

Machines can learn, but what will we teach them?

*Ethical considerations around artificial
intelligence and machine learning*





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Foreword

Ethical behaviour is fundamental to public trust and confidence and as a profession, we accept the responsibility to act in the public interest. The accounting profession's fundamental ethical standards of integrity, professionalism, duty of care, confidentiality and competency have remained the same over time. However as our world evolves with new and emerging technologies, we need to continually explore and redefine what being ethical means.

Chartered Accountants Australia and New Zealand have always been a strong contributor to the global dialogue on ethical behaviour. In 2013, we published 'Why ethics matter to your bottom line' to explain why ethics could no longer be considered discretionary by business but instead is a significant contributor to financial success. Our 2016 paper, A Question of Ethics – Navigating ethical failure in the banking and financial services industry, used evidence from social psychology to show that a great deal of unethical behaviour is unconscious and proposed a range of culture shaping interventions to improve ethical behaviour in the banking and financial services sector.

Former US Supreme Court Justice Potter Stewart once said ethics is 'knowing the difference between what you have a right to do and what is the right thing to do.' Machine learning, a subset of artificial intelligence, has been described as humankind's fourth industrial revolution. In our current world of fake news and privacy concerns, we are currently at an ethical crossroads where we need to determine the right direction for the development of machine learning. In this paper, Machines can learn, but what will we teach them, we explore the ethical considerations around artificial intelligence and machine learning from different dimensions. By setting the right ethical framework now, we have an opportunity to design a new AI enabled world, which could create a more inclusive global society and sustainable economy than exists today.

We would like to thank the key industry figures, whose insights in this fast moving space, have helped to inform the thinking and direction of the paper. We hope you find this paper thought provoking and a way of engaging and starting a conversation.



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1. Introduction

With the rise of artificial intelligence and automation, we are fundamentally changing everything about the way we live, work and understand our world.

Sarah Adam-Gedge, CA, Innovation & Technology Executive and Non-executive Director

This paper has been written to consider how advances in artificial intelligence (AI) will affect the different roles in which people operate as members of society, members of a business and as individuals. It presents an overview of the ethical issues that need to be considered and, perhaps, enshrined in regulation as we embed AI and machine learning applications into our workplaces and our personal lives. It also seeks to explore how regulators have so far responded to AI's advances and to identify some of the ethical questions the accounting profession, business in general and individuals need to ask as we engage with these new technologies.

To date, the media focus on AI and machine learning has been characterised by two extremes. The first focuses on the tremendous benefits AI can deliver to humankind, freeing us from workplace drudgery and enabling us to actualise our higher order skills. At the other extreme are warnings of robots coming to take over our jobs and a world of "big brother" surveillance emerging where our every mood and move will be monitored and analysed, the ensuing information used to manipulate us in ways not of our choosing.

The approach of this paper is to present a more holistic snapshot of this very fast-paced technological movement, to anticipate how these developments will affect our personal, social and workplace environments and foreshadow the

ethical implications that need to be considered. To assist us in drafting this paper, we have interviewed key industry figures across Australia and New Zealand to gain their insights. Special acknowledgements go to Sarah Adam-Gedge CA, Professor Nicholas Agar, Lachlan McCalman, Antonio Papalia CA, Channa Wijesinghe FCA and Peter Williams FCA .

We suggest that, with the recent advances made in machine learning, we have arrived at an ethical crossroads where we need to determine the role AI will play in shaping our shared futures. Our immediate ethical challenge is to consider how best we can use AI to advance human well-being and how best we can prepare people for an AI world. We have a window of opportunity, to step back and purposely design an AI world that ushers in a more inclusive global society and economic system than exists today. If we fail to build the ethical dimension into each stage of our AI journey, an alternative route that perpetuates the current polarisation of wealth and resources within and between societies seems inevitable. The academic world has put in place an ethics regime around research with humans which may be the appropriate starting point in considering the type of ethical framework necessary to guide ongoing AI developments. It is in everyone's interest to ensure AI will take us to places where we want to go and that the journey will change us in ways that enable us to evolve and flourish as human beings.

2. The Technology

What do we mean by AI and machine learning?

From smart phones to smart cars, AI has invaded every aspect of our lives. At the core of the concept of AI is the idea of developing intelligent machines that work and react like humans. Applications include performing speech recognition, natural language processing and translation, visual perception, learning, reasoning, inference, planning, and decision-making. We are now seeing the development of far more efficient and smarter machine learning tools – the core algorithms through which AI systems develop their intelligence.

There are a few different fields which fall under the broad umbrella of AI. The most common are rule based or “expert” systems which can apply vast number of rules on a consistent basis. These have been around for more than 30 years. Common applications include the processing of loans and mortgage applications, and basic medical diagnosis.

Robotic process automation is the next iteration, with machines performing complete processes that in the past required a combination of rule-based decision-making and an element of human judgement. Common tasks include handling calls to a service centre or processing an insurance claim.

The hottest field of AI at the moment is machine learning – the notion of using statistical techniques to help systems learn from data. This area is gaining the most attention at present because of its potential, namely the use of neural networks and deep learning algorithms to develop systems with learning capabilities closer to those of the human brain.

These tools are being used across a range of applications, the most common being chatbots, to perform increasingly sophisticated customer interaction tasks by combining machine learning, natural language processing, and speech generation.

Spotlight: What is machine learning?

Machine learning is a subfield of computer science and artificial intelligence (AI), focusing on the design of systems that can learn from and make decisions and predictions based on data. Machine learning enables computers to act and make data-driven decisions rather than being explicitly programmed to carry out a certain task. Machine learning programmes are also designed to learn and improve over time from exposure to new data.

All machine learning is AI, but not all AI is machine learning. The fundamental goal of machine learning algorithms is to **generalise** beyond the training samples i.e. successfully interpret data that it has never ‘seen’ before. For example, spam filters must continuously *learn* from a variety of signals, such as the words in the message, message metadata (where it’s sent from, who sent it, etc.). Facebook learns to personalise newsfeeds to ensure we’re seeing posts that interest us as well as advertisements that match our interests. Uber learns to determine the price of our ride, minimise our wait time, work out our estimated arrival time, etc.

“Boomerang” is an application in Gmail that gives us more control over when we send and receive emails – ideal for handling time zone differences. **Boomerang Responsible** takes this to the next level by using artificial intelligence to analyse our emails as we write them and give suggestions for improvement.

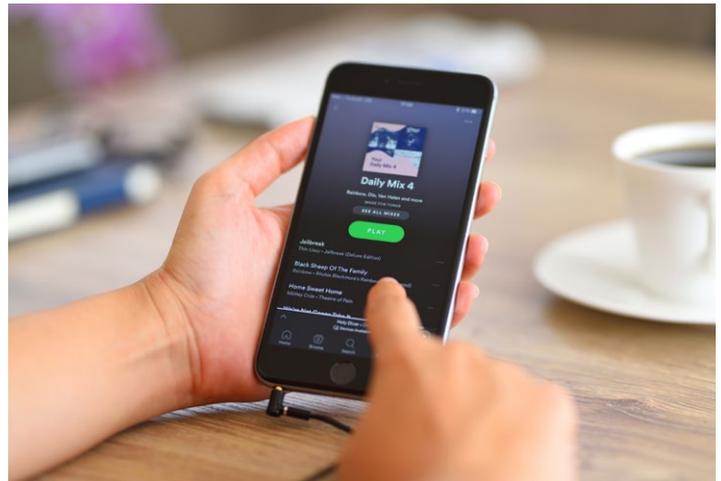
Receptiviti.ai allows us to analyse the psychology, personality and decision-making style of an individual by inputting a block of text, such as an email or blog post. The tool also lets us input a person’s Twitter handle and feeds back the best way to communicate with that person based on an analysis of their social profile.

Machine learning is the most influential of all emergent technologies. Because of its potential large-scale impact, it has been described as humankind’s fourth industrial revolution. Machine learning is projected to have the greatest impacts in areas such as employment, workplace redesign, education, transportation, healthcare, public safety and security, the military and entertainment.

What does AI look like?

Most people are largely accepting of AI and its applications because it appears to be making their lives easier. Benefits range from the convenience of smart phones and virtual assistants, ready access to previously siloed information from Google and other search engines, relevant product recommendations from platforms such as Amazon and Netflix, curated news feeds, and service assistance from AI-powered devices in the home such as Amazon’s Alexa, Apple’s Home kit and Google Home.

There are many upsides to these technologies. Participation in social networks has enabled younger generations to have their concerns heard by those making the decisions that impact upon them. In our education and health care sectors, powerful applications have amplified learning and enabled research and medical breakthroughs that have enhanced our physical quality of life as well as extending our lives in pain-free ways. In workplaces it’s in the form of analytical tools enabling predictive modelling to anticipate future customer behaviours, for example more sophisticated marketing via customer relationship management software, call centres replacing back office staff and speedier trading (etrading).



The potential downsides to these technologies include risks to personal privacy, data security and the potential for social reengineering regarding how we relate to each other. One of the most pressing ethical considerations is that very little is known about what these new technologies are doing to our cognitive functions. Users are therefore not making fully informed choices when they spend increasing amounts of time on their devices. No one yet fully understands how they are shaping our ongoing human social and physical evolution.

Public and regulatory discussion – albeit in an embryonic stage – revolves around the pace with which AI is being developed and applied rather than its ethical implications. For the moment, there are no commonly agreed policies or accountability frameworks. Yet, in the last two years, we have seen widespread use of drones, fingerprint technology, facial recognition, driverless cars and other significant AI breakthroughs that raise serious ethical issues about their social impacts

The rapid progress being achieved in AI means that super intelligent machines are now seen as the next development stage, where these machines will learn to write code for themselves. This is how machines can possibly become independent of programmers and where, perhaps, even greater risks lie. Just as digital technologies have already reshaped our societies, machine learning will accelerate these social changes. We are, without any doubt, heading towards a new decade of disruption.

Why do we need an ethical framework?

Ethical considerations revolve around human relationships and accountabilities arising from how our behaviour impacts on others. The average person in the street's definition of applied ethics is essentially around notions of fairness and transparency. Our digital age has extended our notions of ethical accountability.

The commoditisation of personal data and the lack of transparency is an ever-growing ethical issue for the public. It has heightened concerns about the power of technology giants and how they are embedding potentially addictive AI applications into our day-to-day lives.

It is the very real potential for AI to totally reshape our existing social landscapes as well as our economic order that brings with it serious ethical challenges. It demands that its advance not be left to the technology giants alone to decide. The ethical impacts, especially in terms of human well-being and intergenerational equity, insist that we pace AI to remain in step with the limits of our human understanding so that we do not blindly alter our human evolution in ways that harm ourselves and future generations.

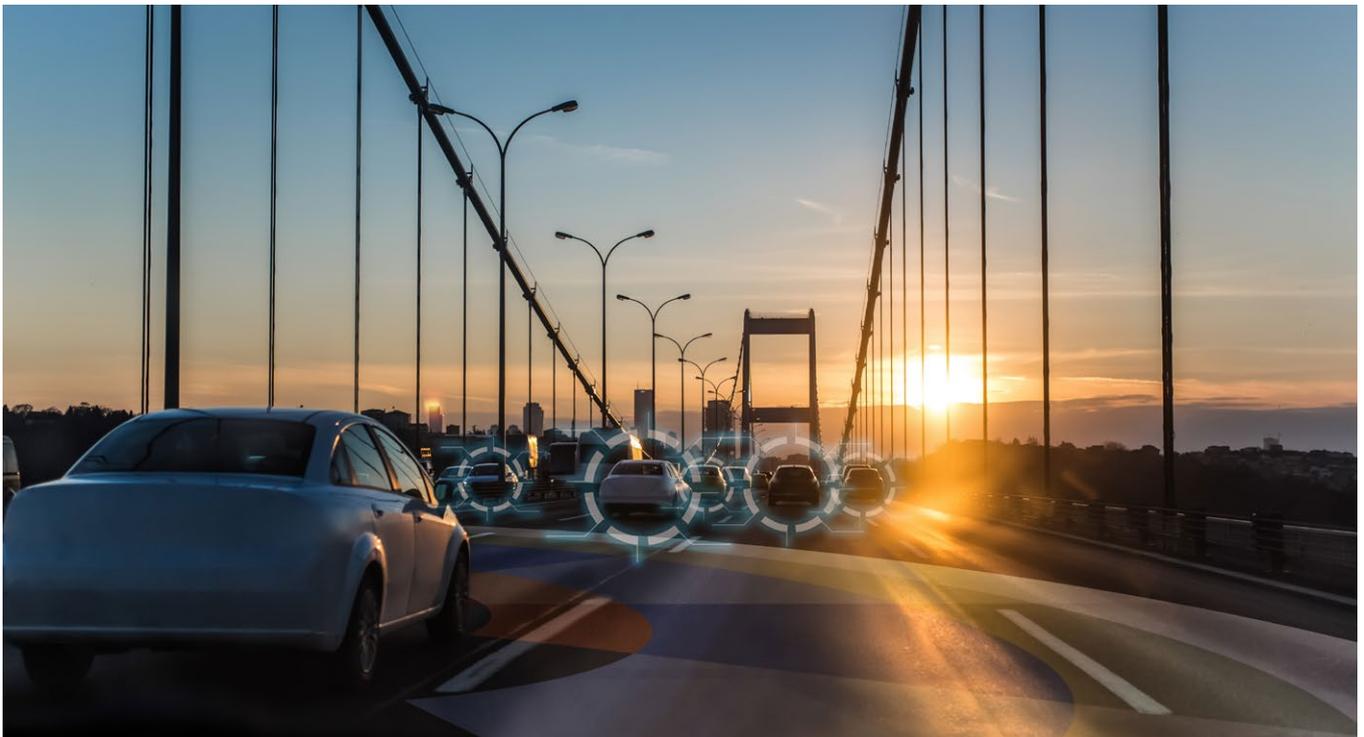
The rise of fake news created by bots and its distribution, along with hate speech, on platforms such as YouTube, Twitter, Facebook and Instagram, and the manipulation of data to interfere with political elections and referenda has created concerns about the integrity of our major political institutions and anxiety around who can be believed and trusted. In April 2018, the Pew Research Center released a

report *Bots in the Twittersphere* which analysed 1.2 million English Language tweets containing links to popular websites and found that two-thirds of the tweets came from suspected bot accounts. The 2018 scandal involving Cambridge Analytica and Facebook has shown how technological advances can undermine the foundations of democracy.

Technology is moving fast. No technological advance is bad in itself but any technology can be used inappropriately. It's never too early to start debating and raising public awareness about change. Our pace of ethical reflection tends to be slow and deliberate, typically slower than the pace of technological progress. We need to have open conversations around the ethics of AI and share different ethical perspectives. These open conversations should address many different scenarios about what hasn't happened yet but could in the future. We need to think creatively about what we are and can be. That way we can make regulations that protect what we really care about.

Professor Nicholas Agar, School of History, Philosophy, Political Science & International Relations, Victoria University of Wellington

The unknown mechanics of exactly how algorithms work and our inability to predict their macro social impacts is a key ethical concern. For example, the role and accountability of humans in relation to AI-enabled advances, such as driverless cars, has become increasingly contentious.



AI systems are neither innately bad nor good but simply the product of humans and the programs they have designed. While the code fed into a machine determines what it will do, a machine can be damaging if it is programmed insufficiently. This was evident when language used by Microsoft's AI chatbot, Tay, deteriorated alarmingly quickly because it adopted the offensive vocabulary, and incorporated the social biases, of those with whom it interacted. Microsoft had to delete the chatbot after only one day of human interactions on Twitter.

It will become increasingly harder to distinguish AI interactions from real human relationships. In an experiment at Georgia Tech, Jill Watson, an AI-powered assistant was used to teach students an AI course. Most students did not recognise it as AI and thought "Jill" was a real person. This points to possible future scenarios where people may believe they are dealing with humans, and the human understanding that comes with that, when in fact they are interacting with machines. The ethical dimension in the Jill Watson scenarios include considerations of manipulation, respecting the innate dignity of human beings with disclosure obligations and the individual's inability to make an informed choice about the kind of interaction they would like.

Case study – Moral Machine

Over the past year, four million people took part in MIT Media Lab's **Moral Machine**, a game of ethics which presents players with the kind of road safety choices which driverless vehicles will soon have to make. For example, should a driverless car swerve to save a pedestrian crossing the road illegally, while sacrificing its own passengers? Or should an autonomous car sacrifice the pedestrian to save its passengers? Refining the capacity of machines to make life and death decisions is crucial, especially as they are already being made with deadly consequences.

MIT Professor Iyad Rahwan's team found that when it comes to 'simple' choices – like between hitting a child or hitting an adult – the results were decisive, overwhelmingly favouring the protection of younger lives. Of some concern is that the more elderly the pedestrians crossing roads, the more disposable they are viewed to be. But when it came to protecting pedestrians over protecting passengers, the results grew even murkier, with nearly 40 per cent of people wanting their driverless car to plough into pedestrians rather than harm passengers. The more complex the scenario, the less decisive people were. To further highlight the difficulties in identifying our common ethical values, Moral Machine's results also varied by country and at a local level.

3. Impacts and concerns

Impact on society

AI is an alternative intelligence without a human conscience or guided by human values so AI cannot be simply used to replace human intelligence and decision making. The absence of transparency and a full understanding of how algorithms work creates significant ethical issues. Take, for example, a bank that uses an AI algorithm to choose candidates for credit extension or, an insurance company that uses AI to decide the cost of car insurance. The algorithm uses various criteria based on their respective importance in the context of credit. Let's say credit wasn't extended to a person who later brings legal action against the bank/insurance company claiming his credit request was denied because he belongs to a racial grouping, a lower socio-economic classification, or maybe because his social media profile shows association with undesirable individuals. The absence of transparency around the algorithm in use means that there is no sure way of knowing whether discrimination has occurred. If the decision is to pass the average person's fairness test, then an immediate ethical challenge is to ensure that coders build in full transparency in AI algorithms. This has not been possible to date and the "black box" nature of algorithms creates a challenge for customers around deciding which organisation they can trust to counterbalance the inherent "black box" risk.

"It's interesting to note how difficult it is to translate concepts like "fairness" into precise mathematical values that can be computed by an algorithm. Work on this is ongoing, and today there are many different notions of fairness for AI systems, many of which cannot be simultaneously satisfied. In the ideal case, the goals, constraints, and behaviour of every AI algorithm in production would include a range of fairness and other ethical considerations, and these would be transparent to enable societal standards to be upheld."

Lachlan McCalman, principal research engineer, Data61

Ethical concerns also revolve around the potential biases of AI designers and coders. Women and ethnic minorities, for example, are greatly under-represented in the coding arena; will this result in a gender or ethnic bias in how AI reaches its recommendations? Failure to design to purposely challenge and remediate potential biases might deepen existing social divisions and concentrate AI benefits unequally among different sections of society.

For example, according to research by Dr Sheryl Brahnham, assistant professor in computer information systems at Missouri State University, users direct more sexual and profane comments towards female-presenting chatbots than their male counterparts. Brahnham suggests that the design and coding of these virtual assistants perpetuate the stereotype that women are subservient to males. Instead of remaining passive in the face of user abuse, bots could be programmed to deliver "harassment is unacceptable" type responses. Such a precedent already exists in the gaming sector, where the World of Warcraft (WoW) temporarily "sinbins" users for offensive language and bullying behaviour.



It has been suggested that the WoW approach is a good example of coding within a virtue ethics framework.

The Internet of Things and data mining have powered advances in machine learning so that data has been described as “the new oil” of 21st century. The absence of regulations and the current commoditisation, marketing and trafficking of personal data around the globe and, how this enables data users to manipulate people’s attitudes and behaviours, is an ever growing worldwide ethical concern.

There are several initiatives underway exploring how a governance regime might be put in place to guide AI’s ongoing development. Leading the way is the Institute of Electrical and Electronics Engineers (IEEE) Global Initiative on Ethics of Autonomous and Intelligent Systems, which involves several hundred participants from six continents. The thought leaders from academia, industry, policy and government aim to find consensus on the development of ethical principles for AI. The UK’s House of Lords has also released a guiding set of principles, which we have detailed in our summary to this paper. Both sets of principles emphasise the importance of protecting human well-being and ensuring full transparency and accountability.

The European Commission, just recently, has put the first major brake on how personal data can be exploited. It has passed legislation reinforcing the principle that everyone has the right to the protection of personal data.

Case Study: General Data Protection Regulation (GDPR)

The GDPR, which applies from 25 May 2018, is far reaching, including introducing the concept of profile portability where the user can transfer their profile and contacts to a new provider just as they do with their phones. The GDPR protects individuals in the 28 member countries of the European Union, even if the data is processed elsewhere. As many of the technology giants are headquartered in Ireland, they will be directly impacted by the standards set by the EU. But it’s not just the technology companies that will be affected; the GDPR will apply to electronic publishers, banks, universities, many of the Fortune 500 and anyone using the web to track and collect personal data. Under GDPR, stricter conditions also apply to collecting sensitive data such as race, religion, political affiliation and sexual orientation. GDPR’s emphasis on consent, control, and clear explanations will assist users to better understand and review the ways they are surveyed online as well as putting boundaries around how such information can be used. Importantly, EU consumers will have the freedom to opt in, rather than the burden of opting out, and the right to be forgotten. GDPR standardises data rights across all EU countries, empowering regulators to hold the line with significant penalties where violators face fines of up to 4 percent of annual global revenue.

Ethical decision-making points for society:

- **Transparency.** Can global bodies come together to agree AI protocols that ensure we are making well-informed decisions about how, what, when, where and to what extent we will utilise AI?
- **Ownership.** If data is the engine of AI, can we agree that it is individuals who own their personal data and therefore have rights around how it can be used and removed from storage?
- **Data Integrity & Relationships.** Can we agree some AI ethical principles such as auditing standards for AI data and “disclosure and informed consent” “principles to govern human interactions with AI or will we rely on external regulation?
- **Biases.** How will we deal with bias in the design process? Will we implement a “precautionary principle” to guide ongoing developments?

Impact on business

Since technology companies have become a large percentage of the economy, they have a pivotal role in addressing ethical issues that emerge as they design, collaborate, market and embed their devices into millions, and even billions, of people's lives. When we consider that 90 per cent of the world's data has been created by these new technologies within the past five years alone, then the power and speed with which technology is reinventing our world can be more readily grasped. However, the design and implementation of these new technologies goes beyond just technology companies. Therefore all businesses have a role to play in considering the ethical implications of the technology they use.

Some examples of ethical concerns presently being confronted about the design and implementation of technology include:

- 1 Concerns around negative social behaviour. Apple this year announced it will enable users to monitor their time on their devices. New "do not disturb" controls mean that at designated periods, users can set their phones to block all incoming notifications from appearing on the home screen. They will also get a weekly breakdown of their usage and be able to set limits on the time they and their children spend on certain apps.
- 2 Concerns around social suffering. A 2017 survey by the British anti-bullying group *Ditch the Label* found that 42 per cent of young people had experienced bullying on Instagram. This year Instagram is rolling out a comment-filtering technology that will automatically hide bullying comments on the social network. The filter, powered by machine learning, is turned on by default, but users can **opt out** to let comments people leave on their posts go unfiltered. Humans at Instagram trained the system, which is built on a Facebook-developed text-processing system called **DeepText**. It sorts negative comments into categories, including bullying, racism, and sexual harassment.
- 3 Concerns around fairness. When an algorithm uses a flawed model to decide whether people are **eligible for government benefits, whether they should get bail** or whether they should be allowed to **board a flight**, there is potential for human rights violations and a breakdown in procedural fairness. **The Centrelink robo-debt controversy** demonstrated what happens when algorithms prioritise the value of efficiency over the value of protecting people – and how this can backfire.
- 4 Concerns around human capacity to make informed choices. Google's virtual assistant can now make phone calls on your behalf to schedule appointments, make reservations in restaurants and get holiday tours. The robotic assistant uses a very natural speech pattern that includes hesitations and affirmations such as "er" and "mmm-hmm" so that it is extremely difficult to distinguish from an actual human phone call.

- 5 Concerns around an individual's right to privacy. Sensors combined with AI can reveal whether someone is lying, stressed or disposed to violence. Facial recognition can zoom in on wanted individuals at a peaceful demonstration or in the shopping malls. Such developments raise questions about the appropriate limits of surveillance.

One of the big issues of replacing human judgement with an AI system is that the "utility function" that describes the good or badness of every possible outcome, must be explicit. Rules for autonomous system behaviour, including AI, must explicitly include all those exceptional cases like extra time to pay bills when in family crisis. The problem is, it's very difficult to write rules or constraints to address exceptions, and even more difficult to build a useful AI system that follows them. Such ethical constraints also often result in a drop in the overall performance of the system and may even conflict with each other, so difficult trade-offs have to be made."

Lachlan McCalman, principal research engineer, Data61

Beyond technology development and implementation, a universal concern is the disruption in jobs that will affect almost every sector of the economy. The OECD predicts around 66 million jobs globally are at risk of automation from AI and robotics.

AI's capacity to force large scale workforce redesigns and employee redundancies necessitates a radical rethink of the ethical obligations business has towards current and future generations of employees, its role in informing citizens about the likely impacts of the new technologies, and, how it can promote the new skills necessary to keep people employable in an AI-powered economy.



For the first time since the industrial revolution, human labour and economic productivity have the potential to become delinked. There is a strong possibility that vast numbers of the current workforce and current graduates may find themselves made obsolete because AI applications can do their work faster and more accurately. The ethical challenge of preparing people for a very different world of work and a different perception of employability are significant.

This will involve a review of how to skill employees to work alongside AI applications as well as helping them cope with the inevitable workplace social and emotional disruptions as the pace of workplace change gets faster and faster.

Perhaps one of the most profound ethical challenges facing business leaders is to seek to realise the untapped potential and wealth that exists in the pool of labour that will be released by AI. New Zealand's Minister for Communications, Clare Curran, said "an action plan and ethical framework is urgently needed to educate and upskill people on Artificial Intelligence (AI) technologies." She made these comments when launching *Artificial Intelligence: Shaping a Future New Zealand*. If AI is to reduce manpower needs, how can the people affected be reskilled, redeployed or compensated? Unless strategically planned, AI might place too much power into the hands of too few computer scientists and coders and those employed to integrate AI technological advances into traditional businesses.

To enable people to participate in the AI economy will require a transitional strategy where at least three social interventions will be needed:

- 1 Upskilling to bring people up to speed with how best to integrate and work alongside AI.
- 2 Re-skilling to help people displaced by AI to find alternative sources of income and meaning.
- 3 Reinvention to identify the social and cognitive skills and the education content that will enable the next generation to thrive in an AI world.

Spotlight – Global inequality

AI offers the promise of tremendous productivity gains; how this machine-created, newfound wealth can be shared is also an ethical challenge. A new apparel robot called the Sewbot can produce a T-shirt in just 22 seconds, highlighting how automation might radically disrupt the global apparel industry. Are we moving to a post-work society for lower skilled sections of society? What are the ethical obligations to emerging economies where these low skills jobs have been offshored to and where the already vulnerable depend on this type of work as their only means of participating in the global economy? Do business leaders have an ethical accountability to make provisions for the social and economic hardships that may accompany their adoption of AI technologies?

If so, what considerations do leaders need to be making now to ensure AI gains are not made at the expense of people's continued well-being?

These profound social impacts for the future of humanity that accompany business' embrace of new technologies have ethical considerations at their core. Already, for example, there is emerging public debate around the need to provide a universal wage when jobs disappear, whose responsibility this might be and whether there should be a 'robot tax' to fund this.

According to global Gallup employee surveys, less than one-third of employees feel engaged in their workplaces today. For the majority, it is no longer the major source of satisfaction; jobs are merely a means to a pay packet that enables them to get their social needs met elsewhere. However, AI can be employed to humanise rather than mechanise customer interactions, with humans working alongside AI applications to provide better informed options and more personalised services. It is also important to note that not all the ethical consequences of AI can be predicted and considered when a system is developed. These can be minimised by utilising a multi-disciplinary skillset in the design and testing of the system. A flexible approach will be needed to consider the ethical implications during the entire system lifecycle. It is this potential for humans to work alongside intelligent machines that will provide the greatest opportunities for both increased productivity and increased human satisfaction from the new services and products that can be designed. Tomorrow's business world will therefore need to develop and nurture a balance of artificial and human intelligence.

Avanade, a global professional services company focusing on IT solutions, says its research suggests that ethical issues will likely increase as smart technologies inexorably play a role in supporting the customer experience, identifying sales leads, and at-risk customers. Avanade recommends that, to maintain the trust of employees, partners and customers, business leaders need to invest now in addressing the ethical issues arising from smart machines in the workplace. Its four-pillar digital ethics framework covers: 1) fairness and inclusiveness, 2) human accountability, 3) trustworthiness and 4) adaptability.

Ethical decision points for business:

- How will your business balance the efficiencies and productivity gains of AI with reinvestment in employee retraining and reskilling?
- How will you draw ethical boundaries around data use?
- How can employees' voices be included in the transition to a blending of human and machine talent in the workplace?
- How will AI enhance the consumer experience and ensure the ethical treatment of customers?
- How will you ensure your algorithms and other AI applications will stand the test of external scrutiny?

Impact on regulators

It is going to be a challenging task for regulators and lawmakers to stay on top of AI due to its rapid pace of development. When legislation is written with specific AI systems in mind, it may become obsolete by the time the legislation is approved.

Channa Wijesinghe, FCA, CEO Accounting Professional & Ethical Standards Board

Most national governments understand that over-regulating AI would be a simplistic reaction rather than a strategic response to AI advances and that if they over-regulate, AI projects and further investments in AI will simply be moved to more relaxed regulatory regimes. Countries like the USA, UK, China, Germany, Singapore and more recently France are articulating public visions of what AI will mean for their citizens and how best their people can leverage the benefits AI brings. For example the Singapore government has established AI Singapore to pull companies and researchers together to perform research that will eventually improve business practices. However other countries including India, Australia and New Zealand are yet to develop statements of intent for the ethical application of AI. The Australian government, for example, has chosen to take a 'wait and see' approach and has focused more on regulation than facilitation.

"Data analytics can help to enhance processes, unlock stronger insights, and facilitate better decision making. People are at the crux of this transformation ... We must take proactive steps to equip our people with the skills they will need for new roles and tasks that they may have to take on.

Dr David Hardoon, Chief Data Officer, Monetary Authority of Singapore

To ensure the ethical dimension is being incorporated into AI design, it may be necessary to accept that identifying and responding to the ethical challenges will have to be an iterative process. This will involve trial engagements with the technology, reflecting on any errors or negative impacts that ensue and, then, incorporating that learning into the next stage of development, before beginning another round of trial and reflection until the desired confidence in ethical protections can be assured.

Sandboxing

Countries like the Australia, USA, Singapore and most European nations, have a policy of “Sandboxing”. Just as a sandbox provides a safe environment for children to play without getting hurt, a regulatory sandbox framework provides fintech organisations with a controlled environment to experiment under the supervision of a regulator. In these scenarios, the regulator keeps watch, gives feedback and directs the organisation to help it achieve its goal. A sandboxing framework is used when a fintech wishes to integrate a new technology or mechanism in their system. To err on the side of caution, Sandboxes are widely promoted. The organisation conducting experiments must still observe certain regulations and safeguards. Generally, an organisation is allocated the sandbox for six months. This way, the technology gets tested in a real-world scenario. If it backfires, potential damage is limited; if it succeeds, the industry gets a better technology and standards upgrade. In the Sandbox environment, the regulator creates a controlled environment and effectively ‘walks alongside’ the developers to ensure consumer, market and financial rights and regulations are built in during the development stages.

In the context of applying AI in fields such as law, accounting and medicine, the corresponding ethical risks will have to be anticipated and mitigated as part of the design process. As of today, no one nation has a set regulatory framework for the application of AI in professional fields.

The public debate on how to make AI judicious and ethical has already started. Recently, the US state of Wisconsin had to decide whether algorithms could be used in determining whether a prisoner could be granted parole. The judges determined that AI could not adequately consider the values and morals that would need to be applied in a case and, therefore, rejected the notion. For now.

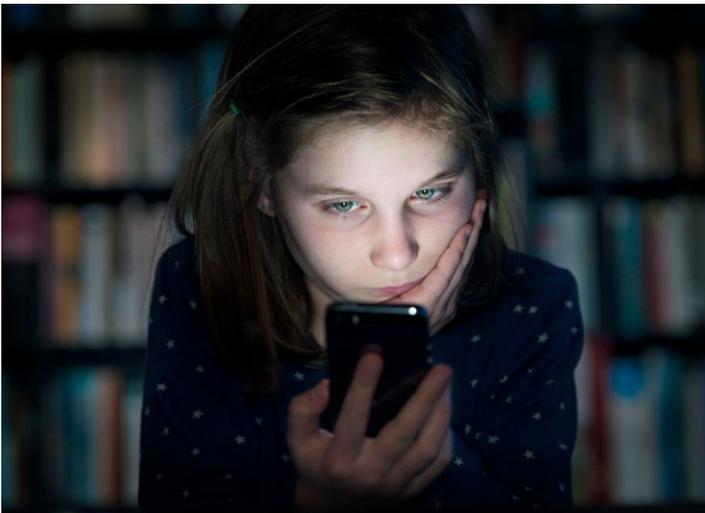
Ethical decision points for regulators:

- Should regulators rather than business be deciding on what data can be used and for what purposes?
- While AI is still in its infancy, how can regulators participate in the global discussion and formulate global ethical principles to underpin the advance of AI worldwide?
- How can regulators ensure that malicious uses are prevented?
- Is it possible to regulate AI to ensure ethical outcomes that protect human well-being are part of the design, or do we leave that to self-regulation?
- Is there a place for a voluntary certification system for AI standards enabling consumers to use their purchasing power to reward and encourage ethical AI just as the “Fairtrade” logo enables consumers to make ethical decisions around coffee and other agricultural product harvesting?

Impact on individuals

While our interactions today are predominately human-centered, these will be increasingly augmented by machine relationships. How we choose to interact with virtual assistants and how, this behaviour in turn impacts on existing human relationships or on how we evolve socially into the future needs to be considered. For example, is yelling at your bot or making suggestive comments to it denigrating ourselves as much as our virtual assistants? Already there are serious ethical concerns about the pervasive extent of verbal abuse that is being directed at bots as well as the extent of cyberbullying that is stalking both schoolchildren and adults, all made possible by our every increasing connectivity. Parents are justly concerned at their inability to apply parental locks to smart phones and the perceived reluctance of IT companies to build-in such control mechanisms.

The increasing amount of time people spend on their devices at the expense of “real life” social interactions and physical experiences is already changing our social world. Research suggests the current generation has never been more socially connected, or lonelier. The potentially harmful addictive nature of these new technologies is an ethical concern for many as we simply do not know how they are reshaping the social fabric. Instead of blindly signing up to the latest app or jumping into an internet chatroom debate, we need to become much more comfortable with asking ourselves to consider not just can we do this, but should we do this, who is affected by our actions and how can we engage with our devices and apps in a socially responsible way.



We need to canvass the positive and negative impacts of our online decisions. For example when our smart devices (phones, tablets, wearables, chips, patches, implants) are recording and reporting a continuous stream of data about our whereabouts, our health, our mood, our interactions and our daily habits – to our employer, insurance company or tax office. Will we consider the collection and use of our data as an infringement of our human rights?

In an AI empowered “post truth” world, we will need to invest more time in clarifying our own personal ethical standards and become much clearer about what is that we stand for; what we will and will not accept as appropriate behaviour towards ourselves and others in both the virtual and physical worlds where we will operate. We will need to know why we place value on certain actions and institutions, and importantly, who we can trust, or we run the risk of blindly signing away our rights or being manipulated by misinformation generated by bots or have our sense of security threatened by cybercrime. We will need to invest time in redefining our sense of personal purpose at work and in society more broadly and help ourselves to adapt and thrive in the emerging new world order.

Ethical decision points for individuals:

- How can you best prepare yourself to thrive in an AI era?
- What precautions will you take to ensure AI is having an overall positive impact on your development?
- How can you play a role in the ongoing debate around the future of AI?
- Will you be prepared to speak up when you witness AI ethical breaches?

Impact on the accountancy profession

The accountancy profession has already established itself as business' trusted adviser when it comes to the veracity of numbers, both within the finance function and as external advisor. AI has already infiltrated the sector in a number of ways. Accounting software, for example, is getting more intelligent, performing automation as well as analysis previously done by humans. Some finance functions and accounting practices are already implementing advanced technology to simplify operations. Benefits include time savings, minimising costs, boosting productivity and providing better accuracy. If an artificial intelligence system is well-configured, it can eliminate transaction posting errors which are difficult to find. Accountants will be in a pivotal position to understand business spending and suggest further improvement.

The development of IT skills and the ability to analyse information and to use it for effective decision making will be key skills that future accountants will need to develop in the age of AI.

Channa Wijesinghe, FCA, CEO Accounting Professional & Ethical Standards Board

While the increasing volume of data allows for more robust analytics and greater monetisation potential, it comes with increased ethical accountabilities around how this data is being handled and, for what purposes it is being used and by whom. As well as helping businesses connect to big data and leverage of the business opportunities it presents, accountants can assist with setting the boundaries for how amassed data can be collected and used.

AI can show us things, but we need humans to identify what we do about it. When organisations' make assertions about an algorithm, the role of the auditor will be to test those assertions to ensure the algorithm does what they asserted it did. Software code is not infallible, mistakes can happen and on a vast scale. Accountants are in the box seat to continue to act as trusted advisers to interrogate the systems and processes that underpin the acquisition, management, analysis, and disposal of this information.

Peter Williams, FCA, Chief Edge Officer,
Centre for the Edge at Deloitte Australia



Even though a new world of AI powered applications is being forged, the fundamental ethical standards for accountants around integrity, professionalism, duty of care, confidentiality and competency remain the same. The ability of professional accountants to ask the right questions around AI will enable ethical standards to be maintained. The increasing flow of data will also come with increased ethical accountabilities around the integrity, ownership, management, transparency, storage and removal of data. Retaining “trusted adviser” status will become even more important in an AI world where the “black box” nature of algorithms poses significant challenges around who can be trusted.

The algorithms that power early versions of AI (like we have today) are the extension of the thinking of individual programmers. The decision-making ability of the AI is directly defined by human decision making. In this decision-making ability can lay the biases and limitations of the human creators. As the AI gets ‘smarter’, the positive capabilities are enhanced, so can these biases and limitations. These unintended consequences must be monitored from the beginning of the development and throughout the development life-cycle.

Antonio Papalia, CA, Product Manager, myadvisor.ai

A guiding principle such as that suggested by the UK House of Lords (summarised in our conclusion) is that artificial intelligence should operate on principles of intelligibility and fairness. It is the sort of guiding ethical principle the profession might consider. The high-profile loss of public trust in the Facebook brand following its failure to protect its users’ personal data has forewarned others that AI is not ethically neutral. Rather, it demands a much higher level of public transparency because its impacts are so far reaching.

The accountancy profession will therefore continue to play a pivotal role in ensuring business information is sound and business decisions are in step with wider societal values, demanding a considered balance between what is good for business and what is good for society. It will become critical that the profession commits to continuous learning in the AI area lest a lack of knowledge and expertise compromises professional competence and due care obligations.

It is important for professional members to identify AI experts and engage with them. When AI is applied to the audit and assurance function, CAs will need to have the skills to make sense of the algorithms and we need to build standards around accountabilities in this application.

Peter Williams, FCA, Chief Edge Officer,
Centre for the Edge at Deloitte Australia

Ethical decision points for the accountancy profession:

- What are the possible threats to the profession’s integrity in an AI environment and how might these be mitigated?
- How will AI change the skills needed within the finance function, advisory or assurance team?
- How can the profession assist with making AI more accountable and algorithm applications more transparent for users and their clients?
- Who will be responsible for deciding if AI’s output and performance fit within an ethical accountability framework?
- Can the profession create its own ‘sandbox’ for ethical development of AI in accounting, audit and assurance?

4. Conclusion

AI advancement is a positive force. Because it is so simple in its behaviour, it forces us to be much more explicit about our ethical standards. Bringing this ethical conversation into wider society will, I hope, rekindle an interest in ethics and make us have much higher expectations of the governments and corporations with which we interact.

Lachlan McCalman, principal research engineer, Data61

We are now at an ethical crossroads where we can stop and ask what can be learnt from the weaknesses of our current industrial system to help guide us as we design a new AI world. This world must bring benefits to as many as possible while providing for those who are unable to take the necessary leap into a new world order.

At a societal level, technological advances are moving faster than most of us can keep up with and our governance regimes can respond to. Human virtues of courage, generosity, empathy and compassion cannot be easily replicated by an algorithm and their human manifestation is what makes our world a better place. So how do we ensure these virtues continue to flourish alongside AI engagement?

The World Economic Forum's [Center for the Fourth Industrial Revolution](#), the [IEEE](#), [AI Now](#), [The Partnership on AI](#), [Future of Life](#), [AI for Good](#) and [DeepMind](#) are among the leading advocates for a considered approach to machine learning. They have all released sets of principles that look to maximise AI's benefits and limit its risks. The most recent set of principles has been released by [the UK's House of Lords](#). Its five core principles are a good guide for speaking to the ethical dimensions of AI:

- 1 Artificial Intelligence should be developed for the common good and benefit of humanity
- 2 Artificial Intelligence should operate on principles of intelligibility and fairness
- 3 Artificial Intelligence should not be used to diminish the data rights or privacy of individuals, families or communities
- 4 All citizens have the right to be educated to enable them to flourish mentally, emotionally and economically alongside artificial intelligence
- 5 The autonomous power to hurt, destroy or deceive human beings should never be vested in artificial intelligence

At the business level, capitalism is being challenged to reinvent itself because of technological advances and the emergence of a highly interconnected "show me" world where everyone can see how business impacts societies in beneficial and non-beneficial ways. This has brought growing demands for business to "protect" their customers and users of their products as well as preserving the common good. The increasing social activism demanding that business becomes more socially responsible in the design and planning of its products and services, can also be expected to extend to how AI is used.

It is against this new social backdrop of growing demands for corporate social responsibility and increased accountability for customer protection that business leaders will need to identify and regulate the trade-offs between public interest and private. As we saw with the Cambridge Analytica data scandal where millions of people were affected, the global impacts of technology loom large.

Businesses and other organisations will need to have an AI ethics code or have refreshed existing governance protocols to outline what the machine is expected to do as well as its limitations. Ideally these should be shared with customers, so they can make informed choices about who they are doing business with. To reassure those affected, AI algorithms will need to be designed so that they can be reviewed by a third party to avoid manipulation or bias. Duty of care accountabilities will mean that AI managers must act proactively to ensure possible adverse impacts can be identified before they become a problem for the organisation or its clients.

“Society is demanding that companies, both public and private, serve a social purpose. To prosper over time, every company must not only deliver financial performance, but also show how it makes a positive contribution to society. Companies must benefit all their stakeholders, including shareholders, employees, customers, and the communities in which they operate.”

Larry Fink, CEO of BlackRock 2018^a

At the regulatory level, there are already concerns about the possibility of “forum shopping”, with some Japanese companies’ offshoring activities to the USA, where standards around data privacy are lower. The need for a global agreement is essential as, without it, the companies developing AI may migrate from one jurisdiction to another as suits their commercial needs or where one country’s regulatory framework is more accommodating than another’s.

At the individual level, the growing range of AI services and products means that everyone will need to better understand how AI is impacting upon them at a personal level, reshaping who they are and how they relate to others. The anonymity provided by the internet is not ethics free and brings with it the same ethical personal accountability to knowingly “do no harm” to others.

We will need to understand ourselves better to be more prepared for the new lifestyle options on offer. Millions of people around the world have been carried away by the pace of change in social media, virtual reality and, more recently, the endless possibilities of AI. The Cambridge Analytica data scandal was a wake-up call to humanity and, for the first time, we collectively asked: “How much do they (machines) know about me; how is that information being used to manipulate me, and did I really sign away my rights to privacy? Is it my personal responsibility to protect myself from AI? For many people, the answer was, “Who cares?”, but for millions of others, they are feeling very uncomfortable as it becomes clearer that our lives are being scrutinised in microscopic detail without our permission.

At the accountancy profession level, members find themselves in a uniquely advantageous position to play a positive role in shaping how AI is integrated into business. As trusted advisors, accountants can help business leaders embrace and embed AI in socially responsible ways that are in tune with societal values around social responsibility to all stakeholders.

The profession can help build consensus around AI industry standards for design, auditing and transparency as well as identifying techniques to build public trust in the new technologies.

Summary

“Everything we love about civilization is a product of intelligence, so amplifying our human intelligence with artificial intelligence has the potential of helping civilization flourish like never before – as long as we manage to keep the technology beneficial.”

Max Tegmark, President of the Future of Life Institute

Artificial intelligence is not here to replace us. It augments our abilities, enabling us to achieve greater efficiencies and to step up to higher levels of performance. It is empowering us to curate a lifestyle more suited to our personal needs and preferences. However, we also must be aware that it is also changing us in ways we are not fully aware of and we need to accept personal accountability for how we engage with technology and how our engagement will shape the person we will become.

We need to tune our ethical antenna now to ensure we take the right road at the right time.

^a BlackRock is the world’s largest asset manager with over \$6.3 trillion in assets under management. Its CEO, Larry Fink, wrote to CEOs of public companies outlining his expectation that they start accounting for their effect on society. Fink warns that managing for the short term is no longer good enough.

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