Assignment 6 – Advanced Recommender Systems

Advanced Data Mining

Task 1: Transfer Learning [4 points]

1. Standard transfer learning:

   - Download the dataset: https://www.robots.ox.ac.uk/ vgg/data/flowers/102/ and prepare it for modeling. You can use the `scipy.io.loadmat` function to load the labels.
   - Use a pre-trained VGG-13 model: https://docs.pytorch.org/vision/main/models/vgg.html.
   - Freeze the convolutional layers, re-initialize the parameters from the last layer, and train the parameters from the last layer only.
   - Evaluate the model.

2. Study of the properties of transfer learning:

   - Repeat the above experiment by freezing the first $1, 2, \ldots, 12$ layers.
   - Log the time consumption and accuracy on a validation set after each epoch. Train until convergence. Remember to save your models after training.
   - Plot the accuracy obtained and the time consumed for each experiment.
   - Plot the time consumed and the number of epochs needed to obtain 95% accuracy in each experiment (you can use other reasonable threshold).

Task 2 - BONUS: Self-supervised Learning with Pretext Task [3 points]

- Use https://github.com/richzhang/colorization/tree/caffe. Following the instructions from the README, download the pre-trained model.
- Use transfer learning and train the classification head on the dataset from Task 1.
- Evaluate your results.