**THE SUPERIORITY COMPLEX**

**CAN MACHINES THINK?**

The question of whether machines may develop the capacity to think like humans is one that has remained unanswered for decades. AI researchers across the world have dedicated their lives to potentially answering this question, and have come up with one general solution – it depends on your definition of thinking.

*“Not until a machine can write a sonnet or compose a concerto because of thoughts and emotions felt, and not by the chance fall of symbols, could we agree that machine equals brain.”* **Anderson, A (1964) *Minds and Machines,* Englewood Cliffs, N.J.: PRENTICE-HALL INC.**

Many people relate the ability to think with the ability to feel emotions and emphasize with the emotions of others. Using this idea, it is easy to decide that machines will never gain the ability to think, as their decisions are based upon probability and analysis rather than compassion or desire. Anderson, among others, was a strong believer that machines could not grow to have doubts or fears like a human could, and therefore could not be described as intelligent. One memorable quote of his, from the same source as above, is that “we can no more say that a computer is intelligent than that a book remembers.” This implies that machine intelligence stems from human intelligence and is therefore not independent, and cannot be classified as the ability to think.

*“Thinking is a freedom of man’s immortal soul. God has given an immortal soul to every man and woman, but not to any other animal or machine. Hence no animal or machine can think.”* **St Thomas Aquinas quoted by Russel, B (1945) *A History of Western Philosophy,* New York: Simon and Schuster, p458**

The ability to feel and emphasize with emotions does not come from the ability to think, in my opinion. It comes from having a soul, and a conscience. Machines may be able to be programmed to think, in their own way, but there is no way to give something like that a soul. The quote above, from St Thomas Aquinas, shows the religious perspective on this – no machine can think because no machine has a soul, and any human trying to change this is therefore playing God. Even from an Atheist perspective, a machine is and always will be artificial, man-made, and not natural as we humans are. From this perspective, machines may learn to deduce, but never to actually think on their own.

There are others, however, who agree that while machine intelligence does indeed come from human intelligence, given time, machines will evolve independently and develop their own knowledge and ideas without human input.

*“The consequences of machines thinking would be too dreadful. Let us hope and believe that they cannot do so.”* **Armer, P (1962) *Attitudes towards Intelligent Machines,* Santa Monica, Cal: The RAND Corporation.**

For a lot of people, even suggesting the idea that machines may learn to think for themselves and become independent of humanity causes an intense rejection of the idea. Why is this? The idea of, for example, AI developing the ability to rewrite its own programming, to create its own protocols, to even develop a sort of moral compass is not something that seems realistic to a lot of people. When presented with these ideas, we relate them to sci-fi movies – Marvel’s JARVIS being a prime example. In the movies, yes, the idea of these ‘characters’ is exciting and amazing, but in real life? People tend not to feel comfortable with the idea. AI researchers such as Armer share this opinion, and believe that machines thinking would have negative consequences and should therefore not be allowed, if it is even possible, at this point, to prevent such a thing.

From a more scientific point of view, it is clear that AI scientists have been attempting to recreate the processes in the human brain that allow us to think and apply them to machine programming. Examples of this include Siri, social media, military drones and missiles, diagnosing rare diseases and self-driving cars. Some of these technologies have had recent advancements that, for a lot of people, are causing major concerns.

*“Last year, a driverless car took to the streets of New Jersey, which ran without any human intervention. The car, created by Nvidia, could make its own decisions after watching how humans learned how to drive. But despite creating the car, Nvidia admitted that it wasn't sure how the car was able to learn in this way,”* **Daily Mail (11.04.17) *Article ‘Has humanity already lost control of Artificial Intelligence? Scientists admit that computers are learning too quickly for humans to keep up.’* Available at** [**http://www.dailymail.co.uk/sciencetech/article-4401836/Has-humanity-lost-control-artificial-intelligence.html**](http://www.dailymail.co.uk/sciencetech/article-4401836/Has-humanity-lost-control-artificial-intelligence.html) **(Accessed 28.07.17)**

These technologies use a system called Deep Learning, which is based off the neural patterns in the human brain, and gives machines the ability to learn from us and from their own experiences. Scientists claim that they have no idea how this technology actually works, only that it does, and this raises the question of what would happen, if we were to lose control of this system? Images of robot revolutions and the Terminator series come to mind, and the fact that we are no longer sure if this is unrealistic or not is what worries us the most.

To answer the question of whether machines can think, we need to consider what a machine actually is. AI and intelligent robots are mechanisms, while we as humans are organisms, and this major difference means that the internal processes we have – thought, for example – are commonly too different to compare. While machine learning capabilities are artificial and dependant on humanity, the machines are still learning and thinking in their own way, and this is not easy to be ignored no matter how much you reject the idea.

**LOSS OF SUPERIORITY, UNIQUENESS AND CONTROL**

So, if machines can think, doesn’t that put them on the same level of intelligence as humans? It is becoming a reality that even the creators of AI technology don’t have a full understanding of how it works, so does that mean that intelligent machines may surpass us as the metaphorical top of the food chain? And why is that such a bad thing?

*“We like to believe man is in some subtle way superior to the rest of creation. It is best if he can be shown to be necessarily superior, for then there is no danger of him losing his commanding position.”* **Anderson, A (1964) *Minds and Machines,* Englewood Cliffs, N.J.: PRENTICE-HALL INC.**

It is generally agreed upon that humanity is the most intelligent race on the planet, and because of this, we have the most power over it. Artificial Intelligence has the potential to become more intelligent than us as a species, and therefore there are concerns of them taking this power. Even before AI was common, machines were being used to solve problems faster and more precisely than the human brain possibly could. Common examples of this include calculators, industrial machines and probability algorithms. In this way, machines have already surpassed humanity, whether we want to realise it or not. However, machines like this were designed to help us, and they do, so what’s the problem?

*“Perhaps we are reluctant to give up our claims for human uniqueness.”* **Millican and Clark (1996) *Machines and Thought: The Legacy of Alan Turing,* Volume 1, New York: Oxford University Press Inc.**

Possibly the biggest threat that AI poses is the threat to change the way we do things, and the way we view ourselves. For as long as we have been on this planet, we have believed ourselves to be unique, to be special, the most intelligent race. Paired with the reluctance to sacrifice this uniqueness is the beliefs that many of us share – religions, for example, teach us that God made us to protect the Earth and to rule over it. The evolution of AI jeopardises this, as these machines are already surpassing us in some fields and will soon surpass us in others. Humans have a history of resisting change, and intelligent machines may be the biggest societal change seen since the Industrial Revolution.

*“AI, if widely successful, may be at least as threatening to the moral assumptions of 21st century society as Darwin’s theory of evolution was to those of the 19th century.”* **Russel, S and Norvig, P (2010) *Artificial Intelligence: A Modern Approach,* Third Edition, Upper Saddle River, N.J.: Pearson Education Inc.**

This is a very interesting comparison because Darwin’s theory of evolution also threatened both the religious and selfish beliefs of humanity, and was rejected because of it. In the same way that people reacted negatively to Darwin’s theory at the time, people react negatively towards AI today as it threatens the assumptions that they have based their lives upon. Once Darwin’s theory was proven, however, it was more widely accepted. Perhaps if it can be proven that AI will do more good than harm, and if scientists directly addressed the public’s concerns, society’s opinions of AI may improve considerably.

**THE FEAR OF REPLACEMENT**

Artificial Intelligence definitely has the potential to change the way we do things, but could it actually replace us? Intelligent machines so far have been largely dependent on us; however this looks likely to change in the near future due to systems like Deep Learning becoming more and more common.

*“It is clear that computers can do many things as well as or better than humans, including things that people believe require great human insight and understanding.”* **Russel, S and Norvig, P (2010) *Artificial Intelligence: A Modern Approach,* Third Edition, Upper Saddle River, N.J.: Pearson Education Inc.**

It is already reality that machines are considerably better than us at things like problem solving and large scale repetitive manufacturing. As these machines continue to evolve, they become better than humans at more sensitive things – for example research, medical diagnosis, military use and in some ways, even education. So, if an intelligent machine is more efficient than a human in a certain career, then aren’t the machines replacing us in our jobs? The answer depends on the job. Humanity simply cannot be replaced in fields such as care and nursing, and jobs where a human touch is necessary to build relationships and offer comfort that a machine cannot. Because of this, there is a balance – humans may need machines, but the machines also need us to improve and instruct them.

*“AI does not attempt to colonise the mind or to subordinate it to the computer,”* **Schank, R (1984) *The Cognitive Computer,* Boston MA: Addison-Wesley Longman Inc.**

Even a powerful computer has limits, although they are not the same limits we as humans have. While they have no environmental, social or nourishment needs, and can work without becoming bored, they do require maintenance and instruction as well as the systems required for their purpose. All of these things need to be provided by a human, so in this sense, intelligent machines cannot replace us and even if they did, they would not last long. The aim of AI is to help humanity, and make our lives easier while enhancing our understanding of technology and creating a more sustainable future. Because of this, the only way the technology could replace humans in a threatening sense would be if the machines became self-aware and self-sufficient enough not to need us anymore. While this could easily happen in the future, it seems unlikely to happen any time soon.

**THE FEAR OF THE UNKNOWN**

**UNKNOWN NEGATIVE EFFECTS OF AI**

Since AI technology is evolving so rapidly, it raises concerns about where, exactly, it will lead. Specialists are already losing sight of how it works, so doesn’t that imply they are also losing sight of how to stop it? In history, messing with the unknown tends to have negative side effects. Now we must ask ourselves; what are the potential side effects of intelligent machines?

*“AI systems’ learning function may cause it to evolve into a system with unintended behaviour.”***Russel, S and Norvig, P (2010) *Artificial Intelligence: A Modern Approach,* Third Edition, Upper Saddle River, N.J.: Pearson Education Inc.**

Intelligent machines would not have been developed without their potential negative side effects being considered. For decades, the idea of AI getting out of control and what would follow has been prominent in the media, as well as in the reports of AI researchers. The development of humanoid AI and the resulting drama has been televised since the early 1900s, with the first ever robot depicted on film being in 1927 with “Metropolis”, where a robot double unleashed chaos in a small town until it was burned at the stake as a witch. Not a very positive beginning to the technology’s media portrayal, but an accurate representation of society’s fears surrounding it at the time.

*“The development of full artificial intelligence could spell the end of the human race… [the technology] would take off on its own.”* **BBC News (02.12.14) *Article ‘Steven Hawking warns Artificial Intelligence could end mankind.’* Available at** [**http://www.bbc.co.uk/news/technology-30290540**](http://www.bbc.co.uk/news/technology-30290540) **(Accessed 28.07.17)**

Many scientists seem to share Hawking’s views, and in the words of technology entrepreneur Elon Musk, in the same article above, “AI is our biggest existential threat.” The technology that allows Hawking to communicate is primarily AI, and the scientist does realise its potential to some extent. He, and many others, agree that AI can and already has aided humanity immensely, however the technology has the potential to go too far, and in doing so could become a huge problem for us as a species.

But what exactly would happen, if the technology went ‘too far’ and became a threat? The simple answer is that nobody knows. Images of a robot revolution come to mind, although whether that idea is purely fiction or potential reality remains to be seen.

*“Maybe the robots will be generous and allow us to inhabit asylums and reserves, where we shall be well cared for and permitted to harm no other human beings, with no other weapons than clubs and stones, and perhaps the occasional neutron bomb to control the population.”* **Sloman, A (1978) *The Computer Revolution in Philosophy; Philosophy, Science and Models of Mind,* Brighton: The Harvester Press Limited.**

Sloman’s view seems like it would be more at home in a sci-fi novel than dedicated AI research, and while it seems farfetched and unrealistic, we have to ask – is it? It is commonly agreed upon that AI will have unforeseen and potentially irreversible side effects, but the true extent of these effects is impossible to predict. Such an extreme, dystopian view of the future with independent AI is instantly rejected as being possible and is occasionally considered as a movie plot. However, as intelligent machines continue to surpass us and their creators, it begs the question of how much longer we can dismiss these ‘radical’ and ‘unrealistic’ views before we start to realise that they may be a lot more plausible than we would care to admit.

While the potentially disastrous impact of AI definitely has to be considered, it is also worth questioning how likely those fears are to become reality. Many AI researchers argue that just because something is possible, doesn’t mean it has to happen. AI evolving also benefits us – our technologies, our way of life, and an exciting new technological future. AI was designed to help us, not to destroy us, and some don’t see humanoid AI living among us to be an entirely bad thing.

*“The bottom line is that this is a question of evolution, not revolution, and that none of this investment is intended to replace humans…. [Artificial Intelligence] is not something to automatically fear.”* **Personelltoday.com (22.11.16) *Article ‘Robots vs Humans? AI and the future of the workplace.’* Available at** [**http://www.personneltoday.com/hr/robots-vs-humans-ai-and-the-future-of-the-workplace/**](http://www.personneltoday.com/hr/robots-vs-humans-ai-and-the-future-of-the-workplace/) **(Accessed 12.05.17)**

The investment into AI has always, seemingly, had positive intentions and the wellbeing of humanity at its core. It could be argued that those who fear AI, for whatever reason, have not looked hard enough at the evidence surrounding the technology and instead, have built their opinions from media and the paranoid statements of people who don’t have all of the information. However, it could also be argued that while the intentions of AI may be pure, it is also uncontrollable and even those who have all of the information available may not be able to prevent their fears from becoming reality. So, is AI something to fear? Most seem to think so, and although there are arguments for both sides, the outcome seems to depend not on us, but on the technology itself.

If our future as a species is no longer in our own hands, and instead in the hands of intelligent machines, should we reject and fear them, or embrace it? After all, in the words of Isaac Asimov:

*“If ever a species needed to be replaced for the good of the planet, we do.”* **Asimov, I (1978) *And It Will Serve Us Right,* People’s Computing, 7, 1, 16-20**

**THE POTENTIAL DANGERS OF AI**

Although we cannot predict the impact of AI in the far off future, we do know the dangers of it in our current and near future society. AI has already been implemented into most aspects of our lives without us even realising, or appreciating that to some extent, the technology we are using is intelligent and comes with all of the potential dangers of Artificial Intelligence.

*“It is possible that AI will have a dehumanizing, alienating effect on society.”* **Self, J (2005) *Whoever said computers would be Intelligent?,* Lancaster, England: Drakkar Press Limited.**

The first thing to consider is the impact on society itself. As AI continues to develop, we will continue to become more dependent on it in our everyday lives. In the same way that the Internet and mobile phones were seen as alienating because of the negative effect they had on the amount of face to face interactions we have with others, we have been continuing to rely more on technology than other people as time has gone by. Evolving AI may lead to this continuing to an extreme level, therefore further dehumanizing society as we socialise with machines and live our lives through screens instead of in the outside world. From this perspective, however, we shouldn’t have to worry about AI dehumanizing our society, because our society is already dehumanized, and the damage there has already been done.

*“AI systems may be used toward undesirable ends.”* **Russel, S and Norvig, P (2010) *Artificial Intelligence: A Modern Approach,* Third Edition, Upper Saddle River, N.J.: Pearson Education Inc.**

Potentially, the main danger of AI in these early stages is how we use it. One major example of this is in speech recognition software, which has recently been upgraded to include AI to improve security systems, and also to aid the disabled or paralysed and allow them more control, safety and independence. In theory, this development has the potential to be amazing, but the risk is that the technology could be used for worldwide wiretapping, and therefore widespread loss of privacy for humanity as well as huge risks regarding major companies and governments. Another example is data handling by everyday companies such as Apple, Google and Microsoft. These companies use AI to store customer information and use it to give recommendations and to monitor activity. Because of this, AI has access to the private details – names, card numbers, and addresses – of most of the human population. This raises the question of who, exactly, protects that data – human, machine or both – and what else it could be used for. Some people argue that AI is only a real threat when used in the wrong hands, but what if the wrong hands belong to the technology itself?

Another concerning development is the manufacture of autonomous AI systems which are commonly being used in the battlefield, both to fight and prepare for wars. Examples of this include heat seeking missiles, intelligent weapons and tanks being controlled only by AI algorithms. Naturally, this raises concerns as AI is essentially being put in control of the means to destroy us. As well as the initial concern for human safety from machines, there is also the possibility of this causing more wars between ourselves.

*“Possession of powerful robots may give a nation overconfidence.”* **Russel, S and Norvig, P (2010) *Artificial Intelligence: A Modern Approach,* Third Edition, Upper Saddle River, N.J.: Pearson Education Inc**.

Much like in historical events like the Cold War, the world’s superpowers may begin stockpiling intelligent weapons rather than nuclear ones, and these advanced technologies could lead to overconfidence and competitive violence. In history, new technology has always been used by the powerful to control the weak, and AI is proving itself to be the most advanced and most dangerous technology that we currently possess.

*“Researchers at Colombia University have created an artificial active tissue that, when 3D printed to imitate a muscle, can withstand great strain and lift 1,000 times its own weight.”* **Mashable.com (20.09.17) *Video ‘This super strong artificial muscle may bring us closer to lifelike robots.’* Available at** [**http://mashable.com/2017/09/20/artificial-muscle-lifelike-robots/#27YUetG8bSq4**](http://mashable.com/2017/09/20/artificial-muscle-lifelike-robots/#27YUetG8bSq4) **(Accessed 30.12.17)**

Even during the process of this project, new developments in AI have been discovered and utilised, for example the artificial muscles developed in Colombia. The scientists who made the breakthrough say that it could lead to a future where humanoid machines are common in our everyday lives, and are using AI to control the muscles and the electrical impulses needed to make them expand. The material is much stronger than human muscle, and while this is revolutionary and has huge medical potential, it also has the potential to be weaponised and create AI soldiers much stronger than humans.

At the end of the day, Artificial Intelligence has almost unlimited positive potential and is developing our understanding of the world around us as well as of technology itself. There is no denying all of the good it can do, but most of the potential issues revolve around the technology being used by the wrong people, or evolving to control itself. Because of this, and because of the human tendency to repeat history, people fear AI as a result of what it can do, but also because of what we will make it do.

**SOCIETAL IMPACTS**

**IMPACTS ON HUMAN SOCIETY**

One thing that most of us fear, other than loss of control and potential robot revolutions, is change. Even if AI remained perfectly under our instruction, and none of our fears became reality, the evolving technology would still have a huge impact on human society as we know it. In the same way that electricity, the internet, mobile phones and television have significantly altered the way we live, AI promises to do the same and more. A world where humanoid AI walk among us, in service jobs or as soldiers, or even as regular citizens – it’s a movie plot, really. But AI scientists agree that intelligent machines will change the lives of mankind, for better or worse, and those dystopian worlds pictured in films like ‘Blade Runner’ and ‘I, Robot’ don’t seem as unrealistic as they used to.

*“Such a development will lead to a fundamental reconstruction of our society.”* **Moravec, H (1999) *Rise of the Robots,* Scientific American, 282, 124-135**

One of the most interesting things to consider is what impact this would have on attitudes towards humanity itself. Would the introduction of humanoid AI invite a new appreciation of what it means to be human? Would the robots be seen as above or below us, or even as equals? There is no way to know, however it is commonly agreed upon that qualities that cannot be replicated by machines, for example creativity and compassion, would be more widely appreciated and sought out by employers. In fact, it could be argued that by forcing us to value our humanity, AI would also be helping us to understand it.

*“Through the advent of AI, then, humanity may come, apparently paradoxically, to an enhanced view of itself.”* **Self, J (2005) *Whoever said computers would be Intelligent?,* Lancaster, England: Drakkar Press Limited.**

This beautiful sentiment by John Self argues that instead of dehumanizing our society, AI has the potential to remind us what it actually means to be human, and to reteach us to respect and value our humanity when compared to intelligent machines. Self goes on to say that *“the ultimate function of AI…..will be to make humans better informed about other humans,”* and with this in mind, the fears regarding AI alienating us as a species seem far off and unrealistic, because after all, AI was designed to help us.

*“AI has the ability to shift our attitude towards underappreciated jobs.”* **Optixapp.com (02.11.16) *Article ‘How Artificial Intelligence impacts the workplace of the future.’* Available at** [**https://www.optixapp.com/blog/2016/11/artificial-intelligence-impacts-workplace/**](https://www.optixapp.com/blog/2016/11/artificial-intelligence-impacts-workplace/) **(Accessed 13.05.17)**

Our society, specifically our education system, is largely based on intelligence and efficiency – you get good grades, you study hard and learn new skills, then you’ll get a well-paid job. We’re commonly told that we can be whoever we wish to be, do whatever we want to – but this is only true for those ‘capable’ of earning it. Artificial Intelligence has the potential to change that. Traits like human intellect can be easily replicated and outdone by machines, so if AI was widely implemented in the workplace, wouldn’t the education system have to change? Such a development would bring to light the importance of other skills, and suddenly creative and social individuals would have an edge – the goal of schools would be to teach children to be *human* rather than to pass exams and to work like a machine.

Naturally, whether this development would be seen as an improvement or a disaster depends on who you are – one of the underappreciated, or one of the replaceable. Hearing about the future with AI will inspire some of us, but terrify others, because any major change in society affects you differently depending on where you are on the metaphorical food chain of life.

**CURRENT APPLICATIONS**

It’s clear that AI will change our society, and has already started to, but the full extent of how it will do this is something that not many people are aware of. In fact, AI is everywhere in one form or another, and the ways in which big corporations are using it to handle our data and create new products is something that the public needs to be more informed about.

*“People in powerful positions already use computer models to make very important decisions that affect our lives, the lives of our children, the welfare of entire populations and the future of the world.”* **Schank, R (1984) *The Cognitive Computer,* Boston MA: Addison-Wesley Longman Inc.**

Since the 1980s, AI scientists have been making predictions about how the technology will evolve, and how it will be used. They theorised about robots capable of problem solving, reading, writing and intelligent communication including arguments and detecting humour. They also predicted the use of the technology for various means by the major tech companies of the world. While scientists today are still working on the former, the latter has become a reality in the past few years, in some cases more subtle than others.

*“Artificial Intelligence is the new competitive weapon that will define how the tech giants compete against one another.”* **Fastcompany.com (10.11.17) *Article ‘How Apple, Facebook, Amazon and Google Use AI To Best Each Other’* Available at** [**https://www.fastcompany.com/40474585/how-apple-facebook-amazon-and-google-use-ai-to-best-each-other**](https://www.fastcompany.com/40474585/how-apple-facebook-amazon-and-google-use-ai-to-best-each-other) **(Accessed 31.12.17)**

One major example of AI in everyday technology comes from Apple – iPhones have become one of the most popular mobile phone providers over the past few years, and one of the main features contributing to this is Siri, an intelligent voice assistant who uses the context of how you use your device to give recommendations and predict what you want to see. Apple also subtly uses AI technology in their microchips and in their facial recognition software on the iPhone X, as well as in their new HomePods which adapt the sound they emit to suit the acoustics of their surroundings.

Google is much more obvious about their AI usage, rebranding as an “AI-first” company in 2016. Gmail and Google Photos use the patterns in your activity to tidy inboxes and photo libraries based on what you use the most, and Google Photos has the ability to suggest filters based on your surroundings. Platforms such as YouTube use Google’s AI technology to tune their recommendations, as according to the same article as above, *“No company has more data or more machine-learning resources”* in comparison.

Facebook, like Google, is publicly fighting to be at the forefront of this new technology. They started using facial recognition back in 2010 for recommended photo tags, and in the words of Facebook CEO Mark Zuckerberg from the article above, *“AI should replicate – and exceed – human senses such as vision and hearing so that Facebook can better understand its users and serve them.”* The company also uses AI to control their translation services, customer enquiries and advertising, and has seen massive increases in company efficiency since.

In terms of AI being used for home improvement, Amazon is the current leading company. Intelligent voice devices such as Alexa have completely changed the game when it comes to home assistant Artificial Intelligence, and they continue to develop their technology and increase the possibilities for consumer AI. The company seems more focused on improvements rather than further inventing, and in the words of the Fastcompany article above, *“will continue to use AI quietly to improve its efficiency in doing what it already does well as the largest ecommerce destination for millions.”*

It’s safe to say that the old predictions of a technologically dependant future are becoming real, but why do these developments cause fear and discomfort? Evolving AI is in our homes, in our pockets, at our workplaces and our schools, and is being integrated into our lives even more each year. So, what if we lose control of it? Or what if the tech giants’ customer privacy agreements aren’t as reliable as we thought? This seems to be the major issue regarding AI in any form, and it is only set to get worse.

**APPLICATIONS OF THE FUTURE**

When considering the possibilities regarding AI in the future, the best place to start is in medicine. As seen with the artificial muscle created in Colombia in December 2017, technology has the potential to completely revolutionise the medical field and solve all of the problems that we can’t.

*“The potential use of nanomachines as a futuristic vaccine against almost any human ailment*” **May, W (1996) *Edges of Reality: Mind vs Computer,* New York: Insight Books**

As well as muscle replacements and artificial limbs, nanotechnology paired with AI algorithms has the medical potential to cure the incurable – including cancer. This technology is not as far off in the future as you would think, but it is also not the current focus of intelligent machines in medicine. The technology is being used for research aid, as the machines can sort through centuries of data in seconds and find rare diagnoses where a human could not. It is also being used to help rehabilitation for patients with healing or reconstructed limbs, and there is the possibility of using AI to produce mechanical limbs controlled by neural impulses rather than a remote control.

*“Humans may become more robotic in a straight-forward physical sense. Computational implants – for example, to enable us to see better…..or to be linked directly to the web via brain implants.”* **Self, J (2005) *Whoever said computers would be Intelligent?,* Lancaster, England: Drakkar Press Limited.**

As well as human repair, of course, there is also potential for human improvement, which comes with a whole new set of ethical issues. Rebuilding cells for sight and hearing is one thing, but brain implants linking us to the internet seems excessive and something that shouldn’t happen for a long time yet. Some see these improvements and repairs to be miracles – technology doing what we can’t, improving the quality and length of the lives of those we have previously deemed past saving. Others, however, see it as playing God and something that should not even be attempted.

Fields such as medicine are seen as essentially human, and the fact that intelligent machines are becoming such a huge part of it could be seen as threatening to the jobs of others. When people think of robots taking over jobs, they think of industrial and service jobs, not doctors, so if AI is taking over medicine, won’t it take over everything? In reality, AI is not ‘stealing’ jobs in medicine. Nurses and doctors need to be able to emotionally connect to patients, to provide reassurance and comfort, which a machine cannot do. Machines can aid human doctors with research and diagnosis, but will not be able to replace them in the foreseeable future.

The same can be said about other fields, such as law. In 2016, the world’s first AI lawyer was created in order to lower the high cost barrier in America, as you don’t have to pay a robot. The intelligent machine could pull up decades worth of files in seconds and was a lot more efficient than a human lawyer. However, this does not replace the need for human lawyers because like medicine, the field requires forming a connection with the clients to help them see the case through. In both roles, the intelligent machines are intended as a support, not a replacement, and are prime examples of humans and machines working together.

**AI AND EMPLOYMENT**

As well as the fear of losing control of AI, or of what it could do in the wrong hands, another prominent fear regarding AI is what it will do to unemployment rates. As AI continues to surpass us in efficiency and learns to do more tasks to a standard higher than us, it will continue to be implemented into various work roles. It is only natural that this would become a concern – world economy is already fragile, and widespread unemployment due to AI could be disastrous for most of us. However, while AI does seem to be replacing us in our jobs, it also seems to be creating new ones.

*“14 million jobs will be created… in order to train, accommodate and compliment the burgeoning AI.”* **Personelltoday.com (22.11.16) *Article ‘Robots vs Humans? AI and the future of the workplace.’* Available at** [**http://www.personneltoday.com/hr/robots-vs-humans-ai-and-the-future-of-the-workplace/**](http://www.personneltoday.com/hr/robots-vs-humans-ai-and-the-future-of-the-workplace/) **(Accessed 12.05.17)**

AI, at this stage, is not wholly independent, and needs us to maintain it, as well as support it in fields like medicine and law where human interaction is still necessary. This means that in industries that are employing an artificial workforce, they will also be employing a human workforce in order to control it. Companies like Google and Apple are also opening up thousands of jobs in AI research and creation, as well as testing and troubleshooting. In fact, as of the end of 2016, around 9.5 million job openings had been created due to AI in the UK alone.

Overall, the statistics show that AI is creating more jobs than it is destroying. However, the jobs being destroyed are mostly low skill jobs, and are being replaced with high paying, high skill jobs, which is a problem because the workers who have lost their jobs to AI are not qualified enough to benefit from the new job opportunities becoming available.

*“Inequality between the 1 percent and the 99 percent may widen as workforce automation continues.”* **Businessinsider.com (15.02.16) *Article ‘Robots will steal your job: How AI could increase unemployment and inequality.’* Available at** [**http://uk.businessinsider.com/robots-will-steal-your-job-citi-ai-increase-unemployment-inequality-2016-2**](http://uk.businessinsider.com/robots-will-steal-your-job-citi-ai-increase-unemployment-inequality-2016-2) **(Accessed 12.05.17)**

This development has the potential to widen the gap between high-skill and low-skill workers dramatically and therefore widen the gap between the rich and the poor, and increase poverty. Low-skill workers will find it exponentially more difficult to get or keep a job as automation continues, while high-skill workers will benefit from the new job opportunities that the machines open up. Again, this links back to the fact that attitudes towards AI depend largely on who you are, and what your background is. High-skilled workers would see this technological future as exciting and revolutionary and full of possibilities, because for them it is. Low-skill workers however, may see intelligent machines as a threat to their way of life, because for them, it is.

*“The jobs that are going to be displaced by AI are not just low-skill service jobs; they might be high-skill jobs.”* **Optixapp.com (02.11.16) *Article ‘How Artificial Intelligence impacts the workplace of the future.’* Available at** [**https://www.optixapp.com/blog/2016/11/artificial-intelligence-impacts-workplace/**](https://www.optixapp.com/blog/2016/11/artificial-intelligence-impacts-workplace/) **(Accessed 13.05.17)**

Of course, high-skill jobs are also at risk, and the likelihood of machine replacement also depends on what country you are from. Industrial countries such as China and the USA have much higher percentages of jobs at risk of automation, around 45%, while in the UK the percentage is around 35%. Generally, the risks depend upon how far corporations are willing to go with technological automation, and on which group we fit into – those who are going to be presented with exciting new opportunities thanks to the technology, or those who will struggle to stay employed. Those of us who belong to the latter group are right to feel threatened and have negative attitudes towards AI for this reason, as it will not only threaten our society , but also whether we will be able to afford to live in it.