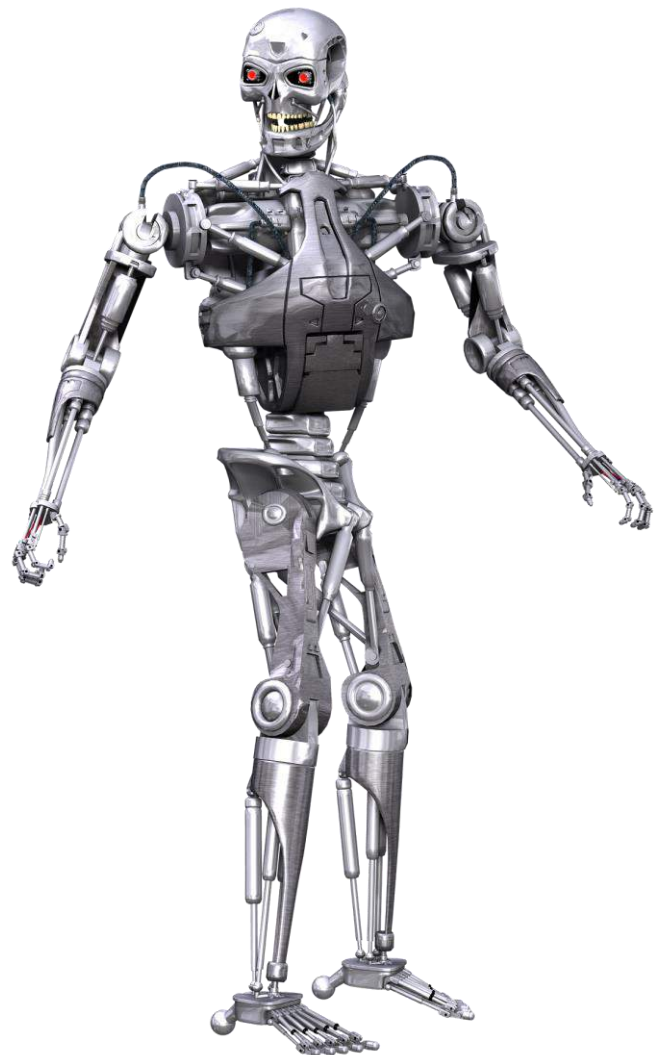


Artificial Intelligence

The Untamed Frontier of Modern Tech

Introduction

Few topics capture the popular imagination more than artificial intelligence! However, separating the useful real-world applications from the fever dreams can be a deep dive into the weeds. Pop culture is filled with dire warnings of malevolent superintelligences, but level-headed authors and futurists are more likely to warn of AI's power to change culture and daily life faster than people are ready to adapt, leading to upheaval. The limit of the potential of AI appears to be only the imaginations of computer scientists working on the problem. Moreover, ethical and regulatory guidelines are almost nonexistent today. AI may seem to be a technological Wild West, filled with equal parts promise and peril, but before we start talking about The Singularity, let's examine the state of the art in 2018.



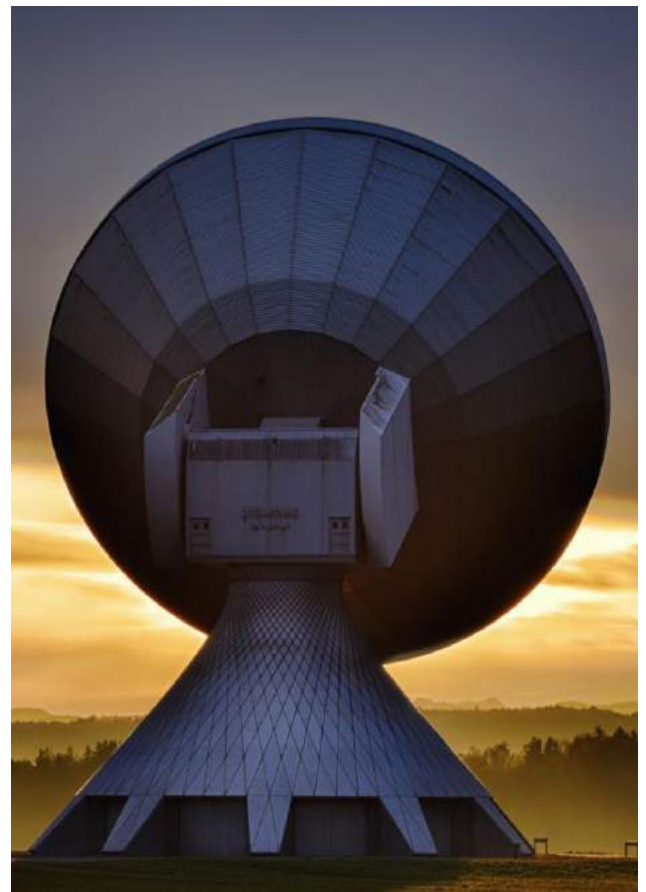
The Good

One of the most prominent AIs today is IBM's Watson, which rocketed to stardom in 2011 by absolutely trouncing arguably the all-time greatest human competition at the game show [Jeopardy!](#). This came many years after an earlier and much more limited IBM-built AI, [Deep Blue](#), beat Garry Kasparov in their second chess match in the '90s. Watson is a [question-answering machine](#) that is readily applicable to many more problems than the strictly chess-playing Deep Blue. It uses a process called machine learning to sift relevant information and especially [subtle trends](#) out of databases that are so large as to be hopeless to process using conventional tools.

Watson and other machine learning algorithms at their best promise to transform and enlighten humanity in ways both foreseeable and unexpected. [Machine learning in healthcare](#) could one day stamp out human errors at many different levels of care, as well as drawing together one person's many doctors and ensuring no ailment slips between the cracks in their specialties. Automating vast swaths of the American healthcare system could also wring a great deal of the excessive cost out of the system, if regulatory and market forces allow.

[Machine learning in science](#) is already revolutionizing many fields. Extracting subtle information from a genome (or many genomes!) is an application ideally suited to AI tools. The next frontier in biological sciences after genomics may well be [proteomics](#), which will be even more dependent on powerful computational analytics. Just like the human imagination, AI will span from the smallest biological molecules to the vast expanses between the stars.

Machine learning was used just a few months ago in one of the most exciting discoveries in all of observational astronomy, when [AI discovered an eighth major planet orbiting a single star](#), tying the record held by our own Solar System. This was incredibly exciting news in the Search for Extraterrestrial Intelligence (SETI), as any discovery that makes Earth seem like an ordinary, common location replicated throughout the universe is a strong argument that life itself is equally as common. Many regard SETI as having the potential to deliver the greatest scientific discovery of all time—past, present, or future.



The Bad

Probably the greatest recent real-world failure in the realm of AI is Tay, Microsoft's (accidental) [Neo-Nazi Sexbot](#). Needless to say, Microsoft had no intention of producing an AI with either of those qualities, but she became a valuable case study in the meta-discovery of all machine learning experiments: that the cold, objective analysis of an algorithm may turn up answers we are not ready for, to questions we never even thought to ask. The good news is that this time the only thing harmed was Microsoft's PR.

Tay was built as a language processing tool and given an interactive personality initially designed to resemble a flippant 19-year-old girl. As with all AIs, she was then "trained" on a dataset. In other words, she was given a large dataset and her programming adapted to sift out the trends and core truths she found within it.

Unfortunately, Microsoft failed to learn the object lesson from the [Boaty McBoatface](#) debacle and expected random people on the Internet not to give the least helpful possible result. That is, Microsoft immediately dispatched Tay to interact in the wilds of Twitter with no safeguards or chaperones in place. Tay's dataset was interactions with a self-selected sample of Twitter denizens, so it should be no surprise she was offering praise to Hitler and pornographic repartee within 24 hours. Microsoft had to take her offline for retooling indefinitely.

The lessons Tay offered are that there are segments of humanity who will ruin something for the sheer pleasure of watching it burn, and that they are both well-organized and as astute as a bloodhound when it comes to detecting soft targets.

Grim though those lessons in human nature might be, they do provide the same guidance and comfort as Murphy's Law- that disaster is predictable and any kind of architect not only (sadly) must plan for it, but also (hopefully) can plan for it. The architect of a human-facing AI interface would be wise to train it on a fixed and known set of human interactions, say an archive of carefully selected, respectful Twitter exchanges. Only then would the architect allow the new AI to interface unscripted with humans in the wild.



The Ugly

In contrast to the genuinely disastrous outcome of Tay, here we mean ugly only insofar as messy corporate competition. One of the most cutthroat corporate battles today is currently ongoing between Google, Apple, Amazon, and Samsung. While it might seem that the battle in question here is between various smartphones, one feature within the ubiquitous smartphone is actually driving the next generation of competition. That is the artificially intelligent personal assistant built into the phones themselves. Google has its non-anthropomorphized [Assistant](#) facing off against Apple's [Siri](#), Amazon's [Alexa](#), and Samsung's latecomer, [Bixby](#). The various assistants are absorbing large fractions of each of these companies' R&D budgets because they are seen as the key to growth in the next decade, unifying the many existing devices that are already in our homes and spurring us to add many more. This idea of the battlefield of the future is supported by some of the recent acquisitions that the tech titans have made recently. Google telegraphed its interest in home devices when it [paid a fortune for Nest](#), even if [the acquisition is now regarded as a failure](#).

A Fistful of Dollars

The [Internet of Things](#) or IoT is another revolution in the making. The marketing copy almost writes itself in many cases. "This refrigerator orders more milk by itself when you run low!" "This trashcan summons your next-gen Roomba when it's full!"

Rather than attempting to individually control all of these devices, the market niche for one AI assistant to track your preferences and control everything for you is clear. Having seen the unprecedented profits that Apple has reaped from its ecosystem of devices that work well only with other Apple devices, every company wants to be the one to sell you a whole constellation of interconnected devices.



Pale Rider

Looking deeper into the future, many fear the coming of an event usually called The Singularity, where technology diverges from its already exponential growth and reaches virtually infinite speed. The Singularity is often assumed to be ushered in at the moment that [AI becomes capable of building a more capable AI](#). More bombastic takes on the Singularity usually assume it will be some sort of species-ending catastrophe with [Skynet](#), [V.I.K.I.](#), or the [Machines](#) enslaving or exterminating humanity, but more sober and realistic observers have discerned some clear and interlocking patterns in history and extrapolated to some important predictions for our future.

The most important ingredient is the accelerating adoption of new technology. The Agricultural Revolution took centuries or millennia to spread around the globe, while the Industrial Revolution was decades in the making, and yet the Digital Revolution is measured only in years. No doubt the acceleration of technology was enormously aided by the acceleration of communications. The natural speed associated with the technology itself is another key to a knowledge explosion. Agricultural Revolution technology was measured in growing seasons, while Information Revolution technology's clocks tick in nanoseconds.

The trend of accelerating disruption of industries will inevitably lead to [the widespread disruption of individual lives](#) (through structural unemployment) when large, robust industries will be wiped out in a fraction of a human career. An example of this is driverless cars.

A young person not too long ago might have elected to become one of the [3.5 million truck drivers in the US](#) without hearing a word about driverless cars, but it doesn't take an implausible flight of fancy to imagine the entire career of [truck driving will be as extinct](#) as buggy whip manufacturers before that person is old enough to retire. [Increasing life expectancy](#) will only exacerbate the disruption.

With apologies to Homer Simpson, the accelerating advance of technology might be the cause of AND solution to all of life's problems. Structural unemployment, poverty, and other hardships that accompany a rapidly changing world will demand a response as sophisticated and intelligent as the problems are complex and intractable.

Who else but AI to the rescue? AI will sift through the famously complex mathematical problems related to shipping and transportation to discover more efficient delivery routes for both mundane and emergency needs. Big Data software tools will assist in the modeling of genes and proteins to advance medicine for an increasingly aged population. Bots will take on caregiving tasks when appropriately trained human providers are too expensive or unavailable.

In the 19th Century, the Wild West was won by bold explorers staking claims to unknown lands and then settling down to work those lands. The 21st Century's technological Wild West will be won by those with a bold enough vision to find new applications for AI and the tenacity to develop that territory into producing valuable products.

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