Digital Africa Plantation Counting Challenge Solution

To reproduce solution:

1. Upload the provided notebook to colab
2. Choose GPU runtime - Ensure you use the NVIDIA A100-SXM 40GB VRAM GPU to get a similar score, using a different GPU might result in different scores.
3. Provide path to the data
4. Run all to get the submission file
5. Upload the submission file to Zindi for scoring

Solution summary

- Image augmentation was limited to the minimum to avoid introducing new noise to the images, for example cropping as an image augmentation technique could cut off some trees and introduce noise.
- The model was trained on a 10 Stratified cross validation strategy to ensure that the training and validation datasets contained at least one count of the various tree counts. Using the first fold would produce the winning model for this challenge.
- To accommodate the huge model, Automatic Mixed Precision was used to fit the model and data in memory.
- The new Pytorch library version i.e., 2.0 was used to speed up training.

Parameters used:

1. Model - convnext_large_384_in22ft1k
2. Training batch size - 8
3. Evaluation batch size - 16
4. Dropout - 0.5
5. Learning rate - 1e-5
6. Image size - 1024
7. Scheduler - CosineAnnealingWarmRestarts
8. Optimizer - AdamW