Artificial intelligence helps with earlier detection of skin cancer

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New technology being developed by researchers at the University of Waterloo and the Sunnybrook Research Institute is using artificial intelligence (AI) to help detect melanoma skin cancer earlier.

The technology employs machine-learning software to analyze images of [skin lesions](#) and provide doctors with objective data on telltale biomarkers of melanoma, which is deadly if detected too late, but highly treatable if caught early.

The AI system—trained using tens of thousands of [skin](#) images and their corresponding eumelanin and hemoglobin levels—could initially reduce the number of unnecessary biopsies, a significant health-care cost. It gives doctors objective information on lesion characteristics to help them rule out melanoma before taking more invasive action.

The technology could be available to doctors as early as next year.

"This could be a very powerful tool for skin cancer clinical decision support," said Alexander Wong, a professor of systems design engineering at Waterloo. "The more interpretable information there is, the better the decisions are."

Currently, dermatologists largely rely on subjective visual examinations of skin lesions such as moles to decide if patients should undergo biopsies to diagnose the disease.

The new system deciphers levels of biomarker substances in lesions, adding consistent, quantitative information to assessments currently based on appearance alone. In particular, changes in the concentration and distribution of eumelanin, a chemical that gives skin its colour, and hemoglobin, a protein in red blood cells, are strong indicators of melanoma.

"There can be a huge lag time before doctors even figure out what is going on with the patient," said Wong who is also the Canada Research Chair in Medical Imaging Systems. "Our goal is to shorten that process."

Wong developed the technology in collaboration with Daniel Cho, a former PhD student at Waterloo, David Clausi, a professor of systems design engineering professor at Waterloo, and Farzad Khalvati, an adjunct professor at Waterloo and scientist at Sunnybrook.

The research was recently presented at the 14th International Conference on Image Analysis and Recognition in Montreal.

Provided by University of Waterloo