Accurate tree species segmentation is a complex challenge in forestry with profound implications for sustainable forest management, biodiversity conservation, and understanding forest ecosystems.

**GOAL:** explore the potential of deep learning to automate the multi-class semantic segmentation of tree species from UAV images.

**INTRODUCTION**

The dataset consists of 47 UAV-based RGB-orthomosaics (drone pilot images) and corresponding tree species masks over temperate forests in the Southern Black Forest in Germany. The usage of aerial photography captured by UAVs (Unmanned Aerial Vehicles) in remote sensing applications has seen a significant boost due to their size and flexibility making them advantageous over satellite imagery.

**DATA PREPROCESSING**

The size of images are very large and diverse:
- The minimum image/mask size: 5357x5357
- The maximum image/mask size: 15269x15269

Taking into account of huge diversity and class imbalance, we divide images and masks into 16 patches, which increases the number of images, decreases the huge sizes, help to create the balanced dataset.

**METHODS**

The pre-trained state-of-the-art deep learning model, U-net with ResNet34 with “Imagenet” weights in backbone were utilised to automatically segment multi-class tree species from UAV-images.

**CONCLUSION & FUTURE WORK**

- The model demonstrates ability to segments some tree species very accurately, most of species species moderately, and for few species weakly, mainly due to imbalance of classes in the dataset. Strong model is advantageous from a forester’s perspective, as it simplifies the process of monitoring species within a forest. This necessitates further exploration of DL models for any type of segmentation of tree species from UAV-images.

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* https://machinelearningmastery.com/how-to-implement-pix2pix-gan-models-from-scratch-with-keras/*