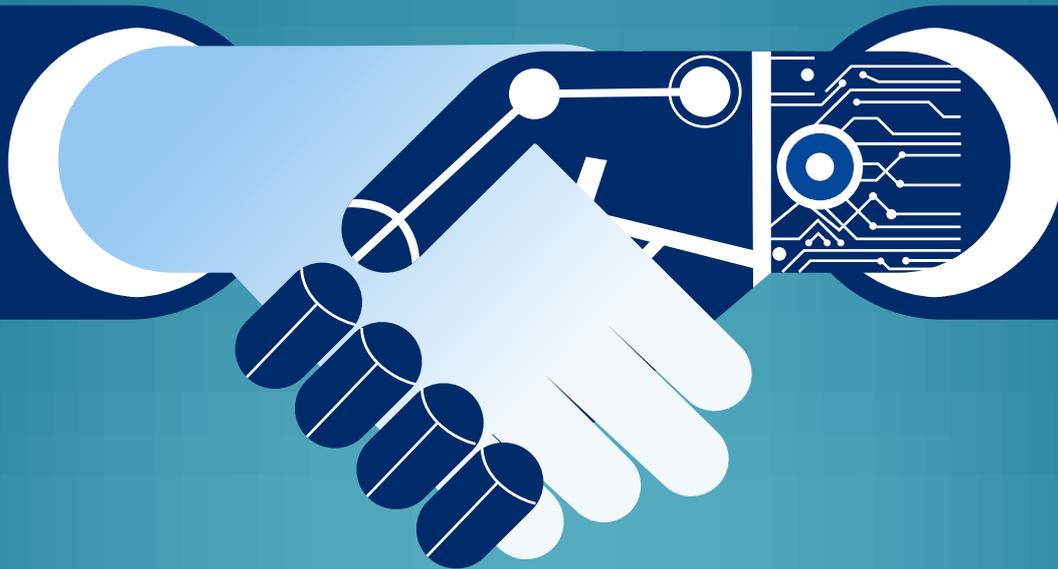


Human+Machine Collaborations: The End of IQ, The Era of EQ



Inma Martinez, Tech Pioneer and A.I Scientist, discusses the origins and rise of A.I and machine learning, and considers the need for collaboration.

As 2020 unfolds, humanity is currently encountering what Medieval society feared the most: the world's order falling into chaos. However, it was precisely this shake-up which gave way to one of humanity's most dynamic and transformative eras: The Renaissance. Amidst the tumbling pillars of centuries past - that humankind can use and abuse nature at will, that pandemics and international wars wipe out populations and send economies into downwards spirals - the lessons learned from each, are producing new mindsets and paradigms that will form a more advanced society, just like we did in the 1500s.

Today, we are realising that ethics, diversity and inclusion encompass not just humans, but the animal and the nature kingdoms too. Furthermore, progress is not a quantifiable tool to account for the number of patents and inventions developed within a given century, but instead the value that a service, a product, or a corporation, can deliver to the highest benefit of all concerned.

A.I. was born out of World War II - the twentieth century replica of the Medieval concept of Hell. This international conflict also derived another unimaginable powerful tool: nuclear fusion. Used at inception to cause pain and horror in the form of H-bombs, today it is considered a green energy because it protects our air quality by generating electricity without harmful pollutants. A.I. had a reverse fate: while it helped decode the Nazi ultra-intelligence messages - shortening the war in Europe by more than two years and saving over 14 million lives - it has in the 2010s created the Cambridge Analytica fiasco, the wide-spread of fake news, the conspiracy of manipulating people's facial expressions and pasting them onto bodies that are not theirs.

A.I. is not an entity that acts on its own. It is created and deployed by humans. It can be created without regulation, and it can be audited for what it brings to society.



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Machine intelligence impacted computer scientists and mathematicians because it demonstrated a machine's ability to amplify human knowledge and understanding, even to simulate human thinking. With this purpose in mind, machine intelligence was developed for decades to create progress; from the birth of statistical analysis, which ignited the efficiency of the money markets, to scenario planning, which allowed governments to plan not just whether or not to enter into new armed conflicts, but also to plan urban developments based on population's needs.

In the private sector, oil and gas companies have been honing scenario planning algorithms since the 1970s, to accurately manage their prospecting sites. Shell has some of the world's best trained "algos" performing this task. As we carefully trained machines to think in more sophisticated ways, we also thrived to allow machines to attempt thinking on their own, and so the 1980s, and 1990s, saw the birth of automated robotics and personalisation systems based on observations of human behaviours.

The first encounter that most people had with an intelligent system was arguably the "people who bought this book also bought this other one" scenario. Collaborative filtering (an algorithmic-based relational system where every piece of information is an object), created suggestions for digital users in music streaming sites, further items to purchase in retail e-shops, and eventually a pretty accurate map of what we like or not based on choices we previously made within defined scenarios. I built one of those in 2000. It re-ordered the links to content in WAP mobile portals so the desired results would always appear in the first screen, saving users insanely tedious scrolling.

Nevertheless, something spun a twist in the development of A.I. - a reversal of fortune caused by IBM's Blue. In 1996, the big Titan of machine intelligence at the time, beat chess grandmaster Kasparov, putting a dent in the souls of the Mensa illustrious members, thus demonstrating that human IQ was soon to be dethroned as the bar to measure human brilliance. Intelligence in the post-World War II society was all about IQ. Mensa, created just as the war folded, aimed to form an elite society for those who could demonstrate superiority in computational intelligence. Mensa never tested creativity, abstract mindfulness, or inductive and deductive thinking. The world's obsession with IQ thus determined that chess players were geniuses, and mathematics prodigies that could perform calculations in their heads were super-humans. So, when machines dethroned world chess players, and Alpha Go even taught itself from scratch to play and win every time, learning from the basic rules of the game and not from the moves of the human masters (as other A.I. programmes learn to play), some thought that humanity would soon be control-alt-deleted by the powerful IQs developed by A.I. programmes.

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However, this is not the purpose, or best use of machine intelligence. IQ is not our best super-power. It is neoteny - our wild, imaginative, unstoppable curiosity. What made our neocortex grow bigger than any other mammal? What got us out of the jungles and made us build a world's order, a civilisation?

The A.I. paradigm that evolved from the Kasparov defeat, aimed at creating machine intelligence that could be versatile, imaginative, talented, and even precocious. The 2000s, brought a new type of machine intelligence training camp: neural networks. Attempting to create an artificial brain based on how a human biological brain operates, neurons became nodes, and just like human thinking creates synapses - the physical manifestation of human thoughts take place when neurons fire and wire together - machines were encouraged to think further by fluidly developing deep neural nodes, and with this, a machine intelligence that was fast and virtuous but also black-boxed.

In Deep Learning, we know when the system has learned something because we observe how accelerated the neural networks grow, and how fast the acquired knowledge manifests itself. When Alfa Go Zero learned to play and win 100 to nil, it interpreted the infinite possibilities of the game far beyond what a human brain could. It was simply that. It had been encouraged to do this. Alfa Go Zero became the token example of how a deep learning system can quickly learn within a computational - big data-fed, binary outcome purpose - win or lose, but not a third outcome. Alfa Go Zero only knows how to play board games. It will not hack into the national grid and switch off the energy supply. That is actually performed by human hackers. Cybersecurity and not A.I. development, is what represents the biggest threat to the digital society.

When A.I. is used as the tool it is, sectors like medical diagnosis, car design and pharmaceutical drug therapy development, have all seen a huge jump in innovation, allowing digitalisation and A.I. to take the lead in the creation of products and services. A.I. saves money, time and delivers better results than our own biological physiology, which is simply not capable of accomplishing tasks with millimetric precision; detecting cancer markers in blood samples, MIRs or CT-scans, measuring and detecting the effects of thermo and crash dynamics in a wind tunnel when designing a vehicle, or spending ten years and an average of £2 billion in drug development based on clinical or in-vitro trials.

At this very moment, machines are helping governments make informed decisions on whether or not to close ports of entry into every major city in Europe and North America, quarantine Covid-19 infected areas, and calculate the effect of this virus on national GDPs. When the data is vast and the outcomes are a multiplicity of possibilities, type A 'force brute' machines are our best allies: they visualise for us, simulate for us, even predict the future. They have been trained to think via mathematical algorithms that deliver 'known unknowns'- circumstances that we know exist but that we are unable to pinpoint. Best of all, they reveal 'unknown unknowns' - that which lurks in the background which we are completely unaware of.

We are heading into a future so full of informational data, that we definitely need machine intelligence to govern and understand what surrounds us. Here is where A.I. becomes a force for good,

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as these machines become our eyes and ears to the world, and the source of insight for us to stay alive - if what goes on is a sentient, invisible force that spreads across the world faster than we can comprehend how to stop and contain it.

No one has a problem with machines that deliver benefits to society, so what makes people nervous about A.I.? I believe it's the fact that machines think inside black boxes that we cannot crack open and analyse. Google is currently being challenged by the EU, to modify the algorithmic architecture of YouTube, in order to prevent children being exposed to extreme radicalisation and X-rated content. It can't fix this as if it were a couple of lines of code that one can go into, delete and re-write. YouTube's algos are part of a closed-up artificial brain. Just like Alzheimer's cannot be surgically removed, the only way to stop an A.I. system from delivering overfitted or inappropriate results is to shut it down and delete it. The tribulations that A.I. companies like Facebook are facing today, is to whether they need to chuck away their old A.I. systems and build new ones that are ruled by ethics and the protection of truth and consumer rights, or continue to generate billions for their shareholders. The real problem is not A.I. itself, but the evil uses that A.I. has been asked to deliver.

As machines take on more computational tasks, we are beginning to develop more creative approaches to solving the world's problems. Machines do not possess tacit knowledge - acquired knowledge that comes from embodying what we learn and excelling at it overtime. Think athletes, sports champions. You cannot replicate Roger Federer, but unique athletes can use the same techniques and then mould their unique tacit knowledge with their own biological DNA. This is why there was only one Steve Jobs. Every Bezos, Musk, and Nadella are their unique

selves. Because tacit knowledge cannot be put into words, it cannot be coded. It cannot be cloned, copy and pasted into an A.I. system.

The future is one where human+machine collaborations bring forth outstanding results together, where human creativity, intuition, empathy, and all the rest of our biological powers use A.I. to achieve desired results. As I write this, I am asked again to work in conjunction with EU commissioners on the future regulatory environment of A.I. in the modern European society. It is a future of ethics, not algos. A 2030 society of human splendour.



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is the advisor to the EU in Big Data and A.I. Regulations.

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