Data science sees ‘gold rush’ to create COVID-19 breakthroughs

By Sibahle Malinga, ITWeb senior news journalist.
Johannesburg, 22 Apr 2020

IN THIS ARTICLE

The use of data science has become a critical “gold rush” as research scientists across the globe partner on scientific breakthroughs, to better understand the novel coronavirus (COVID-19) and recommend strategies to help address its complexities.

Data science, an inter-disciplinary field that uses scientific methods, processes, algorithms and systems to extract insights from structured and unstructured data, is playing an integral part, now more than ever, in helping humanity effectively deal with the coronavirus outbreak.

Combined with other technologies such as artificial intelligence, machine learning and the Internet of things, data science is assisting in an array of research, from determining geographical disease growth hotspots, to analysing citizen behavioural patterns and helping accelerate research into new treatment, according to researchers.

As the impact of the outbreak sweeps across the globe, it has claimed the lives of over 178 000 people, with a current infection rate of over 2.5 million, and recoveries at more than 701 000.

With a confirmed number of 3 465 cases in SA, by time of publication, the local health, academic and ICT sectors have embarked on various research collaborations centred on the

analysis and exploration of data sets.

KwaZulu-Natal’s Research, Innovation and Sequencing Platform (KRISP) has collaborated with the Big Data Flagship Programme of the University of KwaZulu-Natal (UKZN), a multi-disciplinary team of world-renowned experts which mainly focuses on analysis and control of viral outbreaks and genomic analysis.

See also

Mining house contracts Internet Direct

SA COVID-19 research data platform in the works

The team has produced five of the six COVID-19 viral genomes in SA, which clearly showed how the virus was introduced into the country. It is now working with the Department of Science and Innovation and the South African Medical Research Council to help them map the epidemic in SA.

Professor Tulio de Oliveira, director of KRISP and professor at UKZN, saysdata science is at the core of this research, which involves the analysis of millions of data points to understand the spread of the COVID-19 pandemic in SA.

“We use three main research methodologies. The first is big data analysis, which includes mathematical and statistical analysis of the public South African testing and diagnosis data.

“The second is bioinformatics, which includes programming computer software applications to analyse the SARS-COV-2 genomic data. The last is artificial intelligence, which uses diagnosis and genomic data to predict the spread of the COVID-19 disease,” explains Oliveira.

The data comes from two main sources: the public testing and clinical data from the National Institute of Communicable Diseases and government reports, and also from DNA

sequences that are produced at the KRISP.

"We believe data science plays a very important role. Our results were used by the minister of health and the chief scientific officer of the COVID Response Committee, to show South Africans the effect of the lockdown. We think it will be crucial for the country to follow scientific analysis if it is to continue controlling the COVID-19 epidemic," notes Oliveira.

As the data accumulates, the researchers will be able to analyse the level of community transmission from epidemiological and genomic data, he adds.

The South African government is capitalising on the use of mobile technology to curtail the spread of the disease. An extensive tracing system has been deployed to trace those who have been in contact with confirmed coronavirus cases and monitor the geographical location of new cases in real-time.

In addition, the Department of Health and the Council for Scientific and Industrial Research are working to develop a data hub to monitor the geographic spread of COVID-19, among other things.

Keeping track of large data sources

Another research project, conducted by global strategy and investment consulting firm Singular, titled the "South African Health & Economic Crisis", seeks to provide decision-makers with a concrete and focused view on how the crisis in SA could develop over the next weeks and months.

The research focuses on various key "wild card" variables such as COVID second and third waves, and analyses scenarios such

as the ability to enforce a true lockdown in rural and poor communities, allocating government relief packages, the seasonality of the virus and the impact of broad-based anti-bodies testing and a gradual selective release of the economy.

The research found the extended lockdown could see a real-term GDP contraction of 7% to 11% (year-on-year) under three potential scenarios of industry ramp-up. To recover 80% of this loss, it could take SA between three and six years.

"We are and we will be increasingly flooded by data, which is the key to how we react to COVID-19. Singular has a team of analysts who have collated and triangulated data from multiple global data banks and has been able to link case-based insights. The analysts track real-time shifts, trends and learnings, from peers who are ahead of the COVID-19 journey," says Lorenzo Tencati,senior partner at Singular.

By keeping track of large amount of data sources, Singular says it is able to estimate the rolling events in policy, consumer behaviours and geopolitics, and estimate the impact of COVID-19 on key sectors in SA.

S'bu Khoza, founder of cloud and AI technology company Sive Setfu ICT Solutions, believesresearch scientists around the world are dealing with vast amounts of data – far too much for human intelligence to process – in their efforts to find solutions and understand the impact of the virus.

"This has resulted in scientists globally deploying the deep learning capabilities of AI to collate the data to try to uncover patterns that will lead to successful treatment and, hopefully in the course of the next year, a vaccine," he says.