

Geisinger researchers find AI can predict death risk

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Researchers at Geisinger have found that a computer algorithm developed using echocardiogram videos of the heart can predict mortality within a year.

The algorithm—an example of what is known as [machine learning](#), or [artificial intelligence](#) (AI)—outperformed other clinically used predictors, including pooled cohort equations and the Seattle Heart Failure score. The results of the study were published in *Nature Biomedical Engineering*.

"We were excited to find that machine learning can leverage unstructured datasets such as [medical images](#) and videos to improve on a wide range of clinical prediction models," said Chris Haggerty, Ph.D., co-senior author and assistant professor in the Department of Translational Data Science and Informatics at Geisinger.

Imaging is critical to treatment decisions in most medical specialties and has become one of the most data-rich components of the electronic health record (EHR). For example, a single ultrasound of

the heart yields approximately 3,000 images, and cardiologists have limited time to interpret these images within the context of numerous other diagnostic data. This creates a substantial opportunity to leverage technology, such as machine learning, to manage and analyze this data and ultimately provide intelligent computer assistance to physicians.

For their study, the research team used specialized computational hardware to train the machine learning model on 812,278 echocardiogram videos collected from 34,362 Geisinger patients over the last ten years. The study compared the results of the model to cardiologists' predictions based on multiple surveys. A subsequent survey showed that when assisted by the model, cardiologists' [prediction](#) accuracy improved by 13 percent. Leveraging nearly 50 million images, this study represents one of the largest medical image datasets ever published.

"Our goal is to develop [computer algorithms](#) to improve [patient care](#)," said Alvaro Ulloa Cerna, Ph.D., author and senior data scientist in the Department of Translational Data Science and Informatics at Geisinger. "In this case, we're excited that our algorithm was able to help cardiologists improve their predictions about patients, since decisions about treatment and interventions are based on these types of clinical predictions."

More information: Ulloa Cerna et al. Deep-learning-assisted analysis of echocardiographic videos improves predictions of all-cause mortality. *Nat Biomed Eng* (2021). doi.org/10.1038/s41551-020-00667-9

Provided by Geisinger Health System

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