The Fourth Industrial Revolution

What sparked the fourth industrial revolution and how will it shape our future?

By Marietjie Lotz

Introduction:

Man has been put on earth to look after it, to nurture it and to grow it to the benefit of all. As a result, every generation that walked this earth has brought a hand-full of dreamers. People with a burning desire to do something or create something extraordinary that would benefit earth and everyone and everything on, in and around it.
And yes, these dreamers never allowed themselves any possibility of giving up on their quests. When the call for war came, they left the known behind and sailed into the treacherous seas with their wooden boats that were neither equipped with GPS or google maps and as soon as they reached land, they burned the boats that carried them there, just to make sure that they cannot leave those shores alive unless they win the battle. This is what Napoleon Hill, in his book "Think and Grow Rich" aptly call "a burning desire" to win.

Columbus dreamed about discovering the unknown world, staked his life on it and eventually found it. Copernicus looked at the starts and thought: "there must be something out there" and he was right. He soon revealed a multiplicity of worlds combined in a system of planets and planetary objects that orbit the sun.
Fortunately, the concept of time has changed and days have become "shorter" and months and years developed wings at more or less the same time that the earth decided to swallow the dinosaurs, leaving us to become slaves to technology.
But man adapted quickly and has since harnessed the collective knowledge of the millennia and developed equipment and methodologies that alone or in combination can be used to propel its users into an exciting future.

The impact of the fourth industrial revolution has become just as cataclysmic as the Cretaceous-Tertiary extinction event, that led to the die-off of some species caused by climate and geological changes that interrupted the food supply. Hopefully, we could use this revolution to the benefit of all in order to ensure that no country or being is left behind. Imagine the day when there will no longer be a first, second and third worlds, but only one world with no boundaries, proper health care for everyone and no hunger, pain or anger to suffer. That would be the day when John Lennon's dream will have come true.

Discussion:

Industrial revolution timelines:
1784 - steam, water, mechanical production of equipment
1870 - division of labour, electricity, mass production
1969 - electronics, IT, automated production

Recent years - 4.0 - Cyber-physical systems: The Fourth Industrial Revolution is beginning to emerge at the same time that the third, digital revolution is spreading and maturing across countries and organizations.
The Fourth Industrial Revolution involves entirely new capabilities for people and machines. Nicholas Davis, Head of Society and Innovation, Member of the Executive Committee of the World Economic Forum says "While these capabilities are reliant on the technologies and infrastructure of the Third Industrial Revolution, the Fourth Industrial Revolution represents entirely new ways in which technology becomes embedded within societies and even our human bodies. Examples include genome editing, new forms of machine intelligence, breakthrough materials and approaches to governance that rely on cryptographic methods such as the blockchain".

The United Nations report on Optimisation of Automation

In a 2013 report form the United Nations on the developed and developing countries of the world, it stated that more people in the world have access to mobile phones than to basic sanitation. I find this very upsetting, however, I do acknowledge that the world (organisations and society) has become a highly volatile and value driven environment and where children are taught that there are no limits to their dreams. This collective demand for innovation and learning has created the opportunity to have new experiences and extraordinary desires which must be met immediately.

This is not only the choices of the researchers, inventors and designers developing the underlying technologies that feed this demand, but consumers, regulators and citizens are those who adopt and employ these technologies in their daily life. Humans are the ones who cannot operate when there is a power failure, because the computer or electronic devices cannot work without electricity. We are the ones who become frustrated when the bank is off-line and we cannot buy something because we do not carry cash any more. We are the ones who have blurred the lines between work, home, entertainment, etc. due to technology overload. This is why the physical, digital, and biological spheres can no longer be separated without causing total chaos.

Until recently, the main theme on the lips of industry leaders were “optimisation of automation”. Processes and systems were re-engineered and every possible part of supply chain was automated in order to improve production, reduce defects, shorten turn-around times and make things more affordable and effective to pursue larger profits for the company. Everything was about the bottom-line. This made competition for the same scarce resources fierce and multiple players entered similar markets, trough supply and demand and forced competition in prices and choices to benefit of the more affluent countries. In this regard China is a living example of how stockpiling of commodities can take place at a time when there is no obvious reason for doing so and more importantly, it is their government that has become the main importer of everything from copper to soybeans.

Although “globalisation” is blamed as the catalyst that changed the landscape of trade and investment and which has opened the door for a new industrial revolution, this time the focus is not on taking advantage of cheap labour and manufacturing costs, but to honestly strengthen local production and in the process, slow down the perpetual poverty spiral that has a negative effect on the entire world economy. The paradigm shift is found in that the business ecosystems no longer only depend on innovation, optimization and competitiveness of their own resources, but on the inter-organisational innovativeness and commitment of complimentary partnerships, the sharing of technologies, product digitisation and support service systems.

It is an open secret that different components of almost all products are manufactured and assembled in different countries depending on the effectiveness of comprehensive supply chains through automatic data interchange. The primary drivers of these changes are: the rapid development, availability and affordability of technology and knowledge intensive innovation cycles. To achieve and sustain the competitive advantage, industries are forced to understand and apply every step of the value chain irrespective of the fact that the different components are no longer confined to one localised area. A total mind-set change is required from business performance, their efficiencies, management of wastage and the concept of total management. When you buy a product in South Africa you would find that your customer service assistant is in the Philippines, or your IT technician has to Google a solution to solve your stubborn machine’s problem.

This change has been brought about through the disappearance of boarders following world wide access to the internet and the massive advancements in technology. Therefore, it can no longer be business as usual with everyone in their own corner, operating from a premise of self-preservation. Strategic transformation and changes in the economy confront consumers with new products and new management models that are integrated horizontally and vertically. Take the example of the development sector as a means of identifying poverty reduction strategies. Although commonly associated with export-oriented trade, development practitioners have begun

to highlight the importance of developing national and intra-regional chains in addition to international ones. The Crops Research Institute of the Semi-Arid Topics has become involved in the supply chain for producing sweet sorghum in India in order to produce biofuel in order to provide a sustainable means of making ethanol that would increase the income of the rural poor without sacrificing food and fodder security and to simultaneously protect the environment.
Similarly, the telecommunication technologies, the Internet and groupware has levelled the playing fields for smaller firms to compete in the market.

According to Prof Pieter Steyn, from Cranfield college (www.leadershiponline.co.za) "the distinguishing factor of Industry 4.0 is increased competitiveness through smart equipment making use of information about high-wage locations, demographic changes, resources, energy efficiency and urban production". The main technology components of Industry 4.0 are:

Cyber-physical system – (definition: A cyber-physical system is characterized by a physical asset, such as a machine and its digital twin; basically, a software model that mimics the behaviour of the physical asset) creates connections between the real and virtual world, the internet of things, the internet of services and the smart factory. When all of these systems are working together there is optimum communication between humans and machines and this is what makes organisations competitive.

What is the potential impact?
The 2017 Round Table on Digitizing European Industry Working Group 1, reported that "digitalisation is essentially an innovation issue", and the organizations are approaching it with the usual wide variety of attitudes, methods and expectations encountered in managing innovation. It was also highlighted that in future, companies that do not embrace digital progress will not be able to attract and retain young talent, because the new generation employees are mobile and fixed on state-of-the-art technology. The state of your technology would determine who you will attract as potential employees. The perception of "employment" has changed drastically and young people prefer to earn while they enjoy life, with no clear defining boundaries between the two areas. This has the potential to change everything that we know about "work".

Given the expectation as well as the pressure to keep pace with the demand, the most obvious concerns with pushing the limits are: inequality, security and identity.

Inequality
Consumers are supposed to gain from industrial revolutions, as the cost of goods should be lowered based on economy of scales while quality increases. While this is true for some products, it may not always apply to some services like transport, a key component of the supply chain which has become increasingly expensive.

For the more affluent part of society, booking restaurants, buying groceries on-line, making payments, listening to music, reading books or watching films have become instant, at any time and in almost any place. But what if these benefits fail to contribute materially to broad-based economic growth of the poor countries? Will everyone truly be able to access, afford and enjoy these innovations, or will it slowly but surely widen the gap between rich and poor to the point of global instability? And how will it impact on the continuously increasing unemployment figures? How will it impact on the future skills requirements and how much time is available to close these gaps?

It is said that future jobs will increasingly require complex problem-solving, social and systems thinking skills. An upward bias to skill requirements disproportionally affects older and lower-income workers and those working in industries most prone to automation by new technologies.
This shift could also influence gender bias because of its impacts on industries such as manufacturing and construction. But the ability to use artificial intelligence and other technologies to automate tasks in service industries puts many more job categories at risk in the future. These

include jobs that are the source of livelihoods for many young female workers and lower-middle-class women around the world, including call centre, retail and administrative roles.

Looking at these scenarios, it is clear that the future may increase inequality across economies as well as within them. In particular, the increasing flexibility of capital in the form of robots and other advanced manufacturing systems may erode the comparative advantage currently enjoyed by many emerging and developing countries, which are focused on labour-intensive goods and services.

Security

Increasing inequality does not just affect productivity, mental health and trust, it also creates security concerns for both citizens and states. There is already evidence that hyper-connectedness, when combined with rising inequality, could lead to instant flairs of social unrest. This mix of factors creates the conditions for violence and other security threats that could facilitate power shifts to non-state actors. South Africa has first-hand experience in how quickly a situation can turn bad with the assistance of instant communication and live streaming of videos ranging from student unrest to service delivery protests. In the recent history, governments were overthrown following the live streaming of police attempts to stop riots.

It has also been pointed out that the strategic space for conflict is changing. The combination of the digital world with emerging technologies is creating new “battlespaces”, expanding access to lethal technologies and making it harder to govern and negotiate among states to ensure peace. The recent hacking of banking data and government sites are perfect examples of how vulnerable a state and its citizens could actually be. Cyberspace is now just as strategic as land, sea and air. Distortion and disruption of signals, creation of fake news, confusion or destruction of sensors, were all pointed out by UN security council as vulnerabilities that have the potential to impede decision-making capability and can easily lead to loss of life.

The Fourth Industrial Revolution also offers expanded capabilities for waging war which are increasingly accessible to both state and non-state actors, such as drones, autonomous weapons, nanomaterials, biological and biochemical weapons, wearable devices and distributed energy sources.

On the frontier of emerging military technologies are those that interact directly with the human brain to augment or even control soldiers. Even these are not limited to government military programmes. James Giordano, from Georgetown University Medical Centre argues; “It’s not a question of if non-state actors will use some form of neuroscientific techniques or technologies, but when and which ones they’ll use,” “The brain is the next battlespace”.

We have learned from the experiences of other countries that it is much harder to implement international agreements and norms and standards to support peaceful resolution of conflicts, once you do not hold equal resources and capabilities and especially when you have to coordinate large numbers of potentially lethal private and public sector actors in multiple strategic and cultural contexts.

Identity, voice and community

The digital media is increasingly becoming the main driver of individual and collective framing of societies and communities. Everyone is connected to multiple groups and virtual friendships that transcends traditional boundaries of interaction. Unfortunately, such dynamics can lead to miscommunication and even fabrication of news. South Africa has been victim of this crime and it has become very difficult to trust information that is shared on these platforms, especially since politicians use these platforms to raise their profiles in the eyes of the communities.

It is also said that “emerging technologies, particularly in the biological realm, are also raising new questions about what it means to be human. The Fourth Industrial Revolution is the first where the tools of technology can become literally embedded within us and even purposefully change who we are at the level of our genetic makeup. It is completely conceivable that forms of

radical human improvement will be available within a generation, innovations that risk creating entirely new forms of inequality and class conflict. Yes, baby's genes can be modified/changed to correct birth defects prior to birth, designer pets can be bred, humans and animals can be cloned and chips can be implanted for various reasons. Experiments with prostheses has shown that in future, there will be no disabilities. Some of the technology available for prostheses could turn a disabled person into superman.

Here is South Africa's position on the 4th Industrial revolution as quoted from the President Cyril Ramaphosa's State of the Nation Address:

"The world we now inhabit is changing at a pace and in a manner that is unprecedented in human history. Revolutionary advances in technology are reshaping the way people work and live.
They are transforming the way people relate to each other, the way societies function and the way they are governed.
The devastating effects of global warming on our climate are already being felt, with extreme weather conditions damaging livelihoods, communities and economies.
As a young nation, only 25 years into our democracy, we are faced with a stark choice.
It is a choice between being overtaken by technological change or harnessing it to serve our developmental aspirations. It is a choice between entrenching inequality or creating shared prosperity through innovation. Unless we adapt, unless we understand the nature of the profound change that is reshaping our world and unless we readily embrace the opportunities it presents, the promise of our nation's birth will forever remain unfulfilled.

Today, we choose to be a nation that is reaching into the future. In doing so, we are building on a platform of extraordinary scientific achievement.

The successful construction in the Northern Cape of the MeerKAT telescope, the world's largest and most sensitive radio telescope, and the development of the Square Kilometre Array has enabled South Africa to develop capabilities in areas such as space observation, advanced engineering and supercomputing. These skills and capabilities are being used to build HERA, a radio telescope designed to detect, for the first time, the distinctive radio signal from the very first stars and galaxies that were formed early in the life of the universe.

This is not merely about advancing human understanding of the origins of the universe – it is about responding to the challenges that face South Africans now and into the future. It is about developing the technology and the capabilities that will build a dynamic and competitive economy that creates decent, sustainable jobs. It is about enhanced food security, better disease management, and cheaper, cleaner and more efficient energy. It is about smart human settlements and social development solutions built around people's needs and preferences. It is about smarter, more responsive, more effective governance.

To ensure that we effectively and with greater urgency harness technological change in pursuit of inclusive growth and social development, I have appointed a Presidential Commission on the 4th Industrial Revolution. Comprised of eminent persons drawn from different sectors of society, the Commission will serve as a national overarching advisory mechanism on digital transformation.
It will identify and recommend policies, strategies and plans that will position South Africa as a global competitive player within the digital revolution space".

Conclusion

Martin Nowak, a professor of mathematics and biology at Harvard University, stated that cooperation is "the only thing that will redeem mankind". If we have the courage to take collective responsibility for the changes underway, and the ability to work together to raise awareness and shape new narratives, we can embark on restructuring our economic, social and political systems to take full advantage of emerging technologies".

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AI – THE DOUBLE-EDGED SWORD OF INNOVATION

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By Leandri Lotz

Introduction:

What comes to mind when you hear the words: Artificial Intelligence?
Does it conjure memories of a Stephen Spielberg or a Chris Columbus movie? Maybe your robot vacuum-cleaner buzzing from room to room collecting dust bunnies in hard to reach places? Or do you sometimes ask Alexa a question when you are in need of assistance?

However, Artificial Intelligence (AI) is a much broader field than just robots and voice activated Personal Assistants that make our lives easier. In this article we will explore things that fills some people with excitement and others with a feeling of futuristic doom.

I am sure you have guessed the quote at the top! The quote at the top says: "Intelligence is the ability to adapt to change" – Stephen Hawking

Background:
We are living in an age where Google has already become the endeared Great Grandpa of the technological era and where the things that we previously could not fathom, are much closer to reality than just the space travel dreams of a teenage Elon Musk.

Nowadays, even the way we are using debit cards to perform our day to day financial transactions has evolved so rapidly that when a young trendy hipster, working at a coffee bar handles a card to perform the transaction, the instinct is often to "tap" the card onto the speedpoint device, because of innovations in the banking sector like "tap and go". It can be quite entertaining to witness the perplexed expression when you point out that it is an "old fashioned swipe card" that you are still using, because – Who in today's world is still "swiping"? And to think that there was a time when a credit card had to be put between layers of paper to be imprinted onto the carbon section by a roller-contraption moving over it with quite great force. This seems totally foreign in today's fast paced consume-on-the-go trend.

Yet, AI is much more than just consumption and convenient shopping. It has become totally integrated in day to day life.

AI is also not only about space travel and the ingredients of an apocalyptic sci-fi movie. Oh no! Just look at the Amazon Prime robots and drones that make the concept of same-day delivery of items from a warehouse filled with 350 000 000 products to 185 countries a reality.

It is no easy task to locate the correct item in a warehouse the size of 28 football fields, collect it from that spot and then to deliver it to the dispatching centre where it must be boxed, addressed and shipped.

This mammoth task is performed with great precision by hundreds of synchronized workshop bots which are individually numbered and have the strength equivalent to that of a Rugby player. These bots weigh around 137kg and can lift more than double their weight. There are even bigger bots that can lift up to an impressive 1 400kg.

The reality is, AI is not confined to a huge warehouse in Arizona. It is already here in South Africa. It is involved in a multitude of ways that impact our lives and how we live, work and consume in ways that we might not even be aware of.

Algorithms and Block Chains gather data in the background of our automated systems every time we use internet connections. These algorithms are applied to "read your mind" and to do more direct and aggressive marketing of things you might not even really need, leading to over-consumption and the ever-accompanying waste that follow the excess. We are drowning in "choice-overload" and our fear of missing out, is the ideal fuel for the evolving field of AI.

Why do we need artificial intelligence?
The short answer is, it is convenient and enhances the quality of life. The long answer, is: this is the future and if you or your country do not take part in this industrial revolution, there will be severe economic, social and political consequences. This is a time of "hard choices".

According to Kai-Fu Lee, a celebrated expert in the field of AI, the purpose of AI is to liberate man from the routine jobs in order to remind us what makes us human and to free up our time to do the things that are really important. Not in terms of production or monetarily, but in terms of humanity. We have to move back to building solid, secure, harmonies and loving families, because this is the area where the human race failed spectacularly throughout all the previous industrial revolutions.

But what is so artificial about this intelligence and how can it enhance the quality of human life? Just think of our dearest friend, the mobile phone, the toy that is nowadays given to three-year olds instead of a soccer balls as an example. This device can automatically correct your spelling, do some calculations for you and record voice and image messages in real time. Absent moms and dads read their children bedtime stories on the cell phone and kiss their children good night with the touch of a screen.

This article will not endeavour to discuss all the forms of AI, however, it will entice you with snapshots of what is happening, so that you, the reader can make up your own mind about the advantages and disadvantages that AI bring with it, be it new job opportunities, or unemployment, faster and better service delivery, saving of lives or even robotic warfare. The opportunities are gargantuan, but so are the consequences. Where do we find the balance and who will play the role of the "universal conscience" in the future of AI?

The following are examples of innovations in AI that are aimed at making life better:

The Health and Safety Sectors:
What happens when a person gets ill in the deep rural areas and is in need of medication or assistance? With advancements in the health sector, it will soon be possible to be diagnosed via your mobile device and medication could be dispatched via a drone as long as you have access to your smart phone that should be powered by green energy. This, as a matter of fact, is already happening in some countries on the African continent.

Biometric technologies have given us precision medicine. Just imagine the positive impact that Image Scanning Analytics have on the faster and more accurate diagnosis of life-threatening

conditions such as cancers. Just as it is possible to take a photo of a plant in your garden and then utilize specialized applications available through cell phone technology to identify the plant by searching a worldwide database of plants, Doctors can use the same principle of image scanning technology to work through thousands of pathology reports to make a diagnosis faster and with greater accuracy than humanly possible. This is all made possible by machine learning.

The medical care sector is regularly plagued with labour disputes based on the working conditions and the physical demands of these jobs. AI technology can be integrated into a central records management system which can be accessed by all hospitals and medical practitioners by collecting more complete and accurate biographical data of patients, their medical backgrounds, the medication they are taking etc. without having to repeatedly complete the same forms and questionnaires at each point of entry. This has the benefit of eliminating duplication and can also avoid the possibility of prescribing contra-indicated medications. It can avoid unnecessary medical testing if the records of previous test results are uploaded and as a result this will impact positively on the workload of Pathology staff. Nevertheless, a major advantage would be the financial benefit of savings that such an integrated system could have on the cost of medical services.

Image analytics can also be helpful in early detection of illnesses and conditions years before they manifest. Studies have been done using MRI scans on the cartilage of a group of patients and after 3 years the study group was scanned again. Through machine learning it was determined that the AI technology could apply the data to accurately predict which study subjects would develop Osteo Arthritis in the next 3 years, all by recognizing the presence and location of water in the cartilage. I am sure anybody would love to have the foresight of knowing the danger of developing a life threatening or debilitating illness in advance in order to take preventative steps or at least to diminish the impact thereof.

Robotic surgery has advanced dramatically and is used quite often to perform certain surgeries. It is even possible for a surgeon to perform a procedure on a patient in another country through remote controlled robot arms commanded via visual communication over internet technology.

Genomic Sequencing where DNA data is captured and analysed for anomalies and dysfunctionality is on the rise. This helps to target specific parts of a patient's genetic code that is pre-disposed to and causes different cancers. Specific medication can then target those genetic code glitches and extend a patient's life.

The possibilities of AI in bettering the lives of disabled people are also vast. There is technology available where a person can scan the area using a smart phone, which then verbally describe the terrain and surrounding area, making it safer for the person to navigate over and around obstacles. This can be very useful in case of natural disasters or having to negotiate unfamiliar terrain.

In the safety sector, AI can be a great game changer in the form of facial recognition technology.

There has lately been a spate of armed robberies at well-established and much-loved businesses where the robberies resulted in fatalities of the business owners, but crime is not limited to the smaller, family businesses. In today's era any business operating with cash, merchandise or even medicines are targets for robberies.

If facial recognition technologies could be applied using interactive CCTV camera systems, linked to a real-time database of wanted suspects, it could prevent a shop assistant unknowingly opening a mechanically operated entry to a criminal. A warning could be flagged when the camera recognizes the features of a suspect that is already known to the authorities and a locking mechanism could prevent the person from entering the premises. It could even be integrated with the communications of the Police and security companies which could then be

dispatched pre-emptively before a violent situation occurs and thus crime could be more effectively curbed without bloodshed.

To summarize, the benefit of AI to the health, safety and community sector will impact exponentially on the cost and treatments available in the medical, safety and care fields. It can minimize the possibility of medical mistakes and with the dedication of medical practitioners and support staff, create a safer, more cost-effective way of looking after the most valuable assets on earth, -our lives. One thing is for sure, AI will not take over jobs in the medical and care giving industry, because all of these wonderful inventions are human dependent. Machines cannot share warmth, love, care and compassion.

AI as a workplace wellness tool:
Instability and demand on human resources are on the rise in the workplace, a direct result of over-supply of human resources and underperformance in sustainable job creation. The competition is stiff. There is no such thing as a "job for life" any more and pension funds and medical schemes are under siege. People are continuously challenged by circumstances for which they are not physically or mentally prepared. The education system has not provided the expected skills for the changing labour requirements, and the economy is busy pulling the rug from under the feet of those who have to sustain their families, in favour of cheap and fast imports. In general, the absence of a work life balance and a state of continuous stress have put man in a situation comparable to "post-war trauma", but with the difference - this is a psychological war with no end in sight. As a result, the regular overworking and insecurity of staff leads to job dissatisfaction, fatigue and burn-out. Suicides are on the rise, workplace violence happens more often and more employees are bullied and taken advantage of, than ever before. Couple this with work that is not stimulating or interesting, but that requires a high level of accuracy, the possibility of unnecessary error and accidents in the workplace are rife. But all are not lost because there are huge staff wellness benefits in the AI wellness field.

What if AI could help eliminate the possibility of large staff turnover, by assisting in bearing the workload, performing the repetitive and less specialized tasks and freeing up the time and energy of workers for the tasks that AI cannot do as well as humans? This would be beneficial, wouldn't it?

Employee Health and Wellness has become a buzz-word in the workplace, and many organizations have moved away from the strict over controlled work environment to something that provides for a balance between fun/relaxation and productivity. However, this requires a large AI injection to benefit from the machine learning that could alleviate the pressure of managing the long working hours and tight deadlines attached to productivity. These technologies are available but costly, and not something that could be implemented without proper change management principles in place.

Wearable technology that could read emotions and can personalize the wellness programs for employees is one of the new areas of development. Such devices are able to provide rapid responses for employees. Virtual healthcare providing is an area where AI software is developed to assist employees with questions regarding nutrition, disease management and overall healthy lifestyle management. It is said that these chatbots could be available 24/7 on any mobile device – making wellness even more convenient for employees. Apps for counselling is already widely in use due to its privacy and accessibility. This device capture employee information through employee input or an automated tracker, but some e-health companies now offer metrics and action plans on combined outputs with real-time advice and guidance through big data and machine learning.

Modern workplace buildings provide for automated natural light and climate control through artificial intelligence and even workplace noise is manipulated into meditative sounds that can enhance happiness, relieve stress and induce feel-good hormones that can make employees more comfortable and productive. Furniture that can automatically adjust to employee health

needs is an area that many new furniture designers are interested in and there might just be an office chair that automatically adjust to the posture and health requirements of the employee on the market soon. All of these are AI driven.

Also, amongst the many applications mentioned above, the development of systems and devices that can read, interpret, process, simulate and predict human emotions is getting the most attention. There is an expectation that emotion tracking will gradually replace traditional customer satisfaction surveys. The thinking behind this is that happier, more satisfied employees are more productive and creative, have healthier lives and generate lower costs for the employer in terms of absenteeism and medical benefits.

AI in our Agricultural Economy:
AI plays a very valuable role in the economy and export to other countries, which affects the global economy. Not only is there a great potential for the GDP of the country to grow, but it is also beneficial to the farmers on grass-roots level. AI can help in agriculture with soil analyses, the expansion of intelligent irrigation systems, self-driving tractors and harvesters which can double the capability of the area that can be efficiently farmed.

If vast areas are ploughed automatically on a grander scale by a machine, it frees up more time for farming staff to tend to the smaller tasks. Improved harvesting timing based on satellite analyses of the readiness of the crop and the weather conditions can prevent huge losses in terms of natural occurrences such as hail, pests, etc., because the crop can be removed from the field faster than a team of hand harvesters can manage to do. Yes, this might seem to endanger the work security of the farm laborers, but if one strategically works along with machinery instead of fighting against it, the gains could be bigger and the jobs for the human workers can be diverted more efficiently in directions where there are other gaps in capacity. Bigger, healthier harvests will bring the farmers a bigger income from which they can buy more seeds, creating a sustained food chain in a time where food security is very much needed and very important.

As mentioned above, in agriculture timing is of the utmost importance. One has to know when to plough and when to plant and in India they are already successfully using AI initiated by Microsoft to predict the optimum times for sowing. As the rainfall patterns are so unpredictable this application is of great benefit and combines the traditional knowledge of the generations with the latest technology. By using this Cloud based Microsoft Cortana Intelligence Analytics suite the farmer can have accurate information based on weather patterns, soil conditions and various other factors which have an influence on the optimum sowing time. This innovation applies Machine learning and Power PI and it even helps with fertilizer recommendations to ensure the optimum crop yield.

AI in Tourism:
AI can also be utilized successfully in the tourism field to detect dangers of poaching in game reserves and survey vast areas which is not so easy to do by foot or with a game vehicle. Sadly, the topic of drone-use is a bone of contention in South Africa at the moment and for this reason the future of drone use for the purposes of anti-poaching and wildlife tracking as well as traffic monitoring on our national roads, remains to be seen.

Relating to travel bookings, AI has also grown by leaps and bounds. Travel Agents will have to re-invent their careers soon to utilize digitizing of travel as a beneficial tool instead of a threat. It has become so easy for people to make their own bookings online and to stay over at an Air B ’n B instead of a posh hotel.

AI in the social / entertainment and business networking environments:
I have earlier touched on the benefits of AI to the blind community in terms of wellbeing and safety, but another unlikely benefit is in the field of social interaction. With social networking sites like Instagram blind people are not left out of the conversation.

Yes, blind photography has become a thing. Taking “selfies” are not only something the Kardashians do. Blind people also engage in make-up and fashion and it is natural that they also want to take part in showing their latest look. This makes the world more accessible and inclusive to people in a social sense, than maybe a decade ago.

Then of course there is the technology like voice to text and text to voice communications, which makes it possible for blind computer users to communicate and have access to the written media on the internet, but this is not only beneficial to the blind. I always have my best moments of inspiration at the “most inconvenient” times when a pen and paper or typing is just not an option. Being able to record the information and then, at a later stage transcribe it, is hugely beneficial, not only in preventing the possible loss of great ideas, but it is excellent for time-management.

AI in the service sector:
Automation in the lower skilled job sector has also developed more lately. Have you recently been to a fast food outlet where you had to input your order into a machine before proceeding to the queue at the cashier where you would then pay for your food order? Not long ago both these tasks were performed by the same person who would take your order, place it onto the computerized point of sale system where it would then be available for the kitchen staff to prepare the order while you pay the same person who assisted you with taking down your order. This however meant that more cashiers were needed to serve the queues of customers, because one person would need to be assisted from start to finish by one cashier. Technology has now essentially cut the staff required at the premises at one given time in half, because the cashier only needs to receive the payments. Another server then just presents the client with the prepared food et voila, service has been sped up tenfold by eliminating a “middleman” or two.

AI helpful in the performance of dangerous tasks:
With the evolution of Architecture, skyscrapers are a regular sight in all prominent cities of the world. They compete with one another to boast the tallest building. In general, these buildings contain a lot of windows and glass panelling which have to be cleaned regularly. It is a dangerous job to perform manually yet, it has been shown that drones can effectively and safely perform this task. They are much cheaper and more efficient and the risk of losing a drone has far less consequences than losing a human due to failing safety equipment.

AI also impacts the mining industry in the form of robotic excavations. This has the potential to save many human lives through eliminating the danger of Miners being trapped underground when mineshafts collapse due to seismic activity. Now, this will potentially cause an uproar in the Mining Sector under the Unions, due to the possible elimination (or at least decrease in) of mining jobs. Therefore, this is a very tricky terrain to navigate whilst considering the risk of increasing unemployment.

Conclusion:
Because AI is a subject that should be understood in context, this vast field of innovation cannot be left unregulated. The risk of over-innovating humanity out of employment through “reckless” implementation of mechanization, is a factor that have to be managed. However, AI provides just as many opportunities for new job creation and should not be a threat to employment when managed responsibly by people with integrity.

The fourth industrial revolution is here to stay and cannot be ignored, because life’s focus has shifted from the traditional community-driven model to a more consumer focused, instant gratification chasing model. There are however still specialist fields where a human stands out head and shoulders above any AI counterpart and AI will never totally replace the human element. It can however enhance it immensely.

We must acknowledge that it is very possible that many traditional careers will “disappear” with time due to the ability of AI to perform certain tasks safer, faster, more efficiently and at a lower cost than human workers. We see this more and more every day in places such as customer

support and the possibility is there that some health professions will become fully automated. Another sector that might move to large scale automation is the road transport and trucking industry, where heavy load road transport automation is already in an advanced stage of testing and driverless trucks could soon become a general sight on our roads. This is now over and above Tesla's achievements in the field of automation.

However, there is one facet which differentiates humans from AI. This speciality niche is the job sector involving compassion, emotion, care giving, empathy and teaching. Those who romanticise the idea of AI would argue that robots, like Sophia is created with the potential of learning empathy and compassion for the human race, but it still remains the one trait of humankind which has not successfully been replicated.

Kai-Fu Lee tells us of an example where a robot played chess against a human and although the robot won, it could not experience any emotion of pride or fulfilment of its achievement. A robot can take facts and data and through deep learning and apply that data for predicting possible outcomes, but the emotional factor remains the gift of humanity and that should never be compromised.

AI should be seen as a handy gap-filler. It is a tool to make life easier, to free up time and to enhance our lives, not to take it over. AI should not be seen as the enemy, but rather as an assistant to make life more fulfilling and enjoyable. What we might lose in traditional jobs, we might gain in quality of life.

Humanity should therefore never fear of becoming obsolete. There will be a need for more teachers to guide the youth through this exciting, but daunting AI era where job security will have to be re-invented and new jobs be grown with time. There will be a need for more care givers, for more innovators, for more dreamers and all of these might become paying jobs in the future, who knows?

Together with AI we can make the world a better, more organized place where we have the opportunity to spend more time on the things and with the people who really matter. It is just a matter of finding the right balance between AI and the human factor.

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