Abstract:

The field of computer vision based civil infrastructure defect detection is constantly evolving with steady advances being made in sensing technologies, hardware, and image processing techniques. Within the arena of data analytics techniques, deep learning techniques (in particular convolutional neural networks or CNNs) have recently led to groundbreaking advances in numerous fields such as computer vision. While it is possible to build an accurate deep learning model from scratch when big data is available, transfer learning is used for small datasets. In this talk, I would describe some of our recent works in civil infrastructure health monitoring. In particular, we shall take a look at the application of deep transfer learning on pavement images for crack detection, and on images of civil infrastructure captured by an Unmanned Aerial Vehicle (UAV) or drones. A binary classifier trained on ImageNet pre-trained VGG16 CNN features for pavement/UAV images was developed for crack identification, and the results indicate that even for relatively small datasets (of the order of thousands or even hundreds), it is possible to build accurate predictive models using deep transfer learning.

References:


Funding:

NIST Award No. 70NANB14H012, AFOSR Award No. FA9550-12-1-0458