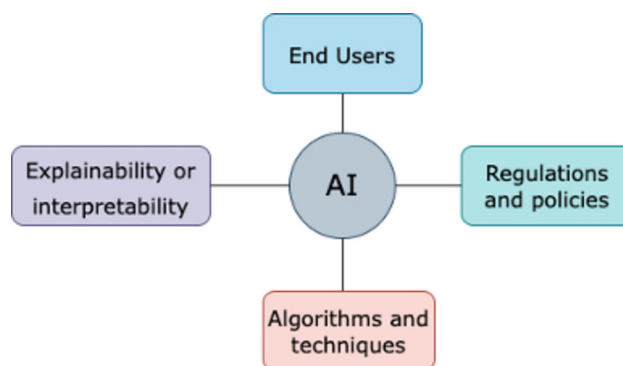


Research advisor Petronio Bendito writes: “The project started in 2020. Ms. Niecikowski joined the team in 2022 via Purdue’s First Year Investigator Program and was actively involved in research, documentation, and providing insights. She also joined our NeuroArt Lounge team at SLSA 2022: ‘Reading Minds: Artificial Intelligence, Neural Networks, and the Reading Human.’”

Promises and Risks of Applying AI Medical Imaging to Early Detection of Cancers, and Regulation for AI Medical Imaging

Student researcher: Yiyao Zhang, Senior

By reviewing the most up-to-date research on AI medical imaging techniques applied to cancer detection and their impact on end users, this research finds many AI medical imaging systems have proved effective in detecting and diagnosing lung and breast cancers at an initial stage, reaching a high accuracy rate of more than 90%. In the case of lung cancer, Ada’s AI medical imaging systems based on supervised feed-forward back-propagation neural network and CT-Scan images and used as a classifier tool for lung cancer produced an accuracy rate of 96.04%. As for breast cancer, the application of intelligent systems based on convolutional neural networks (CNNs) and screening mammography contributes significantly to early and accurate detection of breast cancer. Despite the expected promises of AI medical imaging, regulation is still needed to mitigate risks caused by mistakes and biases; enhance the explainability of AI medical imaging systems; address related concerns such as transparency, accountability, reliability, trust, and fairness; and benefit end users. Putting the



Issues regarding AI in medical imaging.

major concerns or risks in the three-perspective regulation framework of Haenlein and Kaplan, this research addresses them by focusing on algorithms and organizations in the micro-perspective; on stakeholders or end users including physicians, radiologists, other related employees, and patients in the meso-perspective; and on national policies in the macro-perspective. Regulation of intelligent medical imaging is greatly needed as a systematic project involving all the stakeholders in the three regulatory perspectives and has to evolve, while keeping pace with the advancement of AI medical imaging techniques.

Research advisor Kendall Roark writes: “Yiyao Zhang’s approach to ethical and legal dimensions of AI medical imaging is informed by her interdisciplinary orientation to data science and computational medicine. In this project she articulates how patients and clinicians can be centered as key stakeholders within AI-assisted clinical decision-making and in AI regulatory discussions.”