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Prediction of coronary artery disease based on facial temperature information captured by non-contact infrared thermography

BMJ Health &
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Prediction of coronary artery disease based on facial temperature information captured by non-contact infrared thermography

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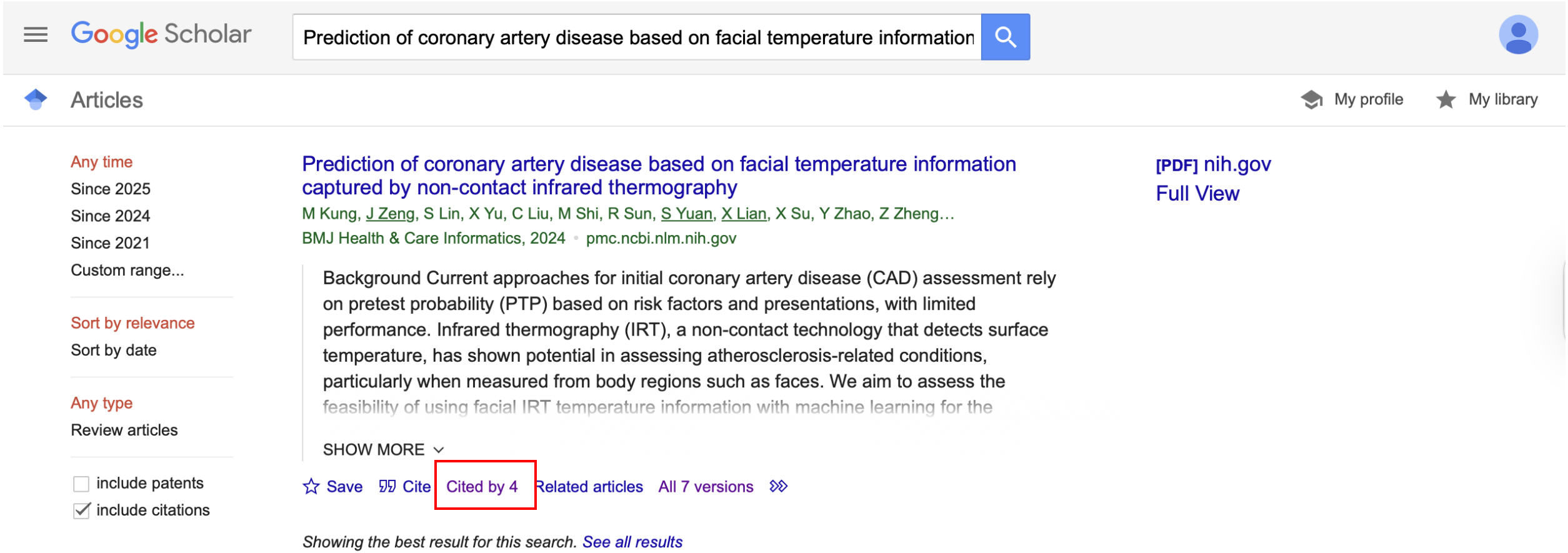
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Background Current approaches for initial coronary artery disease (CAD) assessment rely on pretest probability (PTP) based on risk factors and presentations, with limited performance. Infrared thermography (IRT), a non-contact technology that detects surface temperature, has shown potential in assessing atherosclerosis-related conditions, particularly when measured from body regions such as faces. We aim to assess the feasibility of using facial IRT temperature information with machine learning for the
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Objective

Prediction of coronary artery disease based on facial temperature information captured by non-contact infrared thermography

Target

Prediction of coronary artery disease based on facial temperature information captured by non-contact infrared thermography

Input Data

Prediction of coronary artery disease based on facial temperature information captured by non-contact infrared thermography

Methodology/Technology

Abstract

- Background
- Methods
- Results
- Conclusion

Background

Current Approach

Pre–Test Probability (PTP) based on " Risk Factors"

Limited Performance Assessment

Proposed Approach

Facial infrared thermography (IRT)

Deep Learning Model

CAD Prediction

Methods

Individuals referred for ICA or CCTA were enrolled.

Facial IRT images captured

Deep-Learning IRT image model for detecting CAD

Performance Comparison:
IRT image model with PTP model on the area under the curve (AUC)

Interpretable features

Results

A total of 460 eligible participants (Mean age 58.4 years, SD 10.4 years; 126 female, 27.4%) were included.

Prediction Model	AUC	95% Confidence Interval
IRT Image Model	0.804	0.785 - 0.823
Interpretable IRT Features	0.796	0.782 - 0.811
Only Traditional Temperature Features	0.786	0.769 - 0.803
PTP Model	0.713	0.691 - 0.734

Conclusion

In this prospective study, we demonstrated the feasibility of using non-contact facial IRT information for CAD prediction.

CAD: coronary artery disease

IRT: infrared thermography

PTP: Pre–Test Probability

ICA: invasive coronary angiography

CCTA: coronary computed tomography angiography

AUC: the area under the curve