

Humans can try to upgrade themselves to gods in these three ways

AP PHOTO/HASSAN AMMAR
Not even close.



By [Yuval Noah Harari](#)

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This is an excerpt from Yuval Noah Harari's latest book, [Homo Deus: A Brief History of Tomorrow](#), which is out now.

In seeking bliss and immortality humans are in fact trying to upgrade themselves into gods. Not just because these are divine qualities, but because in order to overcome old age and misery humans will first have to acquire godlike control of their own biological substratum. If we ever have the power to engineer death and pain out of our system, that same power will probably be sufficient to engineer our system in almost any manner we like, and manipulate our organs, emotions and intelligence in myriad ways. You could buy for yourself the strength of Hercules, the sensuality of Aphrodite, the wisdom of Athena or the madness of Dionysus if that is what you are into. Up till now increasing human power relied mainly on upgrading our external tools. In the future it may rely more on upgrading the human body and mind, or on merging directly with our tools.

The upgrading of humans into gods may follow any of three paths: biological engineering, cyborg engineering and the engineering of non-organic beings.

Biological engineering

Biological engineering starts with the insight that we are far from realising the full potential of organic bodies. For 4 billion years natural selection has been tweaking and tinkering with these bodies, so that we have gone from amoeba to reptiles to mammals to Sapiens. Yet there is no reason to think that Sapiens is the last station. Relatively small changes in genes, hormones and neurons were enough to transform *Homo erectus*—who could produce nothing more impressive than flint knives—into *Homo sapiens*, who produce spaceships and computers. Who knows what might be the outcome of a few more changes to our DNA, hormonal system or brain structure. Bioengineering is not going to wait patiently for natural selection to work its magic. Instead, bioengineers will take the old Sapiens body, and intentionally rewrite its genetic code, rewire its brain circuits, alter its biochemical balance, and even grow entirely new limbs. They will thereby create new godlings, who might be as different from us Sapiens as we are different from *Homo erectus*.

Cyborg engineering

Cyborg engineering will go a step further, merging the organic body with non-organic devices such as bionic hands, artificial eyes, or millions of nano-robots that will navigate our bloodstream, diagnose problems and repair damage. Such a cyborg could enjoy abilities far beyond those of any organic body. For example, all parts of an organic body must be in direct contact with one another in order to function. If an elephant's brain is in India, its eyes and ears in China and its feet in Australia, then this elephant is most probably dead, and even if it is in some mysterious sense alive, it cannot see, hear or walk. A cyborg, in contrast, could exist in numerous places at the same time. A cyborg doctor could perform emergency surgeries in Tokyo, in Chicago and in a space station on Mars, without ever leaving her Stockholm office. She will need only a fast Internet connection, and a few pairs of bionic eyes and hands. On second thought, why *pairs*? Why not quartets? Indeed, even those are actually superfluous. Why should a cyborg doctor hold a surgeon's scalpel by hand, when she could connect her mind directly to the instrument?

This may sound like science fiction, but it's already a reality. Monkeys have recently learned to control bionic hands and feet disconnected from their bodies, through electrodes implanted in their brains. Paralyzed patients are able to move bionic limbs or operate computers by the power of thought alone. If you wish, you can already remote-control electric devices in your house using an electric 'mind-reading' helmet. The helmet requires no brain implants. It functions by reading the electric signals passing through your scalp. If you want to turn on the light in the kitchen, you just wear the helmet, imagine some preprogrammed mental sign (e.g., imagine your right hand moving), and the switch turns on. You can buy such helmets online for a mere \$400.

In early 2015 several hundred workers in the Epicenter high-tech hub in Stockholm had microchips implanted into their hands. The chips are about the size of a grain of rice and store personalised security information that enables workers to open doors and operate photocopiers with a wave of their hand. Soon they hope to make payments in the same way. One of the people behind the initiative, Hannes Sjoblad, explained that "We already interact with technology all the time. Today it's a bit messy: we need pin codes and passwords. Wouldn't it be easy to just touch with your hand?"

Engineering of non-organic beings

Yet even cyborg engineering is relatively conservative, inasmuch as it assumes that organic brains will go on being the command-and-control centres of life. A bolder approach dispenses with organic parts altogether, and hopes to engineer completely non-organic beings. Neural networks will be replaced by intelligent software, which could surf both the virtual and non-virtual worlds, free from the limitations of organic chemistry. After 4 billion years of wandering inside the kingdom of organic compounds, life will break out into the vastness of the inorganic realm, and will take shapes that we cannot envision even in our wildest dreams. After all, our wildest dreams are still the product of organic chemistry.

Breaking out of the organic realm could also enable life to finally break out of planet earth. For four billion years life remained confined to this tiny speck of a planet because natural selection made all organisms utterly dependent on the unique conditions of this flying rock. Not even the toughest bacteria can survive on Mars. A non-organic artificial intelligence, in contrast, will find it far easier to colonize alien planets. The replacement of organic life by inorganic beings may

therefore sow the seed of a future galactic empire, ruled by the likes of Mr. Data rather than Captain Kirk.

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We don't know where these paths might lead us, nor what our godlike descendants will look like. Foretelling the future was never easy, and revolutionary biotechnologies make it even harder. For as difficult as it is to predict the impact of new technologies in fields like transportation, communication and energy, technologies for upgrading humans pose a completely different kind of challenge. Since they can be used to transform human minds and desires, people possessing present-day minds and desires by definition cannot fathom their implications.

For thousands of years history was full of technological, economic, social and political upheavals. Yet one thing remained constant: humanity itself. Our tools and institutions are very different from those of biblical times, but the deep structures of the human mind remain the same. This is why we can still find ourselves between the pages of the Bible, in the writings of Confucius or within the tragedies of Sophocles and Euripides. These classics were created by humans just like us, hence we feel that they talk about us. In modern theatre productions, Oedipus, Hamlet and Othello may wear jeans and T-shirts and have Facebook accounts, but their emotional conflicts are the same as in the original play.

However, once technology enables us to re-engineer human minds, *Homo sapiens* will disappear, human history will come to an end and a completely new kind of process will begin, which people like you and me cannot comprehend. Many scholars try to predict how the world will look in the year 2100 or 2200. This is a waste of time. Any worthwhile prediction must take into account the ability to re-engineer human minds, and this is impossible. There are many wise answers to the question, 'What would people with minds like ours do with biotechnology?' Yet there are no good answers to the question, 'What would beings with a *different* kind of mind do with biotechnology?' All we can say is that people similar to us are likely to use biotechnology to re-engineer their own minds, and our present-day minds cannot grasp what might happen next.

Are Humans Becoming More God-Like? Interview with Yuval Noah Harari of Hebrew University

Yuval Noah Harari Professor At Hebrew University In Jerusalem

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Technology will enable people to “upgrade” to god-like cyborgs in a century or two. That could be a good thing, as long as the technology is serving us — not the other way around.

Is technology enabling us to become ever-more god-like? And would that be a good thing?

As artificial intelligence (AI) and embedded technologies empower people to become “more than human,” future advances could become as much of an ethical question as a technological one.

Yuval Noah Harari, a history professor at Hebrew University, has been grappling with the broader questions around humanity's development, [predicting](#) that we could become god-like cyborgs within a couple hundred years.

Several strains of science are putting humans on the path to “upgrade themselves into gods,” he says: biological engineering, cyborg engineering and AI engineering. “All three paths hold great promises, and equally great threats.”

Harari shares the concern of leading scientific and tech minds — ranging from Stephen Hawking and Bill Gates — that artificial intelligence poses a risk to humanity, saying that stronger global institutions are needed to address such existential threats. “The key is to make technology serve us, instead of us serving technology,” he says in an interview:

You've predicted that humans could achieve a sort of divine state through biological manipulation or genetic engineering. How will that evolution happen?

This isn't a poetic metaphor or a vague metaphysical claim. It is a concrete prediction. Throughout history, humans have ascribed to gods specific abilities, such as to design and create living beings; to reshape their own bodies; to control the environment and the weather; to read minds and to communicate instantly across space; and to escape death and live indefinitely.

Humans are in the process of acquiring all these abilities and then some. “Business as usual” will bring us there. If humankind simply carries on with its present economic, scientific and political patterns, humans are very likely to be upgraded into gods within a century or two at most. Yet the same technology that may upgrade human to gods, may also make them useless.

So what will this mean for humanity?

The rise of AI, which dispenses with organic components and seeks to create completely non-organic beings, is a particularly important and extremely worrying development.

I don't think that an AI will annihilate humankind by a nuclear strike, as in some Hollywood science fiction movie. The more likely danger is that AI will make most humans useless. Computer algorithms are catching up with humans in more and more cognitive fields. It is very unlikely that computers will develop anything even close to human consciousness, but to replace humans in the economy, computers don't need consciousness. They just need intelligence.

Throughout history, the only intelligent entities have been conscious entities. But intelligence is now decoupling from consciousness. We are developing non-conscious algorithms that can play chess, drive vehicle, fight wars and diagnose diseases better than us.

When the economy has to choose between intelligence and consciousness, the economy will choose intelligence. Once self-driving cars and doctor-bots outperform human drivers and doctors, millions of drivers and doctors around the world will lose their jobs, even though self-driving cars and doctor-bots have no consciousness.

Many new kinds of jobs might appear, but that won't necessarily solve the problem. Humans have basically just two types of skills — physical and cognitive — and if computers outperform us in both, they might outperform us in the new jobs as well.

So what will be the use of humans in such a world? What will we do with billions of economically useless humans? We don't have any economic model for such a situation. This may well be the greatest economic and political question of the 21st century.

You've suggested that Silicon Valley is developing a sort of "techno-religion," viewing even death as a technological problem. What role should morality have in such transformational innovations?

In all likelihood, the new techno-religions will also create new techno-moralities. We already see it happening.

Humans rarely manage to come up with a completely new moral value. The last time this happened was in the 18th century, when the humanist revolution preached the stirring values of human equality, liberty and fraternity. All subsequent conflicts and struggles have been conducted either in the name of the three humanist values, or in the name of even older values — such as obeying God or serving the nation.

But the hacker movement has created the first new value since 1789: freedom of information. We mustn't confuse freedom of information with the old humanist value of freedom of expression. Freedom of expression was given to humans, and protected their right to think and say what they wished — including their right to keep their mouths shut and their thoughts to themselves.

Freedom of information is not given to humans. It is given to *information*. Moreover, this novel value may impinge on the traditional freedom of expression, by privileging the right of information to circulate freely over the right of humans to own data and to restrict its movement. Given that most humans may also become militarily and economically useless, we may well enter a post-human era, in which information is valued more highly than human beings. Indeed, both biologists and computer scientists increasingly see humans as biochemical algorithms, which should be evaluated strictly according to their data-processing capacities.

We should make technology serve us, instead of us serving technology. For that, we need new and much stronger global political authorities. The new opportunities and threats of the 21st century — from global warming to AI — are all global in nature. If you want to do something serious about them, you must have effective global governance.