ECE 472 Robotics and Vision

Project 1: Deep Learning for Recognition

Code in Python, PyTorch and Google Colab. Submit a notebook file (.ipynb) and an accompanying video describing your code and results.

1. **Classify ImageNet classes with ResNet50** Using PyTorch, set up the pre-trained network ResNet50. Obtain 10 of your own images that are similar to ImageNet classes and classify them. Choose 10 images from 5 different classes (2 images per class). Report the confusion matrix, the accuracy, the f-score, precision and recall of your classifier. There should be 6 classes representing the 5 classes that your images belong to as well as an 6th 'other' class.

2. **Classify MNIST classes with ResNet18** Fine-tune the ResNet 18 network to classify the MNIST dataset. Report the confusion matrix, the accuracy, the f-score, precision and recall of your classifier.

3. **Extra Credit: Classify Dog vs Cat Kaggle dataset with two different networks** Fine-tune a pre-trained network for the dog vs. cat classification problem. Report the confusion matrix, the accuracy, the f-score, precision and recall of your classifier.

4. **Extra Credit:** Perform an adversarial attack (such as adding noise) that will make the 10 images from the first question difficult to recognize. Show the images before and after the adversarial along with the output of the network.