Assignment 1

1 Questions (40 pts)

Answer following questions briefly. (Max 2 paragraphs each)

- What is MLOps? What problems does it address?

- What is dataset/model versioning? In which cases would it be useful and how does it differ from software versioning?

- What are the differences of doing ML in the academic setting and industrial setting?

- Say your model has a decent test set performance but performs poorly in production. What could be the issue and how would you address this problem?

2 Experiment Tracking (60pts)

Find the attached notebook in the assignment that includes a template for MNIST training of a small network for 5 epochs by SGD. Change the second cell of the notebook so that the training and test process is logged by Weights and Biases under a project named "mmi712-assignment1". There are 3 hyperparameters you are going to experiment on, with 3 different values each. Try all combinations using sweeps. You don't need to name the runs since you are going to be logging the configs for each run.

For each run, log;

- Configs and hyperparameters

  - Hidden layer size (32, 128, 1024)
  - Learning rate (0.001, 0.01, 0.1)
  - Momentum (0, 0.9, 0.999)

- Network parameters every 10 iterations

- Gradients of network parameters every 10 iterations

- Training loss every 5 iterations

- Test accuracy after the training. (not every epoch)

- The final network parameters in ONNX format.

Briefly comment on the experiments. Report which hyperparameter combination gives the best results. Note that these results may not be explanatory since we are not using a validation set and experimenting for many other hyperparameters such as batch size and number of epochs.

Submission

You should submit your final notebook and a PDF file named "<**student-id>_mmi712hw1.pdf**" that includes

- Answers for the first part

- Comments of the experiments in the second part

- URL for your W&B project

Do not forget to edit your project privacy as public from the "Overview" section from your project page.