Lensless Image Classification using Deep Learning

Ganghun Kim[1], Brian Rodriguez[1], Rajesh Menon[*]

***Abstract*— Deep Learning (DL) has accelerated advancements in Image Classification via convolutional neural networks (CNNs). However, these image classification tasks have been widely trained on images taken with typical cameras; human consumable photographs. Here, we present a CNN trained using data taken by a single CMOS image sensor with no lens. We created a dataset of lensless images comprised of handwritten digits taken from the MNIST dataset. Then, we trained a CNN on this dataset and we're able to show that for 10 digits, the CNN is able to classify lensless images with a 96.6% accuracy.**