

Elon Musk has repeatedly demonstrated phenomenal success in the execution of his remarkable ambition.

As the co-founder and CEO of Tesla, Mr. Musk leads all product design, engineering and global manufacturing of the company's electric vehicles. Tesla is now the most valuable auto-manufacturing company in the world with a market capitalization exceeding that of Toyota.

As founder and lead designer at SpaceX, Elon Musk oversees the development of rockets and spacecraft for missions to Earth orbit and ultimately to other planets. In May 2020, SpaceX launched its first manned flight, becoming the first private company to both place a person into orbit and to eventually dock a manned spacecraft with the International Space Station. Further, the launch was the first time since the end of the Shuttle Program in 2011 that an American astronaut has been launched from American soil on an American rocket.

Previously, Elon Musk co-founded and sold PayPal, the world's leading Internet payment system, and Zip2, one of the first internet maps and directions services.

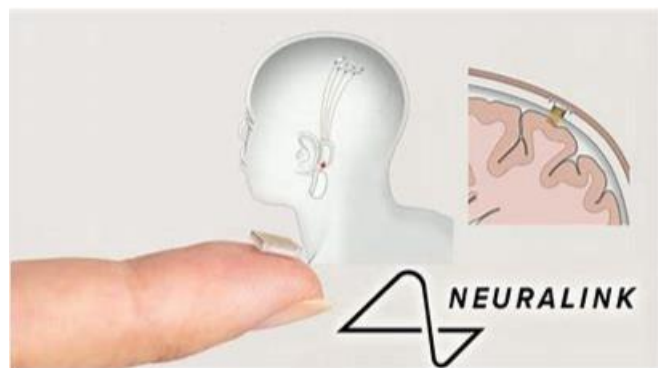
It is therefore very likely that Elon Musk will again successfully execute on his latest venture. He is co-founder and CEO of Neuralink, which is developing brain-machine interfaces to connect the human brain to computers.

Neuralink could be ready to put a version of its implant in a person "within a year," Mr. Musk said when recently speaking on Joe Rogan's podcast. The initial goal of the implant is to use it as a means to treat brain injury and trauma. From recognizing and prohibiting epilepsy in real-time to fixing stroke damage and even assisting the elderly with memory retention, Neuralink hopes to make tremendous strides in improving the welfare of the human population.



"There's still a lot of work to do," Elon Musk said when speaking with Joe Rogan. "So when I say, you know, we've probably got a shot at putting it in a person, you know, within a year. I think, that's exactly what I mean, I think we have a chance of putting input in one end, having them be healthy, and restoring some functionality that they have lost."

The Neuralink computer chip could potentially be used to restore eyesight, hearing, and limb movement in addition to addressing diseases that affect the brain, Mr Musk claims. The device would be implanted directly into the skull to enable electrode threads to interface with certain areas of the brain.



"It could, in principle, fix anything that's wrong with the brain," Mr. Musk said.

But that is just the early ambitions of Neuralink. The Company has three stated goals: Treating brain disorders and helping people who had accidents; creating a brain-machine interface; and building toward a potential symbiosis with artificial intelligence.

It sounds like something out of "Star Trek," but the logic is sound.

"If you know somebody who's broken their neck, broken their spine – we can solve that with a chip," Elon Musk said. "And this is something that I think most people don't understand yet."

It is not just a measure of computerizing your brain, but a measure of potentially fixing complex neurological problems. "I think there's an incredible amount we can do to solve brain disorders and damage," Mr. Musk said.

"I do want to emphasize that it's not going to be like suddenly Neuralink will have this incredible neural lace and will start taking over people's brains. It will take a long time. And you'll see it coming," Elon Musk said.

"Getting FDA approval for devices of any kind is difficult, and this will be a slow process where we will gradually increase the issues that we solve until, ultimately, we can do a full brain-machine interface," Elon said.

Regarding the trepidation towards eventual human-AI symbiosis, Elon responds "It's optional."

His biggest worry is that AI will outright surpass human intelligence and “we will be left behind” as a species. But, if our species can create a “high-bandwidth brain-machine interface,” then we might stand a chance of keeping up.

“We can actually go along for the ride,” Mr. Musk said, “and we can effectively have the option of merging with AI.”

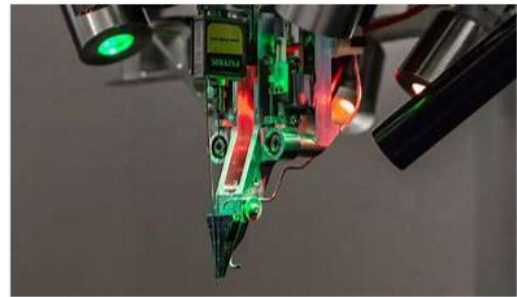
In truth, Mr. Musk claims, “humans are already partly cyborgs”. With our mass dependency on our phones and personal computers, the only difference between the current state and one with AI-symbiosis is that the “data rate” or “communication speed” between us and the electronics right now is extremely slow.

By facilitating rapid information access and augmenting intellectual capacity, the Neuralink interface could enable users with substantial productivity growth, potentially “by a factor of ten”. It is also possible that this future technology could make verbal communication obsolete in the future.

The first person with spinal cord paralysis to receive a brain implant that allowed him to control a computer cursor was Matthew Nagle. In 2006, Nagle played Pong using only his mind; the basic movement required took him only four days to master, he told The New York Times. Since then, paralyzed people with brain implants have also brought objects into focus and moved robotic arms in labs, as part of scientific research. The system Nagle and others have used is called BrainGate and was developed initially at Brown University.

The Neuralink system has substantial advances over older BrainGate technology. The one major advance is the flexible “threads,” which are less likely to damage the brain than the materials currently used in brain-machine interfaces. These threads also create the possibility of transferring a higher volume of data.

The threads are 4 to 6 μm in width, which makes them considerably thinner than a human hair. In addition to developing the threads, Neuralink’s other major advance is a neurosurgical robot capable of inserting six threads (192 electrodes) per minute automatically in the brain. In photos, the robot looks something like a cross between a microscope and a sewing machine. It also avoids blood vessels, which leads to less of an inflammatory response in the brain.



Neuralink has developed a custom computer chip that is better able to read, clean up, and amplify signals from the brain. Neuralink intends to implant four of these “N1 sensors” in the brain, three in motor areas of the cerebral cortex and one in a somatosensory cortex area. It will connect wirelessly to an external device mounted behind the ear, which will contain the only battery. It will be controlled through an iPhone app.

Is Elon Musk being overambitious with this revolutionary mission? If we cannot beat AI, is the best option to join them? Given the exponential acceleration of technology, the prospects of the Neuralink device are endless. Undeniably positioned to have a palpable impact on society, Neuralink ends up leaving us with more questions than answers on the possible trajectory of human evolution.

