

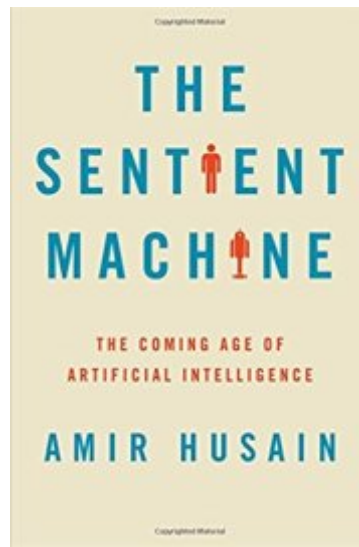


I recently picked up a copy of Amir Husain's [The Sentient Machine: The Coming Age of Artificial Intelligence](#). The book reminds me of Bill Gates' *The Road Ahead*, published in 1997 when VHS was king, everyone went to Blockbuster, and the Sony Discman finally had skip protection. Gates' described a future of Netflixesque streaming, Google-like searches, and Apple Pay-like transactions; all things that are common place today. Amir takes a similar approach and the future he paints has artificial intelligence taking center stage. I recently caught up with Amir and asked him about his book, the future of warfare, and for some further reading on the topic.

Joe: Can you tell readers a little bit about your book?

Amir: *The Sentient Machine* is a book that explores the answers to existential questions in the age of Artificial Intelligence. It asks whether, faced with an unknown future, we should still forge ahead with the development of artificial intelligence. The book is written for a general audience but also presents a personal account and contains vignettes from decades of my thinking on the nature of reality, the intrinsic value of humans in an age where machines out-work and out-think us, and the value of computational science as a way to think about the universe and the processes we see unfolding around us. To make the philosophy a bit more concrete, the book contains several chapters that explore the

applications of AI we see now and those we can expect to see in the near future. I explore AI on the battlefield - what Gen. Allen and I refer to as Hyperwar - as well as the use of Artificial Intelligence to build cities of the future, advance healthcare, hack (or protect) an election and much more.



Joe: Based on advances in AI, what is one facet of modern day life that you think will be unrecognizable in the next couple of decades?

Amir: Many AI practitioners and researchers have estimated that Artificial General Intelligence - human level and post-human capability - is not only possible, it will arrive in less than two decades. I personally feel that while AGI is possible, it will take much longer to develop. That said, if AGI arrives in the next couple of days almost all aspects of modern day life will be very different! But even if it doesn't, we will still see a profusion of autonomous machines of all types utilizing Artificial Narrow Intelligence (ANI).

I expect the transportation infrastructure to be entirely revolutionized. Autonomous cars, package delivery drones, autonomous aerial transportation (AI-powered flying cars!) and even autonomous surface and sub-surface sea vessels will become the principal means of how we get from one place to another, or how we transport goods all over the world. These technologies will multiply mobility many fold and the world will become much, much smaller. This, of course, is a technological trend at odds with today's political trends of insularity, fenced borders and xenophobia. So, the universal, inexpensive global connectivity that AI will power has even greater geo-strategic and political implications than globalization did. As we develop the technology we've also got to address issues around

increasing societal polarization driven by disaffected middle classes who have are setup to fail in our present economic system, given the rise of automation and mechanization. They are not being treated fairly, and we need to take care of them.

Another area which I feel will be completely transformed is energy. We won't stop at the gas station to buy gas anymore. I don't know if most gas stations will remain viable, in fact. Solar is becoming increasingly viable from a cost perspective, and Artificial Intelligence prognostics - such as those my own company, [SparkCognition](#), provides to the largest power producers, utilities and energy companies in the world - are making the energy segment more efficient, less prone to maintenance nightmares, safer and cleaner. With electric aircraft under development now, we will bridge that "last mile" which was keeping fossil fuels relevant and finally move into an all-electric world.

AI fusion with augmented reality will transform how we entertain ourselves. The immersive nature of the high resolution systems of the future, and the depth of the experience they will enable on infinite landscapes will be at an entirely different level than anything we've seen with computer games so far. Synthetic characters enabled by AI will be nearly indistinguishable from real humans and this will also allow us to bring past actors and movie stars "back to life". Soon after, we'll wonder whether we can digitally reconstruct not just movie stars but also our friends and family members in these augmented or virtual reality experiences. That's a question most of us haven't needed to ponder... everyday life will certainly involve new types of decisions!

And finally, robots will be everywhere. They will be employed in agriculture, construction, the armed forces, law enforcement, retail concierge services, healthcare and almost every other area you could think of. Interacting with many robots every day will not raise any eyebrows.

Joe: How do you see AI shaping the future of warfare?

Amir: The future of warfare is, in fact, artificial intelligence. The kind of distributed, large scale autonomy that AI enables means that almost all conventional systems are already legacy. We just don't know it yet. The relevance of strategy will always be maintained, but AI augmentation even in this context will become a factor. We are working with the Air Force, as an example, on AI-powered logistical decision making. LTG Shanahan, who is overseeing Project Maven - one of the USAF's AI initiatives - is a very forward thinking commander who, in my view, recognizes the inevitability and relevance of AI in the battlefield. He is joined by many of his peers in other services who are thinking along exactly the same lines.

And it's not just us, of course...

China just released their AI 2030 vision which expresses their goal of dominating the field of Artificial Intelligence by being the world #1 AI player. They are already implementing AI in weapon systems, such as AI powered cruise missiles, and they have officially acknowledged the relevance of AI to future military systems. Russia just tested a UGV that they say outperforms human soldiers. If you don't believe them now, wait a few years.

Beyond the kinetic and strategic augmentation realms, I also think the weaponization of information via AI poses a massive threat. I am concerned about an "always on" psyops war which can destabilize societies, hack elections, undermine leaders and destroy national cohesion. We are already seeing the opening salvos of this new style of conflict and will soon see much more very soon. Increasingly sophisticated Artificial Narrow Intelligence can be deployed to psychologically analyze and profile potentially millions of civilians in order to automatically customize messages to shape their opinions. I talk about this extensively in my book, "The Sentient Machine" in a chapter titled, "Mind Hacking".

Joe: Getting more to the root of the matter, will I have to lead Soldiers against a robot Army of Terminators in the next Great War?

Amir: They won't necessarily look like the Terminator, but yes, you will deal with robotic opponents in a conflict with a near-peer. The hope is it will be a robot-on-robot melee and we can keep you from being in the middle of it all!

Joe: Besides your book, what would you recommend readers check out or listen to so that they can learn more on artificial intelligence?

Amir: My friend and the Director of CNAS' AI initiative, Paul Sharre, has a great book coming out early next year called [Army of None](#). I've had a chance to read the manuscript and it's very good. Check that one out definitely. I would also recommend [How to Create a Mind](#) by Ray Kurzweil, [Superintelligence](#) by Nick Bostrom, [Mind Children](#) by Hans Moravec, [Society of Mind](#) by Marvin Minsky, and for a contrarian view on the possibility of AGI, Roger Penrose's [The Emperor's New Mind](#). Two good books on algorithms for a general audience are [Algorithms to Live By](#) by Brian Christian and Tom Griffiths, and [The Master Algorithm](#) by Pedro Domingos.

Want to learn more? Grab your copy of [The Sentient Machine](#) and follow Amir on Twitter [@amirhusain_tx](#)

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