AI that classifies colorectal polyps proves useful in the clinic

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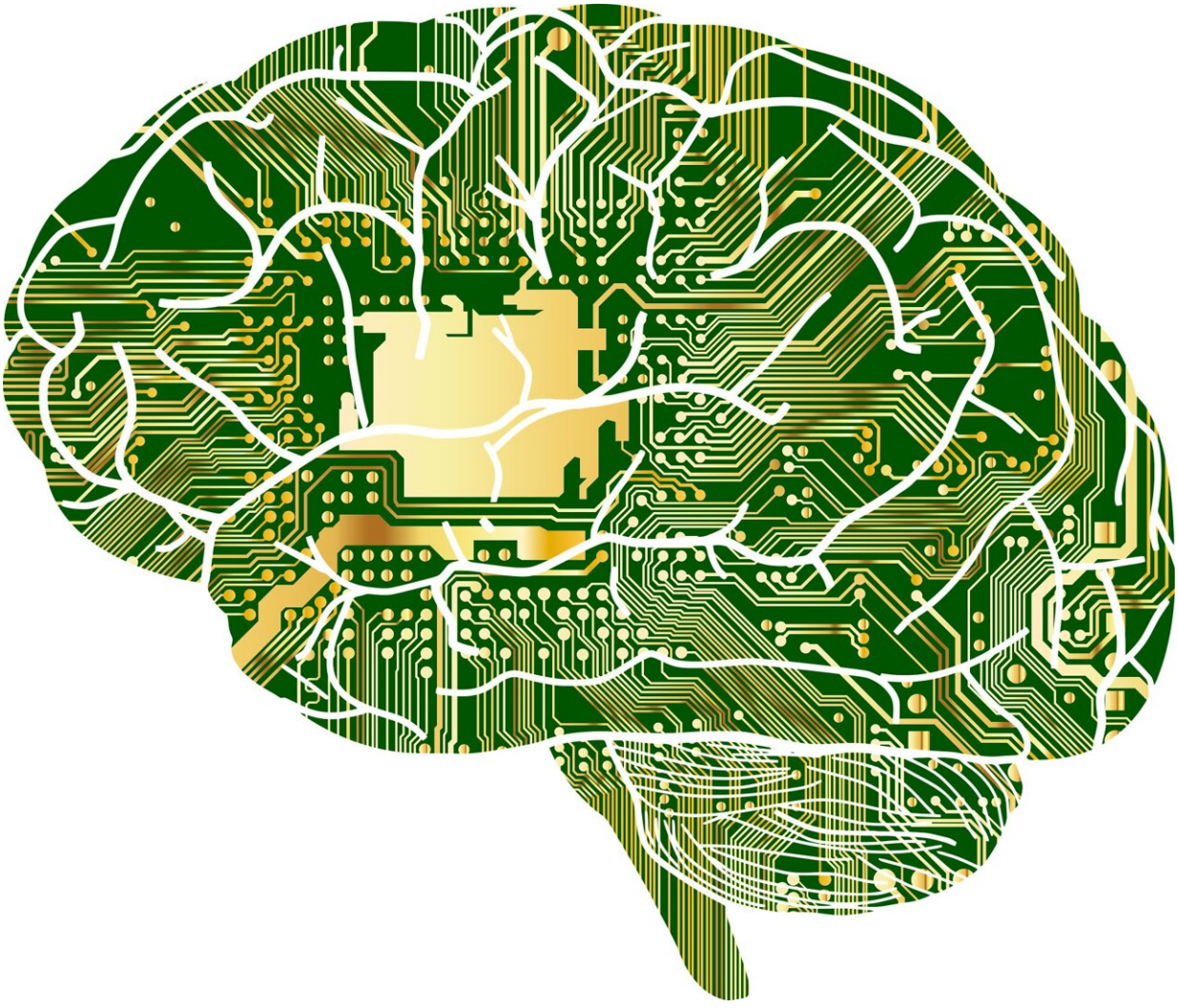

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In a 2020 study, researchers at Dartmouth's and Dartmouth-Hitchcock's Norris Cotton Cancer Center developed artificial intelligence (AI) to distinguish the four major types of colorectal polyps removed during screening colonoscopy. The model not only produced results that demonstrated accuracy and sensitivity at the level of practicing pathologists, but withstood evaluation using broad datasets spanning multiple institutions across the U.S., proving that AI models are generalizable and can be trained on widespread external data.

Now, the clinical research team, led by Saeed Hassanpour, Ph.D., brings the previous study, which was based on retrospective data and performed offline, from bench to bedside. Their new study, published in *JAMA Network Open*, presents the AI model as a tool that can be easily used by pathologists in the clinic.

The clinical trial, involving 15 pathologists from Dartmouth-Hitchcock Medical Center and Cheshire Medical Center in New Hampshire, was designed to compare performance of the deep learning model as part of an AI-augmented digital system to standard use of a microscope.

"Evaluating this tool through a prospective clinical trial shows that the AI-augmented digital system significantly improves the accuracy of pathologists in the classification of polyps in comparison to the traditional process of using microscopes," says Hassanpour.

Before using the AI-augmented digital system, pathologists watched a five-minute training video, read a brief summary of how the model works and how its results are generated, and practiced using a set of ten sample slides to become familiar with the system.

During the trial, the average time of evaluation across all pathologists when using the digital system decreased consistently. In contrast, the reading time did not change significantly during the course of

microscope use assessment, a tool with which pathologists have many years of experience.

Overall, the average System Usability Scale Score for the digital system indicated that the usability was "good," "which is encouraging," says Hassanpour, "considering our system's short training and use period." Moreover, pathologists stated that the digital system was "easy to use and navigate," "intuitive to use," and that it "pans in and out quickly and smoothly."

Notably, half of the participating pathologists stated that they would use a version of this tool in clinical practice. Twelve out of 15 commented that their experience either positively changed or supported their positive opinions for the role of AI in clinical practice.

Hassanpour's team is now working with a leading digital pathology startup to bring their technology to clinical practice and help clinicians and patients with cancer surveillance and prevention.

This AI-augmented digital system shows promise in improving the frequency of surveillance recommendations to prevent cancer development, cutting colorectal cancer surveillance costs, eliminating undue stress to patients, increasing coverage and accuracy of surveillance programs, and ultimately reducing overall colorectal cancer mortality.

More information: Mustafa Nasir-Moin et al, Evaluation of an Artificial Intelligence–Augmented Digital System for Histologic Classification of Colorectal Polyps, *JAMA Network Open* (2021). DOI: 10.1001/jamanetworkopen.2021.35271

Provided by Dartmouth-Hitchcock Medical Center

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