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Faculty of Engineering
Summer Research Program 2022-2023

Project Title: Adaptive active optical polarization imagers using artificial intelligence

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Objective

This project involves the development of optical imaging instruments used to measure polarization scattering properties of materials. The system uses an addressable spatial light modulator to create spatially-shaped illumination that interacts with the target's spatial structure to produce optimum images.

Project Details

In this project, the student will work to extend existing artificial intelligence methods from the receiver side to now include the pixel-addressable illumination system. The student will be working to create new ways of choosing the illumination patterns so as to adapt to the scene structure.
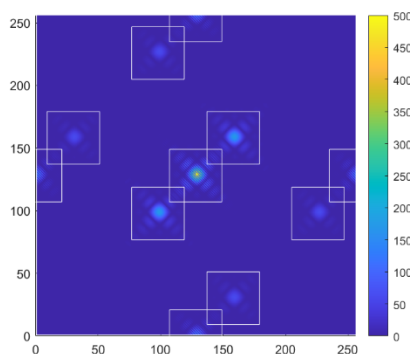
This image shows the two-dimensional FFT of a captured image with several information-carrying "channels" highlighted. The goal of the project is to shape the illumination to create maximum separation between these channels and design extraction filters using a single, end-to-end, artificial intelligence/machine learning system.

Prerequisites

ECSE2111 and ECSE 2191 Preferred