Artificial Neural Networks & Deep Learning

Practice #9
(2 points)

Practice #9 Practice – Important Notice

- You will mimic the results in the CNN (5) & (6). (but slightly different!)
- It requires manual works for data preparation. It would take quite time.
- The learning of the code also will take quite time.
- Please start this practice early.

- I provided “chapter5_2.py” and “chapter5_3.py”.
- Follow the instruction in this file, “step-by-step” and collect the results.

- To do the practice in this file, **I recommend to GPU use through a torque server.** See the lecture 8-3 and 3.
  - Copy and adapt conda_job.sh to your codes!

Practice #9 – Q1 (0.5 points)

- **Start with Chatper5_2.py and modify it.**

- Using the code in the slide 19 of CNN(5), add “data augmentation” to the train_datagen.
- Increase the number of epochs to “60”.
- Run the code, and **attach its loss graph.**

Practice #9 – Q2 (0.5 points)

- **Keep modifying Chatper5_2.py**

- Let's add dropout layers to the model.
- Let's add dropout layers after every maxpool layers with 0.25 dropout probability. (Thus, we have 4 maxpool layers, you will have 4 dropout layers.
- Set the number of epochs to "100".

- Run the code. **Attach its loss graph.**
- **What is the test accuracy? Did the overfitting decrease?**

Practice #9 – Q3 (0.5 points)

- **Start with Chatper5_3.py and modify it.**

- Chapter5_3.py uses “VGG16” as a pretrained model.
- Let’s try to use “InceptionV3” instead of “VGG16”

- Show your code.

Practice #9 – Q4 (0.5 points)

- Run the code. **Attach its loss graph.**
- **What is the test accuracy? Is it better than the results of Q2?**

Practice #9 – Extra #1 (0.5 points)

- Let's do the 2-step fine-tuning.
- Copy Chatper5_3.py into a new file.
- Let's load the saved weights of Q4's learning, instead of build_model().
  - The code contains the statement for model saving.
  - model.save('cats_and_dogs_small_pretrained.h5')
- We will fine-tune only top 2 inception blocks. (we will freeze the first 249 layers, and unfreeze the rest.)
  - We note that "conv_base=model.layers[0]"
  - You may check "https://keras.io/applications/#inceptionv3" for this modification.
- **Show your changed code.**

Practice #9 – Extra #2 (0.5 points)

- Set the number of epochs to 50.

- **Re-run the code, and attach its loss graph.**
- **What is the test accuracy? Is it better than Q4's results?**