FACULTY MENTOR
Nguyen, Truong

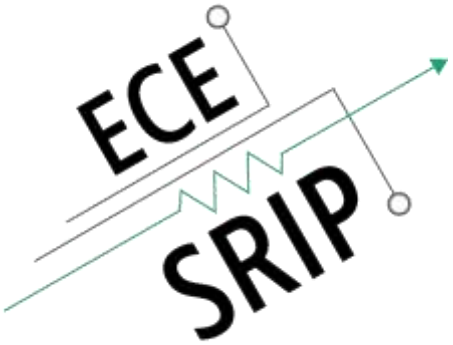
PROJECT TITLE
Autonomous Transducer Positioning System for AI-guided Scanning

PROJECT DESCRIPTION
COVID-19 global pandemic inherently highlighted a critical need to enable contact-free diagnostics and monitoring that can hasten medical therapies and protect patients and medical staff from infection. To circumvent infectious risks associated with close contact, there is a need for disruptive, transformative technology that can enable safe contact-free diagnostics and monitoring of infectious patients from a distance. To this end, we are developing an ultrasound scanning and operation system that can be controlled remotely using a combination of closed-loop autonomous ultrasound positioning systems and artificial intelligence (AI) algorithms for anatomy detection and autonomous lung examination.

This project can accommodate both remote and in-person students

INTERNS NEEDED
2

PREREQUISITES
Image Processing, Machine Learning, Python



FACULTY MENTOR
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PROJECT TITLE
Real-Time System for Detecting and Localizing the Vagus Nerve in Ultrasound Scans

PROJECT DESCRIPTION
In this project we aim to detect and localize the vagus nerve in ultrasound scans of the neck. The vagus nerve is capable of modulating both pain signals and inflammatory reflexes in the body. Therefore, stimulating the vagus nerve would assist doctors in managing pain and inflammatory reactions in patients. To be able to stimulate the nerve, doctors need to first to localize the nerve and track it within the neck in real-time using ultrasound images. Ultrasound scanning, however, is both labor intensive and operator dependent where a scanning session can take up to 30 minutes. In addition, novice operators demonstrated high diagnostic error rates at up to 52% more than expert ones, creating relatively high cross operator variability in accurate anatomical structure identification. Furthermore, ultrasound imaging is primarily used to image soft tissue that are inherently compressible, creating additional within subject image variability. Therefore, an automatic framework that assists operators in detecting and localizing anatomical structures would radically improve reliable and efficient across subjects scanning for both novice and expert operators.

This project can accommodate both remote and in-person students

INTERNS NEEDED
2

PREREQUISITES
Image processing, machine learning, Python

FACULTY MENTOR
Nguyen, Truong

PROJECT TITLE
Automated Visual Inspection system for Tire Defect

PROJECT DESCRIPTION
Currently, during the manufacturing process of automobile tires, about 100 defects in tire appearance are visually inspected by workers in the final inspection stage. Visual inspection has different levels of difficulty in visual inspection depending on the type of defect, and inspection accuracy, such as occurrence of an inspection error due to human error, is low compared to the tire manufacturer's goal. We will be developing a deep-learning method to detect and classify various tire defects based on RGB images and 3D scans.

This project can accommodate both remote and in-person students

INTERNS NEEDED
2

PREREQUISITES
Image Processing, Machine Learning, Python