

Detecting Fungal Diseases in Trees

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background

The forestry sector plays a vital role in the global economy but faces serious threats like fungal pathogens (i.e., agents of disease).

In research, tree lesions created by infections are measured to quantify pathogenicity, as the lesion's length is directly correlated to fungal pathogen strength. However, manual lesion measurement is a slow, error-prone process.

aim

To utilise tools like computer vision and machine learning to detect & measure fungal lesions

This was achieved by:

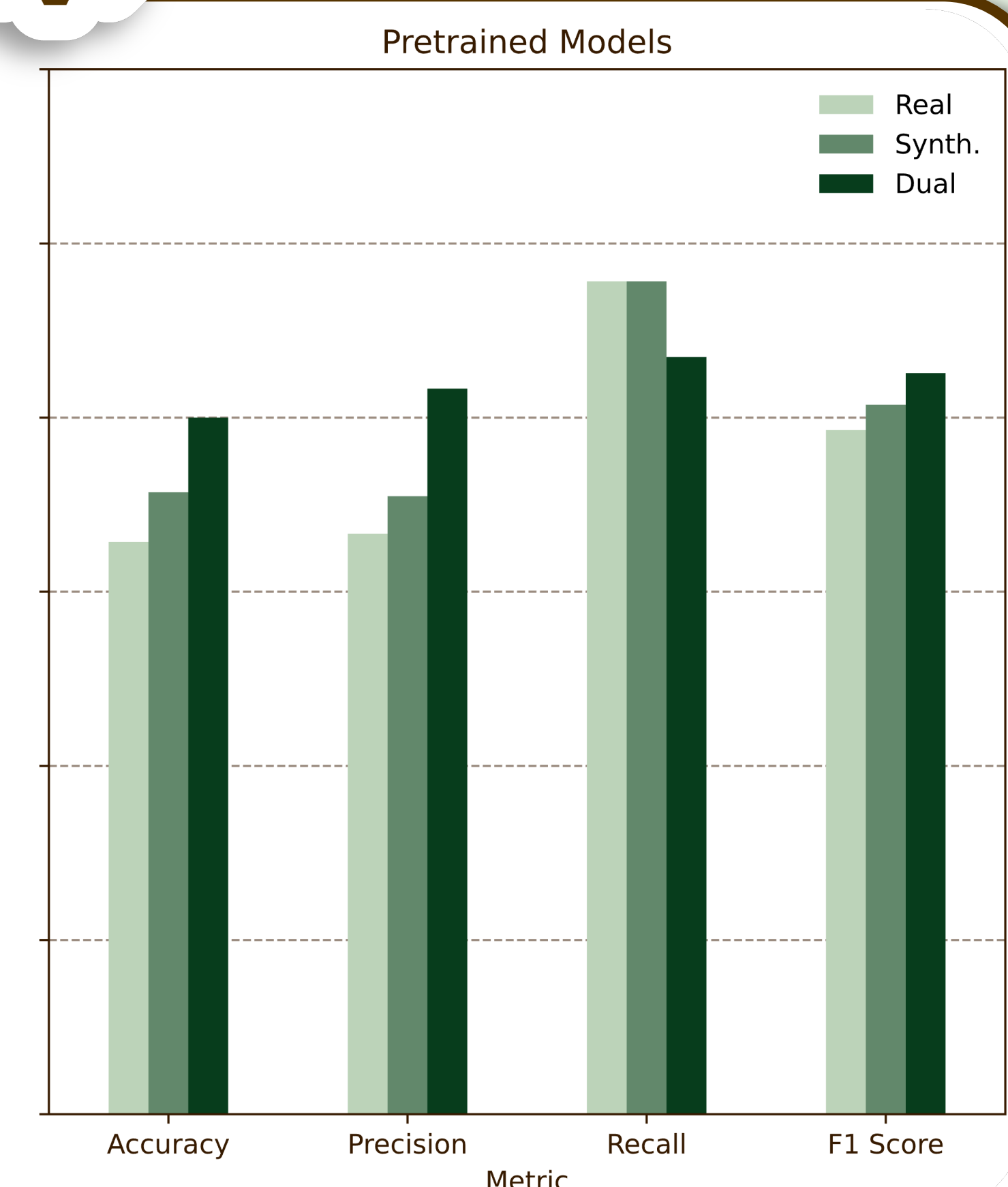
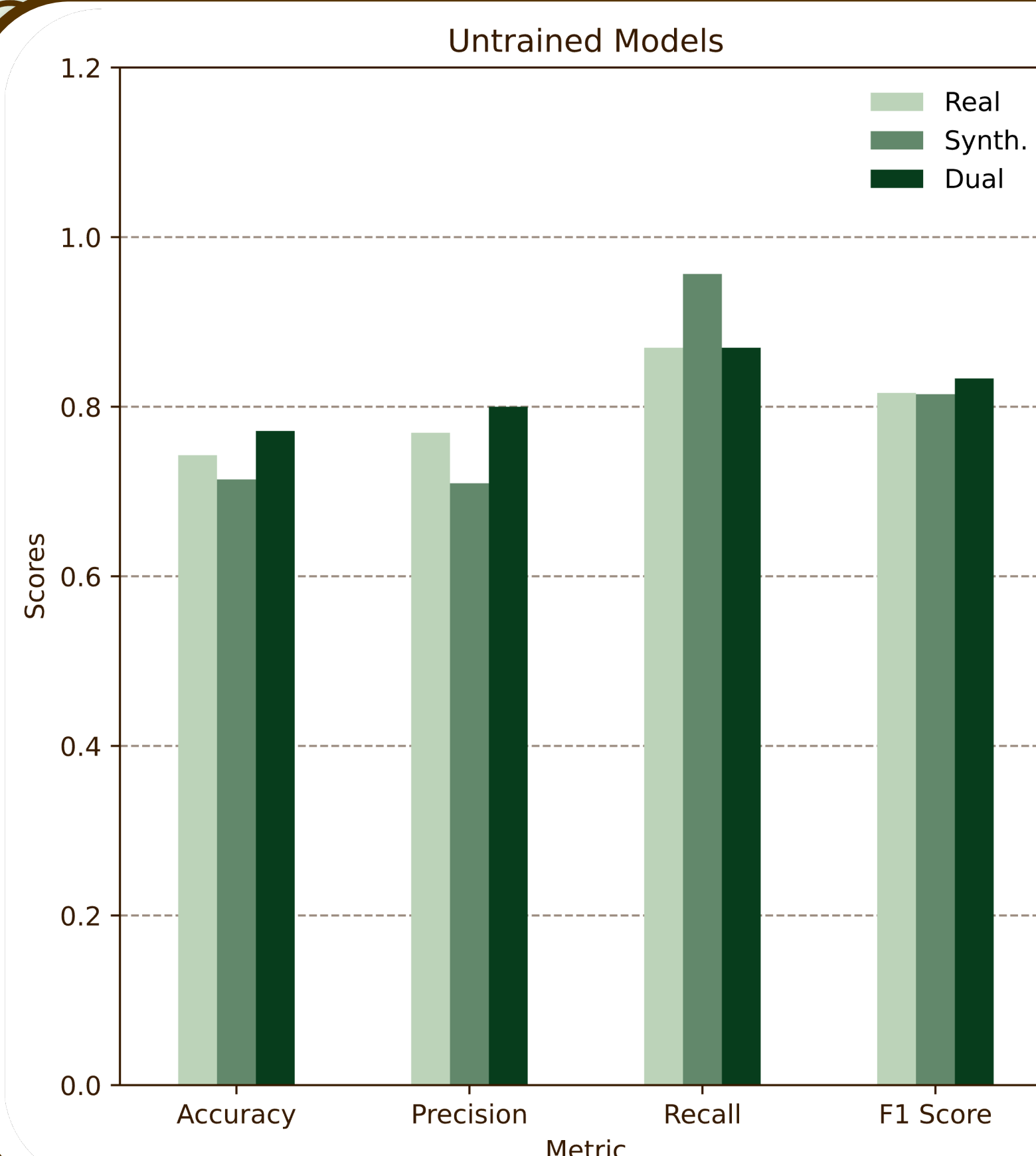
1. Augmenting the available dataset of real images
2. Validating the utility of the synthetic images by:
 - Comparing their colour & structure to the real images
 - Comparing performance of CNN detection models

methods

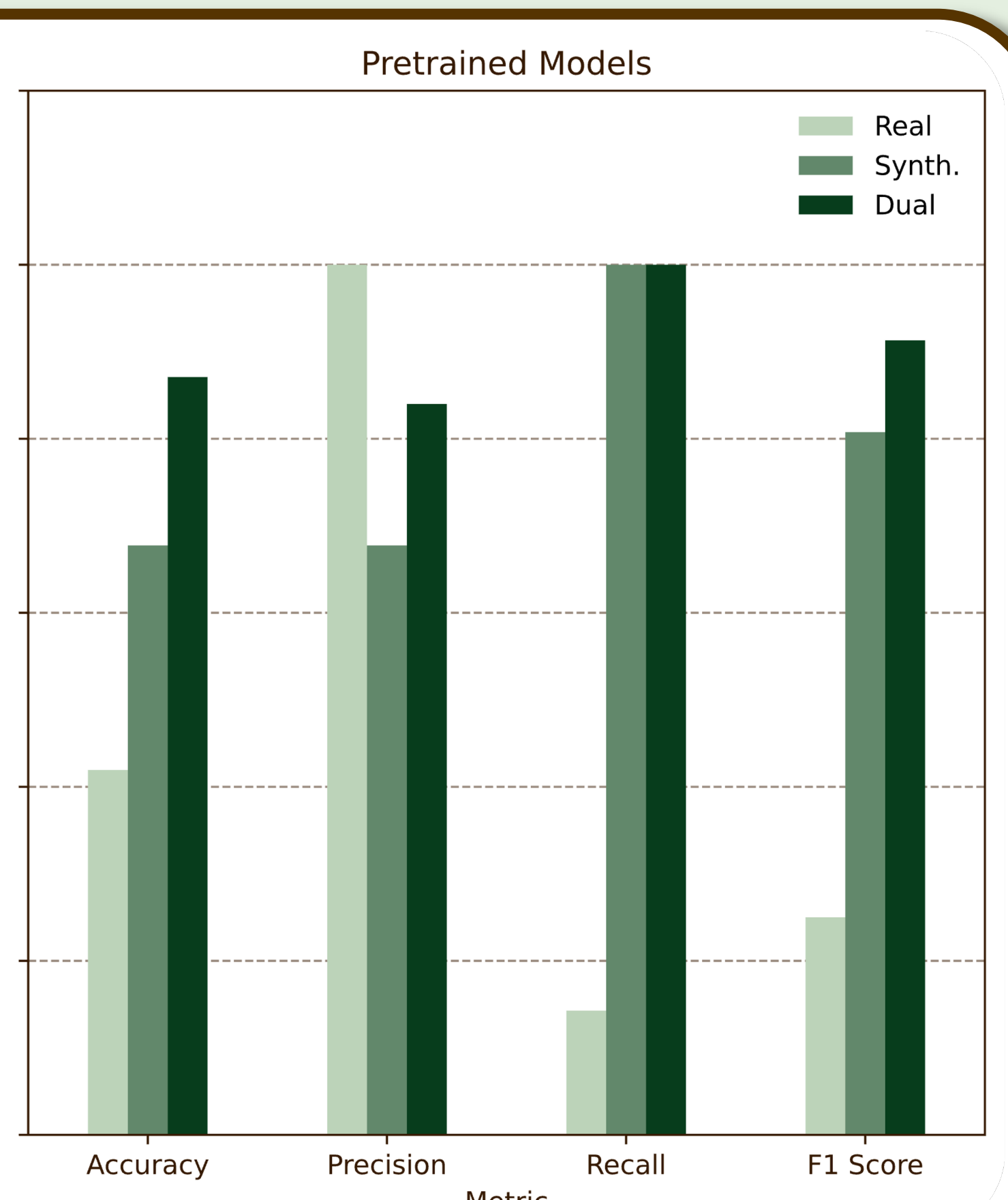
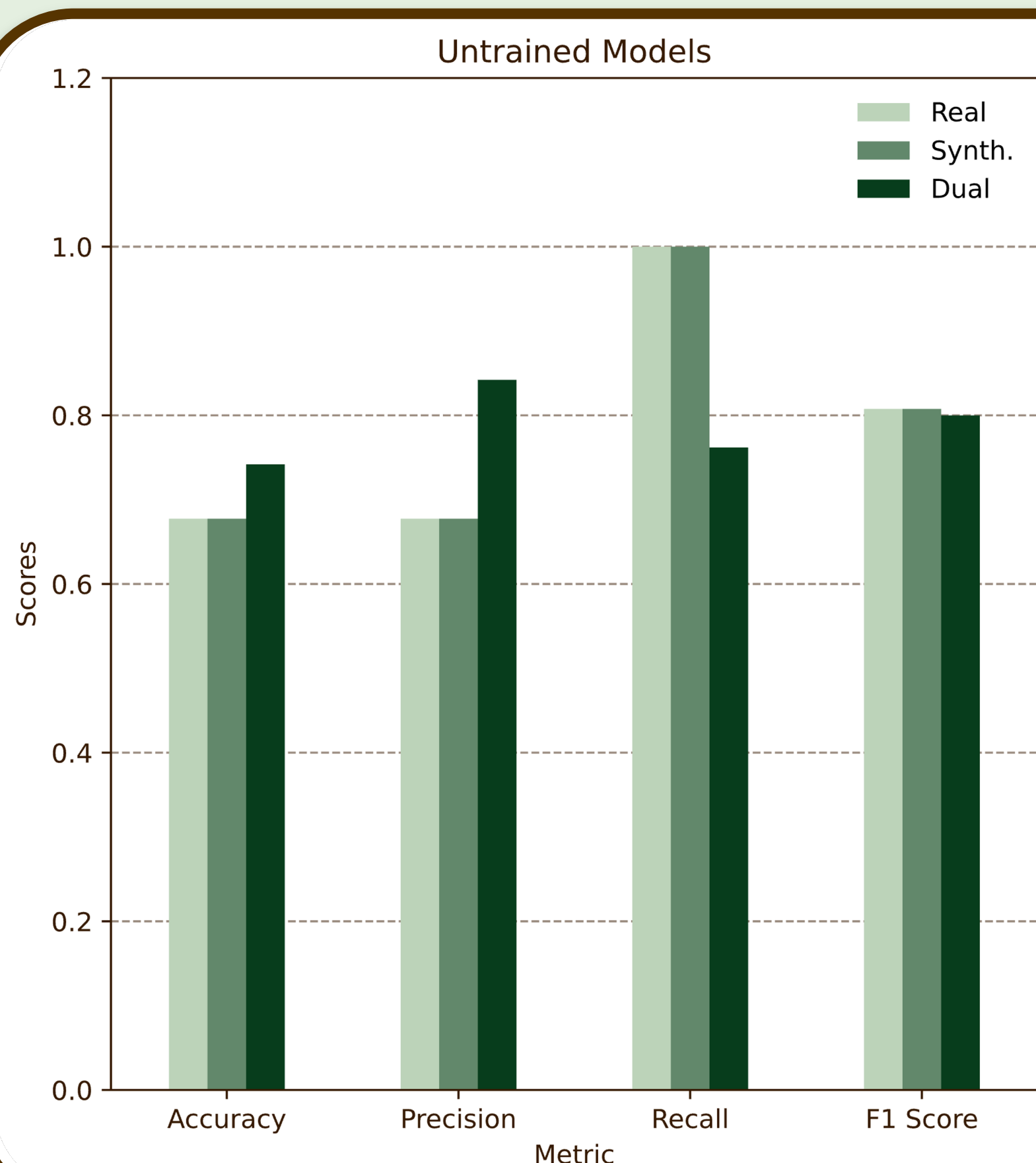
ResNet18 CNN models were applied to both the real and synthetic images to validate the utility of the synthetic images. The 6 ResNet model runs were as follows:

1. Untrained model with real images only
2. Untrained model with synthetic images
3. Untrained model with both datasets
4. Pretrained model with real images only
5. Pretrained model with synthetic images
6. Pretrained model with both datasets

results: stem



results: twig



discussion

Results: Stem

For both the untrained and the pretrained models, the dual runs performed better than those that used only real images

► **Conclusion:** the augmentation added value, so the synthetic images are *valid*

Results: Twig

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► **Conclusion:** the augmentation added value, so the synthetic images are *valid*

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TPCP: Tree Protection Co-operative Programme
BGM: Dept. of Biochemistry, Genetics & Microbiology
EPPI: Eucalyptus & Pine Pathogen Interactions
IH: Information Hub (part of Innovation Africa at UP)

