FACULTY MENTOR
Cheolhong, An

PROJECT TITLE
OCT-Angiography processing for disease detection and classification

PROJECT DESCRIPTION
"Retina is known as an extension of the central nervous system to offer a window to study brain changes (e.g. earlier Alzheimer's disease). Thus, the eye shares a lot of common features with the brain. Particularly, the blood vessel changes which can be estimated by blood flow and vessel density, are correlated with the levels of neurodegenerative damage in the brain. Besides, the vessel information is highly related to many retinal diseases such as vascular diseases, AMD, and glaucoma, etc.
OCT-Optical Coherence Tomography Angiography is a non-invasive imaging modality to produce 3-D representations of retinal and choroidal vessels. In this project, we will gather OCT-Angiography data, and develop a machine-learning algorithm to extract microvasculature information."
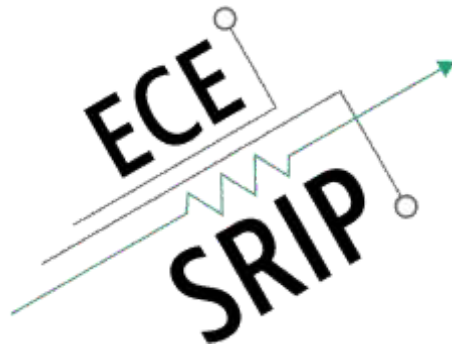
This project will be remote.

INTERNS NEEDED
1 Student

PREREQUISITES
Qualified candidates must have image processing and ML knowledge and the ability to program algorithms on the Pytorch frontend (Python).

FACULTY MENTOR
Cheolhong, An

PROJECT TITLE
Optical Coherence Tomography (OCT) system

PROJECT DESCRIPTION
Optical Coherence Tomography (OCT) is an imaging technique that uses low-coherence light to capture micrometer-resolution, two- and three-dimensional images. It has been used for broad areas including the medical imaging system, security and non-destructive industrial test, and so on. In this project, we will start building a model and a system.
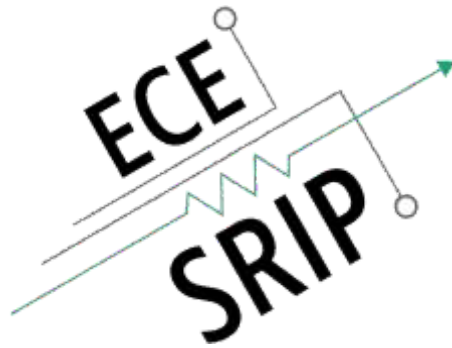
This project will be remote.

INTERNS NEEDED
1 student

PREREQUISITES
Matlab or Python and Signal processing

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Cheolhong, An

PROJECT TITLE
Real-time cell classification for the flow cytometry

PROJECT DESCRIPTION
Flow cytometry is a real-time cell analysis technique to capture single-cell images and sort cells. Since the size of target objects (cells) is very small, and the objects are moving under low light conditions, classifying captured images is quite challenging. Thus, we will develop a machine learning algorithm and test it on an embedded system.
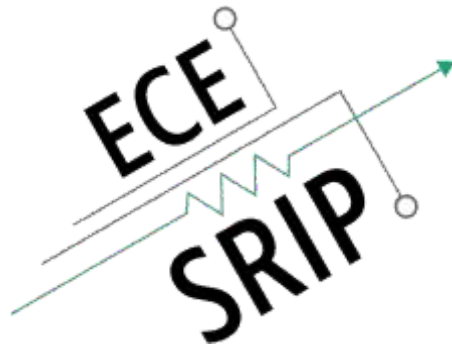
This project will be remote.

INTERNS NEEDED
1 student

PREREQUISITES
Candidates must be familiar with machine learning: Pytorch frontends (Python and C++) as well as Pytorch backend (CUDA), and CUDA programming.

FACULTY MENTOR
Cheolhong, An

PROJECT TITLE
Machine learning-based dynamic fracture behavior tracking and estimation

PROJECT DESCRIPTION
We will develop algorithms to track and estimate the materials' dynamic behavior after impact in this project. Since 10M frame per second high frame sequences are very different from normal sequences at the low frame rate, we need to apply in the fields of the computer vision algorithms to track and estimate impact features and parameters.

This project will be remote.

INTERNS NEEDED
1 student

PREREQUISITES
Pytorch, machine learning especially, tracking and regression.