2023. THE YEAR OF THE AI

Fondation **Pierre du Bois**
pour l'histoire du temps présent

Thomas Gidney*

2023. THE YEAR OF THE AI

Science fiction from the 1970's and 80's often made grandiose predictions about the future. From easy space flight to flying cars, the imagination of the late 20ᵗʰ century was focussed on the reality of the 1960's and the race to the moon. What these often-fanciful visions of the future often missed was the very real revolution that was gradually taking off in computing. Initially code breaking devices hidden away by the British secret services in the depths of Bletchley Park, computers have shrunk from room-size behemoths to now holding many times the same computing power in the palm of your hand.
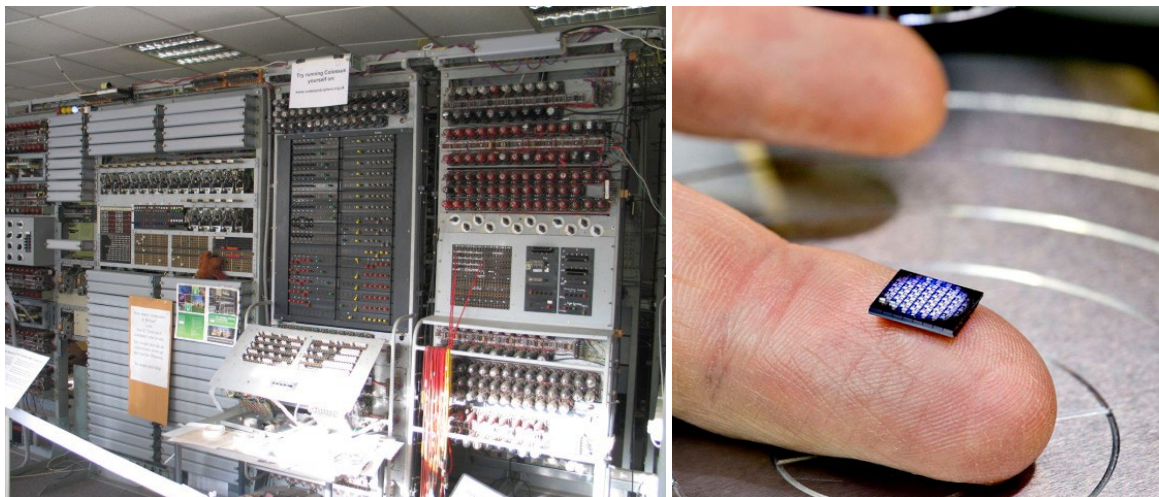

Figure 1: (Left) The Colossus, the world's first electronic computer at Bletchley Park, (Right) the world's smallest computer designed by IBM, (Attribution to 'The Verge' and IBM).

Combined with the launch of the World Wide Web from the office of Tim Berner's Lee in CERN here in Geneva, the marriage of silicon and cyberspace has led to a technological transformation that few sci-fi's accurately predicted (okay Back to the Future 2 predicted Zoom calls, but we were too focussed on the floating skateboards to notice). Driven by Moore's law of the doubling of computer power

every two years, computing power has seen incredible economic growth whereas other sci-fi predictions have proven to be relatively moribund. From what can only be called a technological revolution has seemingly sprung a new phase, driven by 'artificial intelligence'. In the last few months, the media has bombarded us with thousands of takes (including this one), on AI's potential. Yet despite the promise and potential risks of AI, artificial intelligence has often been a field that had lagged behind the computing revolution. AI is not exactly a new concept. For someone having grown up with computer games in the 90s, artificial intelligence has often been a bit of a joke. Either too predictable or too irrational (Mahatma Gandhi in the 'Civilization' series was accidentally programmed to be a nuclear war-monger), AI has been a weak spot in most games despite the huge leaps and bounds in graphics and computing power. These early games, with 'pong' (1972), where one mimics a game of ping pong against the computer, were seemingly some of the first attempts to create a basic form of computer 'intelligence', however primitive. But the roots of attempting to manufacture intelligence that could either mimic or outcompete human intelligence has been an ancient theme. From the bronze man Talos, forged by the Greek God Hephaestus to the 18th century automatons of Neuchatel that can draw the likeness of Louis XV, the mimicry of human action both physically and mentally in the body of a machine has been aspired to, but never in reach.

Figure 2. (Left) 'Tipu's tiger', an automatom of a tiger devouring a soldier of the East India Company is another early mechanical automatom. (Right) Talos from the 1963 film Jason and the Argonauts

If the quest for the creation of human intelligence combined with the computational speed of a machine is millennia old, what is different about the year 2023? Over the previous months, tech companies have unleashed an unremitting barrage of new artificial intelligence models. Chief among these is Open Ai's 'Chat GPT'. A so called 'language model', it is far from omniscient. My attempts to twist Chat GPT to my academic whims by identifying relevant literature in my field turned out to be a damp squib, when Chat GPT recommended several legitimate sounding papers, that all turned out to not exist. Where Chat GPT excelled at was when my mother-in-law used it to write a poem for a cardiologist's 90's birthday. "Through every beat of the heart, You've been there to play your part" was probably the strongest stanza of the whole poem.

From reciting cardiology poems to predicting nuclear Armageddon, this year has seen a wild array of praise, hype and prophecies of doom over the new technology. There have also been moments of incredible embarrassment too. Google's unveiling of its AI model, Bard, was a disaster. When asked an astronomical question about who took the first photo of an exoplanet (a planet orbiting a star outside of our solar system), Bard responded that it was the James Webb Telescope in August 2022. The telescope had discovered an
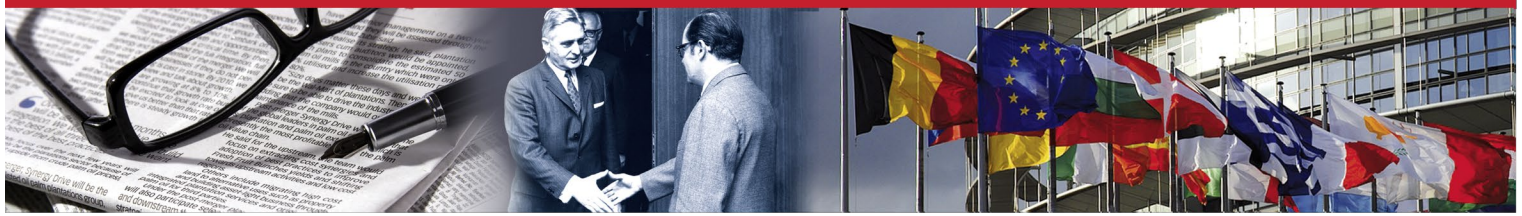
exoplanet that year which had generated a considerable amount of news stories for Bard to pick up on, but the first discovery was in 1988 and confirmed in 1995. The event proved that despite the hype, there are still clearly limits to AI, and Google was punished by its somewhat fickle investors to the tune of an 8% crash in its share value. At its least competent, AI thus seems like yet another failed iteration of the ancient desire for a mechanical mimicry of mankind.

Nonetheless, whilst AI seems more automaton than compared to 2001 Space Odyssey's HAL, artificial intelligence's mission to outperform the human mind is not a trivial one. It might be hard to imagine, especially when you look at the current state of global affairs, but the human brain is one of the most complex things in the universe, making up tens of billions of neurones and hundreds of trillions of synapses contained within a kilo and half of its gelatinous walnut shaped lattice. The intricacy of our brains makes even the most advanced supercomputers comparably look like the lumbering room-sized behemoths from IBM from the 1960's many times over.

Yet, unencumbered by the billions of tasks needed to maintain homeostasis, and the complex and more convoluted ways people access their memories, AI has outperformed humans in mathematical tasks for decades. AI has famously defeated Chess grandmasters since the 90's, with IBM's 'Deep Blue' famously defeating Gary Kasparov in 1997. Whereas human players rely on a mixture of strategies and gambits to anticipate their opponents next string of moves, as well as psychology to better understand their adversary, a machine's sheer computing power can process millions of potential moves in the fraction of a second and choose the optimal one. However, computers traditionally struggled at other games. The ancient Chinese game 'Go', features $2.1×10^{170}$, more potential moves than there are atoms in the universe. However, usually a human player can identify several logical moves without having to calculate every single possible option.

This changed between 2015-2017, where a new programme, AlphaGo by 'Deepmind' was able to beat the leading Go players by adopting artificial intelligence and machine learning into the computer model. Rather than using sheer computing power like its ancestors, AlphaGo incorporated ideas not dissimilar to the function of the human brain. Neural networks, not unlike human neurones, help reduce the possible number of moves. By being trained on 160 thousand past matches, and using human like reinforcement training, AlphaGo could distinguish between moves that would help win the match, and random moves. Using its computing power, it could then choose to optimal move from a smaller pool of possibilities rather than having to calculate every single one. Future models using neural networks go beyond this form of machine learning, to foster actual creativity in artificial intelligence rather than sophisticated mimicry.

AlphaGo's victory over the world's best human players sent signals that Artificial Intelligence could match the human brain when faced with an almost infinitesimal number of moves. We had finally been bested. Yet there was still hope that humanity and artificial intelligence could find a happy balance. Machines are mechanical and mathematical, whereas humans are creative and (can) possess ingenuity. We contended ourselves that a two-tier system could exist where humans could innovate, and machines process the innovations. AI generated portraits of people spat out images of maniacal smiles and monstrous fourteen mangle fingered figures that could only have been spawned biologically from the deepest depths of the Norfolk Broads. Artists often claim that hands are the hardest thing to draw, and it appeared that machines were having the same issues too. Therefore, it seemed that the creative arts were a safe haven from the machines. That was until 2022, when an AI won first place at a Colorado art competition. Although it may have been a reflection on the quality of art in the Mid-West, the AI had breached a final frontier of human ingenuity. A few months later, they could generate hands that didn't look like Anne Boleyn's.

Figure 3: Figure 3. An image from AI art programme 'Midjourney' depicting early limitations on the generation of fingers, from Buzzfeed

The looming domination of artificial intelligence, that can seemingly beat humans in all areas of work has led to a spate of analyses about the future of work. Some organisations such as the World Economic Forum have seen the ascendency of computing / AI as a 'Fourth Industrial Revolution' that will eventually replace the vast majority of jobs, leaving people free to either pursue their passions, but also potentially leading to unemployment and the monopolisation of financial power in the hands of companies controlling AI. This is the background for the 'Dune' series by Frank Herbert, in which humanity has overthrown the rule of an elite that had concentrated power through machines, and exists in a post-computing, albeit drug induced feudal universe. Resistance to artificial intelligence may seem to derive from the resistance to technological development since the 18th century weavers of Lancashire destroyed the power looms during the first industrial revolution. Technological innovations are often destructive for those that it renders obsolete, yet new positions have often arisen from technology that have ensured that human workers are not replaced. Keynes's prediction that mechanisation would become so efficient that the work week would be reduced to 15 hours never came true, with many working longer hours than ever, whilst the post-pandemic era saw unemployment rates shrink to record lows.

Nonetheless, many predictions state that this it's different this time. The recent leap in development in AI and robotics presents a faster pace of evolution than the one precipitated by the steam engine or the electrification of society. Industrial and mechanical jobs seemed the most at risk, but the creation of AI generated art shows that the potential goes well beyond automotive jobs. It's difficult to see who will be spared the rapid proliferation of AI.

In a presentation of the effect of AI on jobs by the economist Richard Baldwin, I asked whether my own profession, history, would be safe. From the material side in reading archival material and deciphering old handwriting, to the analytical need to make connections to understanding the often seemingly irrational actions of human actors, historians seemed safe. In fact, the only discussions I had seen in the historical profession was how to identify whether a student had used Chat GPT to write their essay. Every profession is probably going through a process right now rationalising why they cannot be replaced by a machine. Since the industrial revolution, technological leaps have primarily affected the agricultural and industrial sectors. This time, AI is coming for office workers.

Therefore, my confidence that I would not be replaced by a machine was perhaps unfounded. But Baldwin's response was one that has become increasingly popularised as "AI won't replace you. A human using AI will replace you". Rather than laboriously trawling through
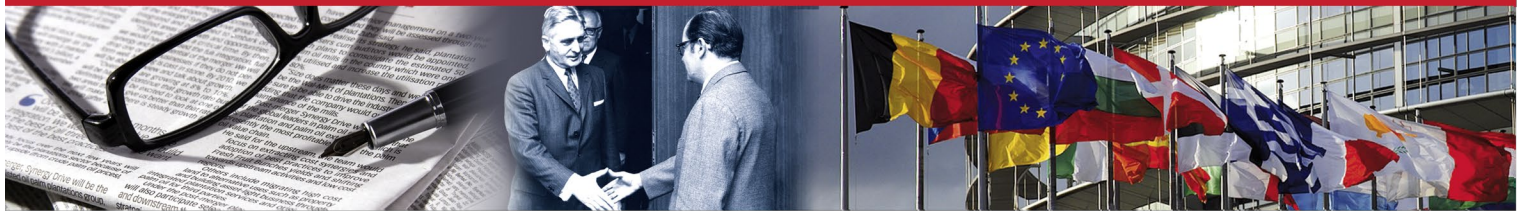
thousands of pages of an archive looking for gold, an AI could identify key elements within a document and summarise them into an essay. The researcher could then fine tune and analyse these summaries into the finished article / monograph. Granted, this would require a high degree of digitalisation of archives, a notoriously slow process, combined with AI that can identify handwriting, especially for those studying pre-modern history who don't have the luxury of reading typed text. But these developments are happening slowly but surely, as records are increasingly digitised, and AI improves its understanding of the fine cursive to messy scrawls of our ancestors. Humanity is not obsolete yet and in the tug of war between the human brain and artificial intelligence, human ingenuity can still persevere. In February 2023, Go player Kellin Pelrine beat an AI despite the seeming domination of AlphaGo several years prior. However, Pelrine was able to do so by using an AI himself to analyse his digital opponents strategy, noticing patterns within the way its playstyle. Recently, Noam Chomsky, Ian Roberts (both linguistics professors) and Jeffrey Watumull (an AI expert) published an article in the New York Times attacking the 'false promise' of language models such as Chat GPT. They argue that current AI lacks the sophistication of the human brain that is designed to make complex inferences and analyses on much smaller amounts of data, rather than having the Olympic sized swimming pool of human knowledge through the internet at their disposal. Their critique finishes on the amorality of AI. Chat GPT will often respond that it cannot state an opinion or hold a moral position. When AI's have done so, they can often regurgitate some of the more unpleasant perspectives from the internet that one would find trawling a subreddit at 3am. In their critique, AI is more an 'incel' that philosopher, unable to attribute significance and weight to different bits of data.

Whilst some see AI as simply a vulgar attempt to replicate human intelligence, there have been significant calls to rein in the development of AI. Early pioneers in AI technology first blew the whistle on the fruits of their own labour, followed by a litany of tech CEO's such as Steve Wozniak (Apple) and Elon Musk (Tesla). Their warnings have often seemed hyperbolic, cautioning that AI could become a threat to humanity itself, especially if employed by the military, which it almost certainly will. Governments around the world have been keen to be seen to pre-emptively bring in strong regulations governing the use of A.I. Nonetheless, authorities have been notoriously slow in implementing and updating regulations on fast moving areas of digital technology. The most comprehensive protections for digital privacy came from European Union's 'General Data Protection Regulation' (GDPR), which was only introduced in 2018, a good decade after the arrival of the digital advertising model had catapulted tech companies into some of the world's largest corporations. If AI promises to be the next great leap forward, there will understandably be some reluctance among states to limit its usage.

Whether AI is simply a banal form of mimicry to the existential dangers posed by it, AI is probably not just a passing fad that will dissipate by next year. In the late 90's, when the internet began its inexorable rise to ascendency, there were widespread doubts about its utilisation. One of the best examples that captures this doubt is this youtube clip, that may not contain the intellectual heavyweights previously mentioned in this article, but of BBC presenter Jeremy Paxman interviewing Pop singer David Bowie from 1999. When asked whether the internet amounted to much more than a way to share pictures of your cats, Bowie responded that we had only just seen the 'tip of the iceberg' of its potential. Since then, the internet has triggered everything from a revolution in the way we communicate and buy and purchase goods, to literal political revolutions during the Arab Spring, as well as of course, keyboard cat. The internet has encapsulated quite perfectly the political, the economical, the malicious and the banal into one.

With the rapidity that people are taking up AI, the proliferation of different kinds of models on offer, as well as the leaps and bounds through which AI has improved, is the hype real? A year following Bowie's 1999 interview on the promise of the internet, the NASDAQ, the *de facto* stock exchange for tech companies crashed, as some of the first generation of tech companies crashed out of existence. No-one remembers Pets.com and Webvan which were lost in the financial massacre of the Dot Com bubble and the internet looked
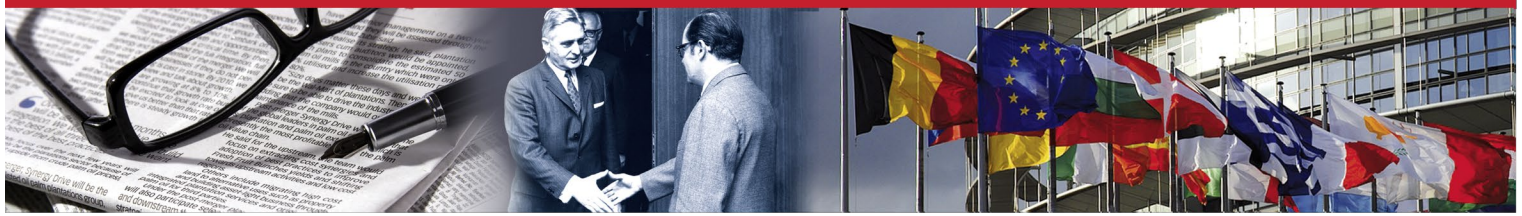
like it could have been a flash in the pan. However, companies that survived the carnage, such as one company called 'Amazon', have revolutionised retail shopping, whilst simultaneously leaving most of the world's highstreets empty and in foreclosure. Even if we haven't found a better use for Chap GPT than writing a birthday card for a 90-year cardiologist by the end of 2023, it would be wise to consider AI's potential as one as important as the internet itself. I can't give you the answer to what the next big use of AI will be, but someone in Berkley or Bangalore probably does, and when they do, the world will not be the same again.

Dr. Thomas Gidney

* Researcher specialized in colonial and Indian history, the history of international organizations, and foreign policy