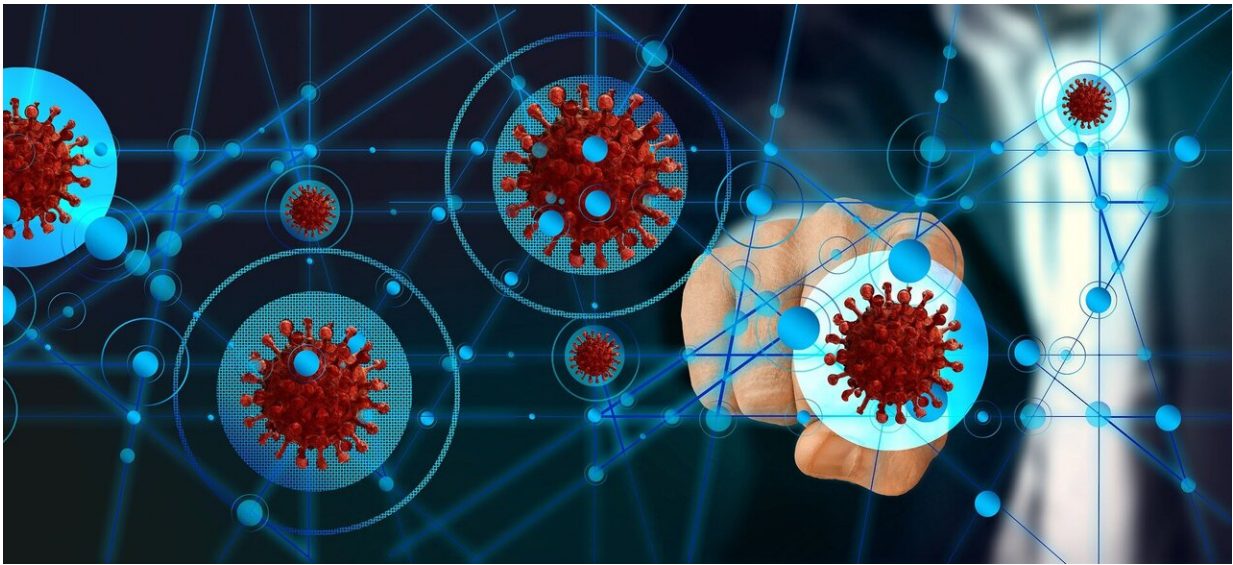# Researchers use artificial intelligence to accelerate access to COVID-19 treatment

July 13 2023, by Brian Katzowitz

Credit: Pixabay/CC0 Public Domain

To address an emerging issue in health care delivery, researchers from Emory University's School of Medicine and Georgia Institute of Technology are exploring how artificial intelligence (AI) can offer a way to increase efficiency of diagnoses and treatment.

During the COVID-19 pandemic, the use of telemedicine and electronic health record (EHR) messaging rapidly increased. As virtual visits became more commonplace, the widespread availability of COVID-19

at-home tests allowed patients to report a positive test and start treatment or recovery without having to visit a doctor's office. While this shift in health care delivery offers many benefits, an influx of messages without a digitized triage system creates a logjam that can slow response and delay access to timely treatment.

A new study published in *JAMA Network Open* assessed how a specific type of AI, called natural language processing (NLP), can speed up the time between a patient-initiated message, a physician response, and access to COVID-19 antiviral treatment.

Building off previously tested deep learning predictive models, the research team developed a novel NLP model to classify patient-initiated EHR messages and evaluated their accuracy at five Atlanta-area hospitals between March 30 and September 1, 2022. Over the course of the study, 3,048 messages reported COVID-19 positive test results. When a positive test was reported via EHR, the NLP model sprang into action.

Findings show that the NLP model classified patient messages with 94% accuracy. Furthermore, when responses to patient messages occurred faster, patients were more likely to receive antiviral medical prescription within a five-day treatment window.

"We were excited to see how natural language processing accurately and instantaneously triaged patient messages reporting a positive COVID-19 test and helped improve patient access to treatment," says Nell Mermin-Bunnell, a third-year student at Emory School of Medicine and the lead author on the study. "While this model proved effective for this specific application, there are opportunities to broaden the scope beyond COVID-19 diagnoses."

May Wang, Ph.D., a co-author on the study, professor and Wallace. H.

Coulter Distinguished Faculty Fellow at Georgia Tech adds, "The results illustrate the power of using advanced NLP models in accurately identifying patients at risk of a certain disease in real time. It showed that the speed for patient access to healthcare can be significantly increased. "

The study is the result of a partnership between Emory University, Georgia Tech, and Switchboard, MD, a data science and artificial intelligence company founded by physicians from Emory Healthcare.

The NLP model used during the study period, eCOV, was developed initially by Blake Anderson, MD, CEO of Switchboard, MD and an Emory primary care physician. As more patients began using EHR to communicate with their clinical team, Anderson saw a need to better organize incoming messages to ease the cognitive load on clinical staff and alleviate burnout. Anderson and his team conducted experiments to evaluate the model's performance and homed-in on an algorithm to account for the context of the message, not just keywords.

"We're trying to take a mountain of incoming data and extract what's most relevant for people who need to see it so patients can get care faster," says Anderson, senior author on the study.

Once fine-tuned, he teamed up with Georgia Tech to ensure the NLP model was reproducible and began deployment of the model to evaluate its ability to expedite physician-patient communication.

Further analysis is needed to measure the impact the model will have on clinical outcomes. What's becoming clear though is that as AI is further integrated into the mainstream components of health care delivery, it holds the ability to reshape how medicine is practiced.

Anderson says that despite the concern some have around the use of AI

in medicine, "this type of NLP offers a way to use AI by prioritizing human interactions instead of replacing them."

More information: Kellen Mermin-Bunnell et al, Use of Natural Language Processing of Patient-Initiated Electronic Health Record Messages to Identify Patients With COVID-19 Infection, *JAMA Network Open* (2023). DOI: 10.1001/jamanetworkopen.2023.22299

Provided by Emory University