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Short webinars for environmental policy-makers and practitioners

Remote Sensing – more than meets the eye webinar series 2023

Introductory concepts of remote sensing and classification

The following questions were asked during our live webinar with David Pairman but due to time restrictions, we were unable to answer these in the session.

How close are we to be able to get detailed vegetation (e.g. for biodiversity) and carbon maps (usable for e.g. ETS) for e.g. farmland?

We can certainly already map vegetation at a relatively detailed scale. Jan's talk on Friday showed the detection and characterisation of individual trees (at least canopy trees). The use of remote sensing for applications such as biodiversity or the ETS probably comes down to questions of spatial extent, frequency, and cost. I expect that aerial or other remotely acquired imagery is already supporting the ETS. My understanding is that the issues there are the mapping of smaller woodlots or areas of woody vegetation than covered by the LCDB or LUM maps, But more importantly, showing that they are post 89, and are otherwise eligible for the ETS scheme.

I would like to understand how to best test/train models, specifically, how do I know if I have enough data? Could you recommend some resources for me to gain better insight into these assessments?

It is a difficult question to answer simply. As I tried to point out, the complexity of targets you are trying to detect, their similarity with others you need to distinguish from, and the amount of data being used, all have an impact on the training required. As deep learning models are so complex, it is not possible to give a mathematical answer - it really comes down to experience and experimentation on your specific application. I think you would be aiming to have at least a hundred examples of targets you are looking for and similarly for non-targets. However, you won't really know until you start running these in the machine learning algorithms and looking at the accuracy metrics achieved.

Are there any internship or entry level job opportunities for Environmental science graduates, if so how to approach

There have been various summer internship programmes over the years and also opportunities through university partnerships. It is probably best to keep an eye on our career's webpage at <https://www.landcareresearch.co.nz/about-us/careers-at-manaaki-whenua>.

How much research is (or should?) be done to ground-truth remote sensing applications as truly reflective of reality?

Maps produced from remote sensing can easily look very convincing but still be quite inaccurate. It is therefore very important to build accuracy assessment into remote sensing projects. This is normally done using independent observations either from fieldwork or from higher resolution imagery that can be reliably manually interpreted.

How frequently does Manaaki Whenua -Landcare Research do land cover mapping data on a nationwide scale?

The LCDB and MfE's LUM maps are updated approximately every five years. These both cover all New Zealand land. In recent years MWLR have done several projects focused on agricultural land nationally. These have often been looking at mapping winter feed cropping. In some form, we seem to be doing this every year recently.

What courses of study do you recommend at post grad level to learn more about remote sensing?

Most universities offer some remote sensing courses - normally in geography departments. I don't feel I have a current or comprehensive enough awareness of these to make specific recommendations.

There used to be a simple table on the MWLR website which summarised the threatened land environments data (% of indigenous veg remaining for each Level 4 category etc) for a particular version of LCDB. This is not now available, and it is much more difficult to find this within the mapping portal. Are there any thoughts of reinstating this resource?

You are probably referring to work led by Susan Walker that was based on LCDB v4.0 (https://www.landcareresearch.co.nz/assets/Discover-Our-Research/Environment/Threatened_Environment_Classification_2012.pdf). I don't think this has ever been updated for LCDB v5. See also, <https://www.landcareresearch.co.nz/tools-and-resources/mapping/threatened-environment-classification/>