Coronavirus Pandemic

Tapping AI to battle Covid-19

From a smart clinical chat assistant to a real-time command and communication system, artificial intelligence is being used to help Singapore’s healthcare sector stay on top of the fast-evolving situation.

Think of us like a Google Assistant or Apple Siri, but designed for busy healthcare professionals... Whenever clinical staff need an answer to questions like who's on call or guidelines on hospital-specific protocols, they can simply type a query (and the app “Bot MD”) will instantly respond with the right answer.

Healthcare facilities and technology companies here are tapping artificial intelligence (AI) technology in the fight against Covid-19 outbreak.

They include hospitals such as National University Hospital (NUH) and Tan Tock Seng Hospital (TTSH), while several local tech firms have AI offerings now being used in coronavirus mitigation.

According to the Infocomm Media Development Authority, AI refers to the study and use of intelligent machines to mimic human action and thought. It is associated with learning, problem solving and pattern recognition.

NUH and TTSH are using a clinical chat assistant smartphone app by Singapore AI start-up Bot MD, which helps doctors and front-line healthcare workers stay abreast of the fast-changing information related to Covid-19.

The app uses AI to power its natural language interface and can extract clinical information from large swatches of content from different data sources.

"Whether I am looking for Covid-19 clinical workflows, at how to contact the pandemic team, or to keep up to date on our hospital’s latest operational directives, I am able to search for and obtain all this information instantly on the Bot MD app," says the app’s biggest value is in providing her with clinical information whenever and wherever she needs it.

Bot MD was founded in 2010. Its app is currently used by 13,000 doctors in more than 80 countries, but MD chief executive officer (CEO) and founder Dorethee Koh says: "Think of us like a Google Assistant or Apple Siri, but designed for busy healthcare professionals."

She says the app can be quickly trained on any hospital or clinical content and answer questions from medical staff. The content can come from hospitals, medical associations and the Ministry of Health (MOH).

"Whenever clinical staff need an answer to questions like who’s on call or guidelines on hospital-specific protocols, they can simply type a query (and the app) will instantly respond with the right answer."

"With our partner hospitals such as NUH and TTSH in Singapore, we trained the AI on hospital specific content such as hospital protocols, drug dosage information, drug formulary information, on call rosters, disease guidelines, Covid 19 operational directives and the latest MOH circular updates," says Ms Koh.

"It is also being used at TTSH’s new Command, Control and Communications (C3) system for healthcare, which was rolled out at the end of last year after two years of development."

Developed jointly by TTSH and MOH’s IT arm Integrated Health Information Systems (IHS), the system provides real-time visibility of the hospital’s ground operations - from the moment patients are admitted to the hospital to when they are discharged, while keeping track of resources such as hospital workers, beds, critical equipment, including personal protective gear and other supplies.

The system uses AI to predict situations before they occur – thus giving information on how resources could be better allocated – and to provide insights for better decision making.

IHS CEO Bruce Liang says that the system can predict future care demand and enables "autonomous decision-making with more than 600 pre-defined formulas."

He adds: "(The system) helps us go beyond hindsight to foresight. During this Covid-19 situation where there is an escalating number of patients, speed and foresight are essential."

In early February, TSHS saw a surge in attendance at its screening centre for Covid-19. This coincided with a rise in impatient admissions at the National Centre for Infectious Diseases (NCID), which is located next to TSHS.

Guided by the C3 system, TSHS was able to pull together the manpower, equipment and other supporting resources to open five wards at NCID and strengthen support at its screening centre.

AI TEMPERATURE SCREENING AND CONTACT TRACING

AI is also used in temperature screening here. IHS and local medical tech start-up Kronikare have developed a solution called iThermo that uses AI to spot febrile people in a crowd, reducing the need for a manual process. It works even if people are wearing sunglasses, surgical mask or headgear.

The solution, which comprises a smartphone fitted with thermal and 3D laser cameras, is currently being piloted at the IHS headquarters in Serangoon North and St Andrew’s Community Hospital.

In a blog post on its website in late February, Kronikare said it had received more than 200 inquiries across various industries, requesting some 500 units.

A real-time contact tracing and communication system created by Singapore-based AI firm Squeem Technologies is being used by the South Africa government.

Squeem, which was incorporated in Singapore in 2010 and has about 150 staff, has a software called Channel Squeem, which can track people using their mobile device ID down to a 5 sq m grid. It does this without needing to know any personal information of the device owner.

A MUST COMPLEMENT MEDICAL SYSTEM USING AI TO BE USEFUL

continued on C4

AI must complement medical systems to be useful

From: Sirem, CEO and founder Ian Chapman

"Once a person is found to have tested positive for Covid-19, all the health authorities need to do is to trace people and work addresses of the individual through Channel Sirem."

The software then uses AI and machine learning models to automatically determine how many devices that are carried by other people can be risky contact with that person over the previous 14 days. Relevant agencies can then send messages in the form of advertisements to the next website or app that the owner of the device knows or uses.

These messages can be information on how to check for Covid-19 symptoms, local health support contact details or a message for them to contact the local health authorities.

Channel Sirem was rolled out in South Africa at the end of last month and has an accuracy rate of 90 per cent, says Sirem.

Like other AI and machine learning solutions, its accuracy improves as it AI continues to learn and optimizes itself.

The software is currently in use only in South Africa. Mr Chapman says the company is in talks with potential clients across Asia, Europe and the Middle East.

How AI helps

Many experts say AI is an effective technology to battle the coronavirus pandemic.

Mr Malina Platon, Ayana managing director of New York-based AI firm UPW, points to the use of AI in combination with automation technologies such as Robotic Process Automation (RPA).

RPA allows software - the "robot" - to mimic the actions of a human in digital systems. For instance, a software robot can watch and repeat what a person does in an application's graphical user interface.

Mr Platon says RPA can collect vast amounts of data, such as patient records, and feed them into the AI algorithms, which can then help doctors and healthcare professionals make quicker and better decisions.

In January, London-based AI firm BenevolentAI used its extensive scientific literature and biomedical research data to look for links between Sars-CoV-2, the virus that causes the Covid-19 disease, and potentially effective drugs against it. The firm found a drug called baritum, which could potentially slow down the effects of the coronavirus.

The drug is undergoing trials.

Mr Mike Fucic, CEO of data and technology firm Quadrant, says: "Unlike the Spanish flu pandemic or even Sars, today we are generating masses of data that we can pump into AI algorithms that could help forecast or even prevent another pandemic of this kind."

He pointed to how location data can be used in combination with other types of data to uncover new insights.

"For example, we know that the severity of Covid-19 in part depends on viral load and dosage. And so marrying medical data (such as chest X-ray results) with location data, we may be able to uncover hot spots where people contract the virus more seriously," he says.

Mr Liang Feng Yuan, CEO and co-founder of home-grown AI start up RiaAI, cautions, however, that AI has to be used in combination with other pandemic-fighting efforts.

"It's not a single answer to the challenging situations we are faced with. Technology alone will not help us dispose of the underlying conditions necessary for a successful battle against Covid-19," he says.

But with the right systems and checks in place, he adds, AI will provide public health officials with more accurate overviews of patterns.