ECE 472 Robotics and Vision Prof. K. Dana

Deep Learning for Recognition

Code in Python, Pytorch and Google Colab. Submit a colab notebook file and an accompanying pdf file.

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. Write a paragraph describing ResNet.

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. Write a paragraph describing your results and methods.

3. **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. Write a paragraph describing your results and methods.

4. Extra Credit (20 points) **:** Find and perform an adversarial attack (such as adding noise) that will make the 10 images from the first question difficult to recognize.