

AI monitoring of peatland health and diversity

Summary

Challenge

Sphagnum peatmosses provide essential ecosystem services through carbon sequestration, water retention (flooding control) and water purification.

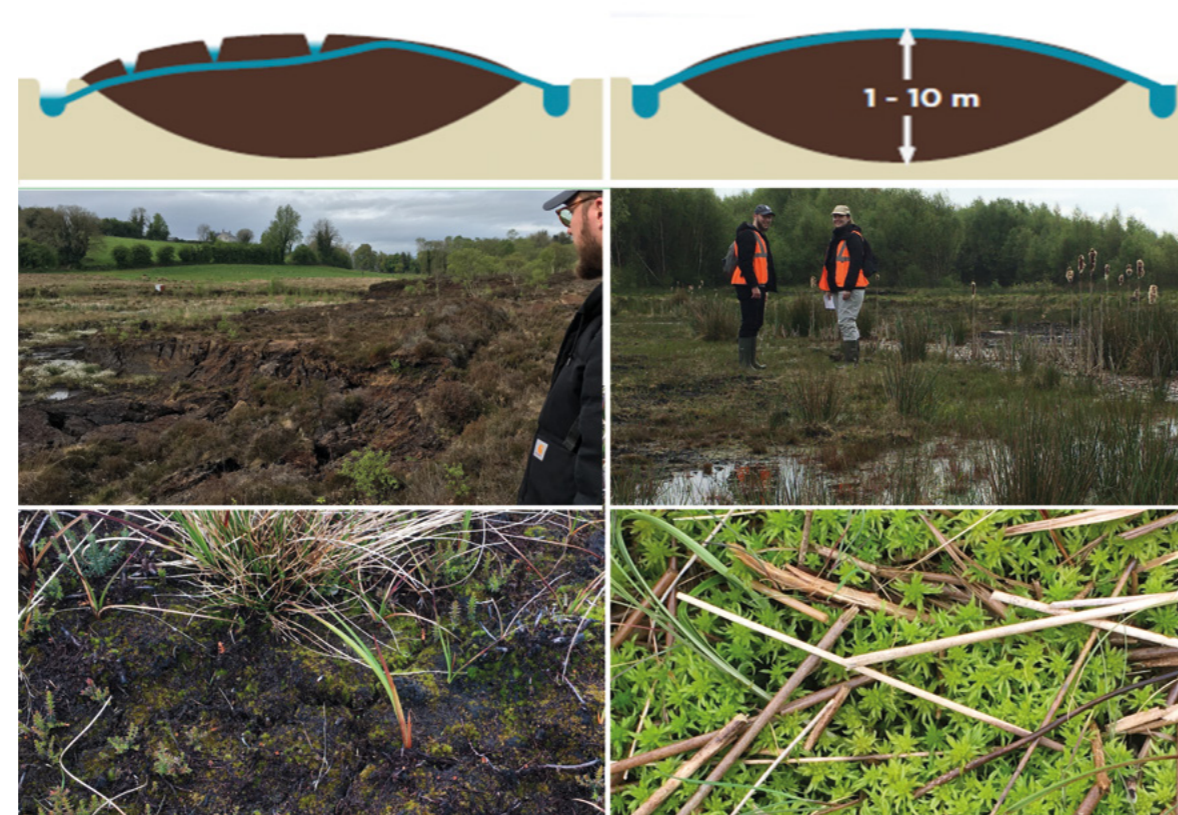


Figure 1

Peatlands have been damaged through peat harvesting, drainage and neglect (Figure 1), leading to drying and loss of the layer of living peatmoss. Monitoring peatland health across the years needed for restoration has depended on subjective but time-consuming assessment by trained experts.

Solution

This project develops user friendly tools using smartphone and drone to capture images (which can be stored) and a CNN to objectively quantify proxies for peatland health.

Images (from various distances, angles and in varying environmental settings) were collected using cameras and phones. A convolutional neural network (CNN) YOLO ('You Only Look Once') was trained, in part using images preprocessed using traditional computer vision methods, to enable partition of highly complex scenes from many different styles of images to identify and quantify peatmoss coverage (Figure 2). YOLO also supports videos and real-time object detection, significantly improving throughput.



Figure 2

Benefits

- Open-source CNN model
- Improves workflow as compared to conventional fieldwork
- Straight forward, easily interpretable geo-referenced results showing on the image
- Facilitates dynamic assessment of management decisions

Further exploitation/next steps

- Further Improvement of model accuracy for all image styles, especially drone and video.
- Estimation of moss health (using colour and texture information)
- Direct comparison against NRW manual monitoring data from the ongoing restoration project on Cors Fochno (Dyfi National Nature Reserve, contact - Justin Lyons)

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