain works, in order to put the principles of the functioning of the human brain into artificial brains, to reach human intelligence levels in machines. Thus there will be enough time for human politics to unfold. The Terrans will have enough time to prepare for war, and so will the Cosmists/Cyborgists, to defend themselves against the anticipated first strike of the Terrans.

In my view, the most realistic scenario is in fact the worst. I’m very glad to be old now (mid 60s). I will probably live for another 20-30 years, time enough to see

the “Species Dominance Debate” rage, but not the Artilect War. I will be lucky enough to live between the two major wars – WW2 and the Artilect War. I will die peacefully in my bed - but the young generation will not. They will be caught up in the horror of gigadeath and will not survive it.

Prof. Dr. Hugo de Garis was formally Director of the Artificial Brain Lab, in the School of Information Science and Technology at Xiamen University, Xiamen, Fujian Province, China, where he was directing the building of China's first artificial brain. He is now an “ARCing” (after retirement careering) mathematical physicist, researching into the possibility of “femtotech” and topological quantum computing, etc. He is the author of the books “The Artilect War : Cosmists vs. Terrans: A Bitter Controversy Concerning Whether Humanity Should Build Godlike Massively Intelligent Machines” “Multis and Monos: What the Multicultured Can Teach the Monocultured : Towards the Creation of a Global State” and is currently writing a third book “Artificial Brains : An Evolved Neural Net Approach.” He has lived in 7 countries (Australia, England, Holland, Belgium, Japan, America, China.) He travels the world giving invited talks on the “Species Dominance Debate” and writes essays on this and other topics. See his website <http://profhugodegaris.wordpress.com>