



Author Elise Kwan hard at work researching.

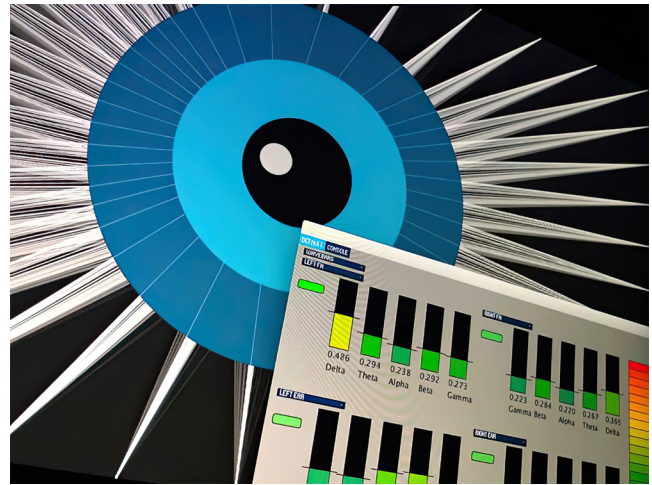
agree to do sexual acts. A harasser can continuously message and call someone until they agree to provide sexual favors or send sexual images. Nonconsensual pornography elaborates on sextortion: Filmed sexual acts are sent to others without the consent of all participating parties. There is a way to measure online interpersonal surveillance and recognize early on if a partner is starting to develop abnormal behaviors. This is known as the measure of attention of an OSN, which can be presented as a genuine solvable problem in terms of an analysis of social networks. Another program that has been proposed is the Account Reachability Checker, shortened to ARChecker. This program shows users how accessible the information on their social media accounts is for cyberstalkers who wish to obtain it. Using these programs can prevent digital abuse from getting out of hand, as well as give victims the necessary information to recognize important signs regarding abusive tendencies and unprotected information.

Research advisor Kendall Roark writes: “Elise Kwan’s research focuses on gendered power dimensions of surveillance capitalism within a human rights framework. In this project, she situates tools for limiting interpersonal surveillance at the consumer level within the context of international technology policy.”

NeuroArt: Presenting a Tool for Self-Regulation

Student researcher: Emma Niecikowski, Sophomore

The art of self-regulation is a key concept in meditation and useful for everyday application, as it reflects one’s



The Focus app captures brainwave data as seen in the control panel in the right corner. Brain signals are translated into a visual image that changes in real time. This is an example of the neurofeedback imagery with its white dot and other visual cues. Focus app and control panel (detail), 2020 © Petronio Bendito and Tim Korb. Used with permission.

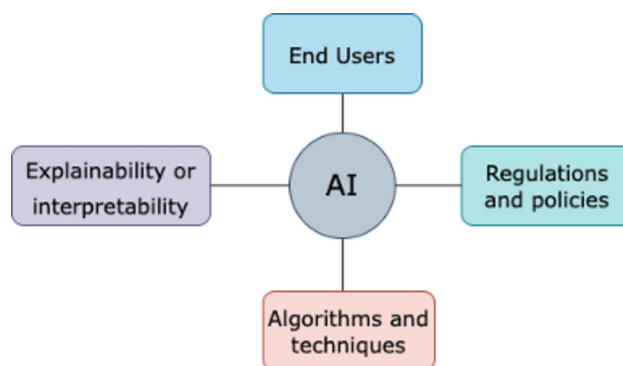
ability to manage their emotional state and consequently brain activity. Through the creation of the Calm and Focus apps, Dr. Petronio Bendito and Dr. Tim Korb present two neurofeedback visual tools for users to gauge their brain activity and practice to optimize their results to achieve calm and focus. Users wear an electroencephalogram (EEG) and its electrodes capture alpha, beta, gamma, and delta brain waves and send them to the app to display the signals visually as an art form. The Focus app shows a dot that moves to the center of the screen as brain activity symmetry is achieved, and the Calm app displays color gradients that shift from warm to cool tones as brain activity lowers. Recently, the interactive NeuroArt project was presented at Chulalongkorn University (Thailand) and users learned methods that promote self-regulation, including stretching and restful awareness. Promoting positive self-regulation methods is integral to health, and using these apps is advantageous as it allows monitoring of brain function in real time. NeuroArt is a growing discipline that allows neurological disciplines to become more accessible and enjoyable and paves the way for future health care endeavors. It is difficult for a layperson to understand medical jargon and interpret brainwave data, but the Calm and Focus apps display brain signals aesthetically, in a visual and metaphorical way, so they become comprehensible across all languages and speaking levels.

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.”