



AUTHOR:
Ntombizodwa Mathe¹

AFFILIATION:
¹National Laser Centre, Council for Scientific and Industrial Research, Pretoria, South Africa

CORRESPONDENCE TO:
Ntombi Mathe

EMAIL:
NMathe@csir.co.za

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Insights from 'Unlocking COVID-19 current realities, future opportunities: Artificial intelligence in the time of COVID-19'

The University of Cape Town, in partnership with Standard Bank, hosted a webinar entitled 'Unlocking COVID-19 current realities, future opportunities: Artificial intelligence in the time of COVID-19' on 19 August 2020. The webinar was facilitated by Professor Tommie Meyer from the University of Cape Town's Centre of Artificial Intelligence Research at the Department of Computer Science. The two speakers for the event were Professor Tshilidzi Marwala, Vice Chancellor and Principal of the University of Johannesburg and a pioneer in the field of artificial intelligence (AI) in South Africa and the Deputy Chair of the Presidential Commission on the Fourth Industrial Revolution (4IR). The second speaker was Mr Nanda Padayachee, Head AI, Automation and APIs at the Standard Bank Group. He has extensive experience in digitisation of capabilities and established the Inaugural Data Science capabilities within the Standard Bank Group.

Prof. Marwala started the session with an overview of the COVID statistics globally, including South Africa, with the number then at 22 million cases. Economies have been devastated, with many companies closing down just 5 weeks into the hard lockdown, with a negative impact on families and on the whole of South Africa. He observed that, coincidentally, the pandemic has occurred alongside the acceleration of 4IR technologies. This is a time when technologies such as AI are permeating all aspects of our lives and merging the identities of people and identities of machines into one. AI has been used extensively in all areas of our lives and health care is one of the main industries using this technology. For instance, a study by Lancet Digital Diagnostic AI uses deep learning models with the aim of being equivalent to that of healthcare professionals in diagnosing illnesses correctly. However, the use of AI is not intended to make doctors obsolete, but rather to take over many of the time-consuming and tedious aspects of patient care while allowing for faster diagnoses. Prof. Marwala also used an example of a video circulated in China at the beginning of the pandemic in February 2020 that showed a drone communicating with an elderly woman instructing her to wear a mask and wash her hands. However, this kind of application can also generate the fear that, by using 4IR technologies, state surveillance agencies are able to track people and their movements in instances that are not benign. Nonetheless, AI has been an important tool in diagnosing and preventing illness while also assisting many people to deal with the impact of isolation through the availability of online platforms that allow video calls for families to stay connected and robot assistants that assist the elderly with household chores.

Prior to lockdown, the Beijing subway system used AI to scan body temperatures and identify any COVID-19 symptoms in the passengers using the trains. Moreover, algorithms are being used by healthcare professionals to scan chest X-rays of patients in order to differentiate between pneumonia and COVID-19. An AI program has also been developed to determine which coronavirus patients will develop serious complications, thus allowing doctors to determine which patients are more likely to need ventilators. There are, of course, limitations to current AI technologies which rely on reading pictorial data of ultrasounds and CT scans, yet these have been proven to be useful tools in managing the disease and patient care. An AI healthcare start-up company in Daejeon, South Korea, used deep learning models to determine how strongly a molecule would bind to a protein, for determination of the ideal medication for patients with COVID-19.

Similarly, Benevolent AI in the United Kingdom used AI and existing data to sort through existing drugs that could be used to treat patients with COVID-19 until a vaccine became available. VIR Biotechnologies in San Francisco, USA, used algorithms to identify molecules that could be targeted towards treating COVID-19. In March 2020, the US government launched a project in collaboration with Tech Giants and academics to make coronavirus research accessible to AI researchers and their algorithms in an effort to aid health experts. Such measures are needed because AI cannot be used unless data are available.

It was explained in the webinar how the use of AI in combating the pandemic has ranged from robotic cleaners that spray disinfectants in hospital wards, to AI voice assistants calling people to gather information on home quarantine. In China, autonomous robots have replaced human cleaners, which has not only reduced infection rates but also prolonged working time. Voice-assisted AI has contributed to monitoring and control of the spread of the virus by collecting personal information and symptoms to alert officials to possible hotspots. An AI search tool called COVID-Scholar was developed by a researcher at the Lawrence Berkeley National Laboratory, University of California Berkeley, to assist researchers and clinicians to sift through the literature on the virus – much needed because there have been over 28 000 scholarly publications related to coronavirus since the beginning of the pandemic.

In South Africa, the robot 'Pepper', piloted at Nedbank, has been deployed as a robot companion to counteract the surge of loneliness during the pandemic, particularly among the older population. Pepper can make phone calls and identify missing items in the kitchen. AI has also been used as a government services digital platform called GovChat in South Africa, which allows for the easy access of information as well as for tracking and tracing to assist authorities in identification of COVID-19 hotspots so as to manage resource allocation. At the University of Johannesburg, Prof. Marwala and his student have developed an AI tool that they describe in their publication in *PLoS ONE*¹ entitled 'Bayesian inference of COVID-19 spreading rates in South Africa' and which is able to estimate vital statistics such as infection and incubation rates. The CSIR and the Department of Science and Innovation have developed a dashboard that can streamline data that will help the government COVID-19 National



Command Council to better manage the pandemic. By teaming up with Telkom and Samsung, the South African government is able to track and trace people who may have contracted the coronavirus using data such as geographical information systems (GIS) and mapping from their cellphones. While if a person has already contracted the coronavirus, they are able to personally assist by doing a daily check-in on the Impilo app developed by the Gauteng Department of Health in 2019.

Despite the successes of AI, there is a growing debate for regulation. Prof. Marwala is a member of the World Health Organization's committee that is developing guidelines for the application of AI in medicine so that the technology cannot be misused. AI technologies are often not guided by policy but rather used to pilot new ideas. The consequence is that there are great unknowns as well as potential dangers given the speed of adoption of these technologies and the frantic nature of trying to find speedy solutions to the pandemic. We have not experienced a pandemic like this since the 'Spanish' influenza in 1918 that killed over 50 million people, 350 000 of whom in South Africa, and the isolation, social distancing, total lockdown, and working and schooling from home are collectively a new experience. Prof. Marwala concluded his presentation with a quote from the 2014 book *The 1918 Spanish Flu Pandemic: The History and Legacy of the World's Deadliest Influenza Outbreak* by Charles River Editors:

In many ways, it is hard for modern people living in First World countries to conceive of a pandemic sweeping around the world, and killing millions of people. And it is even harder to believe that something as common as influenza could cause such widespread illness and death.

This is now our reality, and yet in the 4IR we are far better equipped than we have previously been, with AI being the most powerful tool in our arsenal.

Prof. Marwala was followed by Nanda Padayachee who pointed out that any notion of AI being in the realm of science fiction is no longer the case and AI has impacted our lives and society as a whole. He noted that even before COVID-19 there were technological advances that made our lives 'not normal'. For instance, we need to consider the global inequalities and remember that there are over 600 million people untouched by the First Industrial Revolution, without access to electricity or any form of mechanisation, while half the current population lacks access to Internet connectivity. We are reaching a point at which our impact as a species is

becoming detrimental to the planet. The question is: 'How do we use AI to create a better normal?' AI must have a far better reach in creating the 'new normal' to address societal needs in a far more equitable manner. In terms of what we want to achieve with AI, Padayachee broke it down into three specific categories:

1. Using AI to improve existing processes, services and products with the opportunity for incremental growth such as autonomous systems.
2. Using AI to create new ideas, for instance in medicine, agriculture, and in productivity generally.
3. Considering how AI can lead to breakthrough advances, e.g. personalised medicine, agriculture, and mining for using resources more efficiently. For example, one mining company has utilised machine learning to optimise productivity and has achieved a 20% increase simply by streamlining their processes, without having to drill new mines or expend additional resources.

Often when we think of new technologies, we consider them in a private sector context or consumer context. However, there is a substantial opportunity for these technologies to be used in the public sector, i.e. from government to consumer and the transition to a digital government. Countries like Estonia are making substantial leaps towards a digital government. COVID-19 has shown that as a country, South Africa can move quickly and make bold decisions, and more of such thinking and action will allow us to serve our people, entrepreneurs, and organisations to a far greater extent. One of the creative features of AI is the ability to recommend actions with human oversight.

In conclusion to this fascinating and information-packed webinar, Prof. Marwala emphasised that the three areas mentioned by Nanda Padayachee needed to be assessed urgently and reminded the audience that South Africa can gain advantage by collaborating with other countries to take full advantage of the technologies on offer.

Competing interests

There are no competing interests to declare.

Reference

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