Department of Materials Science and Engineering Seminar Series 2025

AI-ENABLED, MULTIMODAL SKIN INTERFACED SENSORS

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Date and time: 11 am, Oct 8th, 2025

Venue: Level 1 Seminar Room, iCube

Abstract

Artificial intelligence and multimodal sensing technologies have revolutionized electronic skin sensors, enabling many capabilities in health monitoring and human-machine interfaces. It is well common for the sensors to integrate multiple sensing modalities with machine learning algorithms to have meaningful interpretations.

This thesis discusses the integration of artificial intelligence with multimodal skin-interfaced sensors for healthcare and robotics applications. We address two key challenges: leveraging AI to enhance existing sensing capabilities and improving an AI's contextual reasoning and descriptive capabilities through novel sensory inputs. First, a battery-free platform that simultaneously monitors biomarkers through colorimetric sensing enhanced by deep learning developed. it enables early prediction of wound healing outcomes and assessment of burn severity through multimodal data analysis. Second, a system combines tactile sensing, visual information, and language models to provide human-interpretable descriptions of textile properties has developed. These systems demonstrate how AI-enabled multimodal skin interface sensors can both enhance diagnostic capabilities in healthcare and ground tactile perception in natural language. enabling more intuitive human-robot communication about the physical world.

Biography

Zijie Yang is a Ph.D. candidate in the Department of Material Science and Engineering at the National University of Singapore. Working in the Sensor.AI lab under the supervision of Professor Benjamin Tee, his research focuses on healthcare wearables and tactile perception. Mr. Yang received both his B.Eng. and M.Eng. in Electrical Engineering from Southwest Jiaotong University, China.

Please join us!

HOST: Assistant Prof. Ming Zhao