

FACULTY MENTOR Nguyen, Truong

PROJECT TITLE Multimodal Denoising Autoencoders

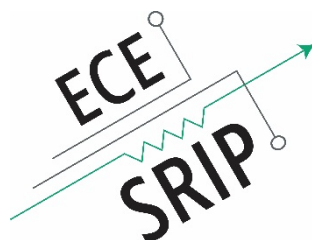
PROJECT DESCRIPTION

This project will entail a student learning about autoencoders and their usage for denoising of images, speech, etc. A growing paradigm in the signal processing community is to explore multimodal systems, where information from multiple modalities is combined to produce a better output. We will extend the commonly used denoising autoencoder to a multimodal variant. One application of this work could be in improving the denoising of images using text/captions that are associated with the image.

INTERNS NEEDED 1 MS Student OR 1 Undergrad Student

PREREQUISITES

Must have background in linear algebra, optimization, probability, and machine learning. Some programming background will also be necessary.



FACULTY MENTOR Nguyen, Truong

PROJECT TITLE Human/hand pose estimation using machine learning

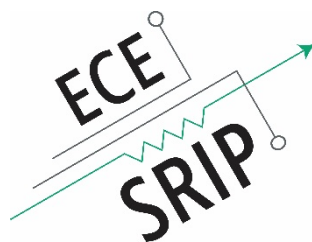
PROJECT DESCRIPTION

Video processing lab is working on a system which understands human/hand pose using machine learning with applications of health care system and virtual/augmented reality. The input of the system is color image and/or depth map from Microsoft Kinect v2. The system processes segmentation, pose estimation, and gesture/action recognition, etc. The selected intern will work on part of this system through data collection, improvement of learning algorithms, etc.

INTERNS NEEDED 1 MS Student OR 1 Undergrad Student

PREREQUISITES

Candidates are expected to have basic knowledge of image processing and computer vision, and have experience with C/C++ and Python/MATLAB.



FACULTY MENTOR Nguyen, Truong

PROJECT TITLE 3D reconstruction system using RGB-D camera

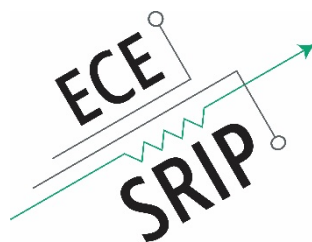
PROJECT DESCRIPTION

Video processing lab developed a 3D reconstruction system using a hand-held RGB-D camera. The system includes camera calibration, surface geometry refinement, camera tracking, data integration, visualization, and 3D printing. The selected intern will extend this system to other camera sensors (Microsoft Kinect 2, Intel Realsense), improve the overall system performance and investigate the use of drone in data acquisition.

INTERNS NEEDED 1 MS Student OR 1 Undergrad Student

PREREQUISITES

Candidates are expected to have basic knowledge of image processing and computer vision, and have strong experience of C/C++. Also, candidates with experience of OpenCV, PCL, and CUDA are preferred.



FACULTY MENTOR Nguyen, Truong

PROJECT TITLE Testbed for free viewpoint indoor touring system

PROJECT DESCRIPTION

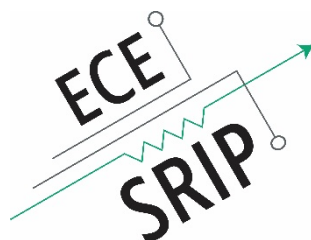
The Video Processing Lab is developing a free viewpoint indoor touring system. With the help of virtual reality devices, such system allows user to 'fly' through the indoor environment for a closer look at various objects/areas. Potential application of the system includes free viewpoint stage events streaming or remote apartment sale/rent and etc. Since it is impossible to place cameras at all locations, view interpolation technique will be used to synthesize views where no physical camera are installed. The goal of this project are: 1) Construct a miniature room with various objects, equipped with calibrated and synchronized color camera and depth sensors, 2) Produce a ground-truth 3D model for the room, 3) Develop and evaluate 3D model construction algorithm, and 4) Develop and evaluate free-viewpoint interpolation algorithm.

INTERNS NEEDED 1 MS Student OR 1 Undergrad Student

PREREQUISITES

Candidates are expected to have:

- Experience with setting up camera system, from installation to wiring to capturing data.
- Experience with camera calibration and synchronization.
- Experience with C++ and Matlab.



FACULTY MENTOR Nguyen, Truong

PROJECT TITLE Optimal design of a microgrid considering uncertain energy market parameters

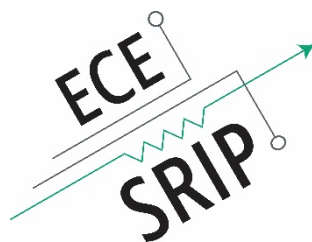
PROJECT DESCRIPTION

In this project, students will learn out fundamental methods how to find optimal design of a microgrid based on combination of renewable energy resources and time-variant energy pricing. In practical cases, however, uncertainties in future energy or equipment rates can affect the appropriateness of the design. We will develop probabilistic models of uncertain parameters to quantify their effects on the final design. Finally, we will analyze financial risks for microgrid design.

INTERNS NEEDED 1 MS Student OR 1 Undergrad Student

PREREQUISITES

Must have background in linear algebra, optimization, probability and machine learning. Some programming background will also be necessary.



FACULTY MENTOR Nguyen, Truong

PROJECT TITLE Optimal management system for microgrid/smart city using machine learning

PROJECT DESCRIPTION

This project will entail a student learning about optimization and energy system. This project will develop an optimum operation system for microgrid and the objective of cost optimization plan. One application of this work could be in improving optimal operation system using machine learning technique.

INTERNS NEEDED 1 MS Student OR 1 Undergrad Student

PREREQUISITES

Must have background in optimization, probability, and machine learning.

