Machine Learning Engineering Assignment

This assignment involves modifying the EfficientDet-D0 model to use the CSPDarknet53 model as the backbone and modify the head to train using two datasets at the same time.

1. Download the Appliance Dataset and Food Dataset as your datasets for training. They are already in MSCOCO format.
2. Modify the EfficientDet-D0 model from EfficientDet paper to use the CSPDarknet53 model from the YOLOv4 paper as the backbone. You can use any TensorFlow or PyTorch implementation with enough stars that you think is correct for this.
3. Add one more head to the backbone so that you can train using two datasets at the same time.
4. Modify the data preprocessing code of EfficientDet to include the data augmentation from YOLOv4.
5. Modify the training code to optimize for both loss from two heads using a single forward and backward pass.
6. Next, load the backbone using MSCOCO trained weights from YOLOv4 and freeze the backbone to train the two headed architecture on the two datasets you downloaded using single forward pass and backpropagation. Make sure you are using the data augmentation from step 4 and train on both dataset for 30 epochs.
7. Make predictions on a sample image containing objects from both datasets by correctly loading the two heads using the saved model weights from the model you trained. Load the backbone weights using MSCOCO trained YOLOv4 model.
8. Now train the architecture with a single head separately on the two datasets for the same number of epochs and compare the performance on the test set from the two datasets. They must match.
9. Document your code using PyLint (https://pypi.org/project/pylint/). Create a document explaining your solution and approach and include it in your GitHub.

Please upload your code, notebook and documentation to a public repository on GitHub and share the link. Use your best intuition in case of doubt. You will need to explain your solution if you are selected for an interview.

NOTES:

1. Please implement your code in a simple, modular way.
2. Perform thorough testing and document well using Google documentation style.
3. Make sure your code achieves a 10/10 score using PyLint.

All the best,
Matrice Hiring Team