CS 436/536 Assignment-3

Description:

Part-1:

1. Use 3 Deep Learning Models to perform classification of CIFAR-10 dataset. [30 Points]
2. Please refer: https://pytorch.org/tutorials/beginner/blitz/cifar10_tutorial.html , to know how to load CIFAR-10 Dataset in pytorch.
3. In CIFAR10 there are 50000 images in training dataset and 10000 images in test dataset.
4. Split train data in 80:20 (Train: Validation) and perform 5-fold validation. [20 Points]
5. Report the Training Time, model size and training accuracy for all 3 models. [10 Points]
6. Select 1 best model out of these 3 and report test accuracy as well as draw confusion matrix. [10 Points]

Part-2:

Choose at least Three hypotheses, test them, and explain why they are correct or wrong.

Following are some example hypotheses: [30 Points]

1. Increase/decrease the model size/complexity will improve performance (justify) (test) (yes/no) (explain)
2. Increase/decrease the batch_size (justify) (test) (yes/no) (explain)
3. Increase/decrease input sample size for training (justify) (test) (yes/no) (explain)
4. Change the model, which model? (justify) (test) (yes/no) (explain)
5. Needs more regularization for better training. (justify) (test) (yes/no) (explain)

Submission:

1. Due date is midnight of 30 March 2023. The total points will be reduced by 5% for each day after the due date.
2. Submission in a single PDF file. Include all the code with comments, plots, and summary.
3. Segregate the data of your choice and plot its distribution. [10 Points]
4. Split the data randomly in 80:20, that is train and test data both should have roughly 50-50% data of each class. Print to show the split. [10 Points]
5. Build the logistic regression model and plot the curve of accuracy and epochs for train data. [60 Points]
6. Test your model and report the accuracy of test data. [20 Points]

Note:

1. It is important that everyone submits their entire notebook code in PDF format as well merged to the report. If this is not done points will be deducted.
2. Feel free to provide links to your notebook in your report as well.
3. Review and follow these Watson College Academic Honesty policies that spell out the consequences of academic dishonesty.
4. Do not copy/give code from/to others. If plagiarism is found, both will receive zero points.
5. You can submit multiple times before the due date, only the last submission will be graded.

Important Notes:

Make a report first answering all the questions individually. For example, if a question is asking you to show a plot, copy your plot from your notebook and paste it in your report with the question. If a question is asking you to report the final accuracy, please put the values in the report with the question.

After the report is done, then merge a pdf of your notebook to the bottom of your report. Please submit only a single PDF file.