

Assignment - 3

Submission Deadline: 11:59 PM, 15th April 2023

Submission Policy and Requirements :

- Any kind of plagiarism is not accepted. We will strictly follow institute policies for plagiarism
- Programming languages and framework allowed: Python + PyTorch (use of Tensorflow will attract zero marks)
- Do cite references (if using any)
- Submissions should include a working code (with readme) for the questions asked, a report to show the analysis of results in each part, and a video demonstration indicating the functional codes.
- Submission of the report is mandatory.

Assessment criterion:

The assessment will be done on the basis of the following components:

- Working codes
- Analysis and clarity of results (drawing comparisons across different parts) & clarity of the report
- Understanding the theoretical concepts and the choice of hyperparameters

Guidelines for Submission:

- A single report(pdf) for all questions
 - Mention all the relevant results and comparisons as asked or wherever required for a better understanding of the results
 - A single zip file containing the report, codes, video demonstration of working codes, and readme
 - Name the file with the roll number, for example, Roll_Number_PA3.zip
-

Question 01:

[10 marks + 30 marks bonus]

Perform *Attribute Prediction Task* on [CelebA](#) [1] dataset for the attributes available in the dataset. For this task, use a VGG16/ResNet18 backbone and train your model in a *Multi-Task Learning* fashion. Report the following:

1. Train the model for the prediction of 8 attributes out of 40 attributes and report the following:
 - a. Mention your choice of attributes, backbone, and other parameters and the reason behind your choice. [2 marks]
 - b. Report task-wise accuracy. [4 marks]
 - c. Report the overall accuracy. [4 marks]
2. **[Bonus]** Refer to the work of [Malhotra et al.](#) [2] and report the following:
 - a. Drop rate for each task (any of the four metrics described in the paper). [10 marks]

- b. Explanation step-by-step on how you computed the drop rate. [5 marks]
- c. Analyze your observations and discuss them in the report. [5 marks]
- d. Use your drop rate to calculate task-wise activation probability (since you are using a single metric to calculate drop rate, task-wise activation probability can be modified accordingly) and implement the DST algorithm and report the gain in performance with your analysis. [10 marks]

References:

- [1] Liu, Ziwei, Ping Luo, Xiaogang Wang, and Xiaoou Tang. "Large-scale celebfaces attributes (celeba) dataset." Retrieved August 15, no. 2018 (2018): 11.
- [2] Malhotra, Aakarsh, Mayank Vatsa, and Richa Singh. "Dropped Scheduled Task: Mitigating Negative Transfer in Multi-task Learning using Dynamic Task Dropping." Transactions on Machine Learning Research.