

AI Algorithm Matches Potential Volunteers to Clinical Trials

Artificial intelligence algorithm developed by NIH may save clinicians time and accelerate clinical enrollment and research.

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Researchers from the National Institutes of Health (NIH) have developed an artificial intelligence (AI) algorithm to help speed up the process of matching potential volunteers to relevant clinical research trials listed on [ClinicalTrials.gov](https://clinicaltrials.gov).

A study published in [Nature Communications](https://www.nature.com/nature) found that the AI algorithm, called TrialGPT, could successfully identify relevant clinical trials for which a person is eligible and provide a summary that clearly explains how that person meets the criteria for study enrollment. The researchers concluded that this tool could help clinicians navigate the vast and ever-changing range of clinical trials available to their patients, which may lead to improved clinical trial enrollment and faster progress in medical research.

A team of researchers from NIH's National Library of Medicine (NLM) and National Cancer Institute harnessed the power of large language models (LLMs) to develop an innovative framework for TrialGPT to streamline the clinical trial matching process. TrialGPT first processes a patient summary, which contains relevant medical and demographic information. The algorithm then identifies relevant clinical trials from ClinicalTrials.gov for which a patient is eligible and excludes trials for which they are ineligible. TrialGPT then explains how the person meets the study enrollment criteria. The final output is an annotated list of clinical trials—ranked by relevance and eligibility—that clinicians can use to discuss clinical trial opportunities with their patient.

“Machine learning and AI technology have held promise in matching patients with clinical trials, but their practical application across diverse populations still needed exploration,” said NLM Acting Director, Stephen Sherry, PhD. “This study shows we can responsibly leverage AI technology so physicians can connect their patients to a relevant clinical trial that may be of interest to them with even more speed and efficiency.”

To assess how well TrialGPT predicted if a patient met a specific requirement for a clinical trial, the researchers compared TrialGPT's results to those of three human clinicians who assessed over 1,000 patient-criterion pairs. They found that TrialGPT achieved nearly the same level of accuracy as the clinicians.

Additionally, the researchers conducted a pilot user study, where they asked two human clinicians to review six anonymous patient summaries and match them to six clinical trials. For each patient and trial pair, one clinician was asked to manually review the patient summaries, check if the person was eligible, and decide if the patient might qualify for the trial. For the same patient-trial pair, another clinician used TrialGPT to assess the patient's eligibility. The researchers found that when clinicians use TrialGPT, they spent 40% less time screening patients but maintained the same level of accuracy.

Clinical trials uncover important medical discoveries that improve health, and potential participants often learn about these opportunities through their clinicians. However, finding the right clinical trial for interested participants is a time-consuming and resource-intensive process, which can slow down important medical research.

"Our study shows that TrialGPT could help clinicians connect their patients to clinical trial opportunities more efficiently and save precious time that can be better spent on harder tasks that require human expertise," said NLM Senior Investigator and corresponding author of the study, Zhiyong Lu, PhD.

Given the promising benchmarking results, the research team was recently selected for The [Director's Challenge Innovation Award](#) to further assess the model's performance and fairness in real-world clinical settings. The researchers anticipate that this work could make clinical trial recruitment more effective and help reduce barriers to participation for populations underrepresented in clinical research.

The study was co-authored by collaborators from Albert Einstein College of Medicine, New York City; University of Pittsburgh; University of Illinois Urbana-Champaign; and University of Maryland, College Park.

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