

Experience Report

Challenges:

I faced some challenges while implementing the YOLO/ResNet object detection model.

1. One of the main issues was the processing of the Pascal VOC dataset. The VOC dataset has extreme class imbalance which leads to worse metrics on certain objects.
2. Another challenge was the implementation of the YOLO loss function. The YOLO loss function has multiple components and is unlike any other ML model.
3. The challenge of training included a large amount of training time required to get decent results. I had to train for 20 epochs on most configurations and it took around 2-2.5 hours every time.
4. Overfitting was a significant challenge due to the Pascal VOC dataset being relatively small.

Usage of AI tools:

I used AI tools while completing the assignment in certain parts like YOLO Loss implementation and Data stratification. AI was helpful in creating a starting baseline for the model training/evaluation pipeline. I also used AI for hyperparameter-tuning by providing it with the training logs and asking it to suggest changes.

Learnings:

The primary learnings from this assignment were: -

1. The actual implementation of the YOLO head and the YOLO loss function. Before this, I had used the pretrained YOLO model only and not implemented it myself using PyTorch.
2. Efficient Hyperparameter-tuning based on training logs.

There is an ideal equilibrium between coding myself and asking an AI to do it. I find that AI tools are still not up to par when it comes to complex code generation like the code required for this assignment and can actually hamper progress rather than to accelerate it.

I find AI the most helpful in generating baseline boilerplate code that can be further developed by ourselves with the use of documentations and other online resources.

Finally, I found the assignment to be a good project for learning.