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Identifying forest loss using Artificial Intelligence

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Wellington technology start-up Lynker Analytics has been selected by the Ministry for the Environment (the Ministry) to lead a consortium including UAV Mapping NZ and Carbon Forest Services to inventory the extent of forest loss in New Zealand during 2017 and 2018.
Each year 40,000 – 50,000 hectares of forest is harvested in New Zealand as part of normal forestry land use activity. Most of this forest area is replanted, however a small but significant area is deforested and converted to another land use. Deforestation is an important form of land-use change from a greenhouse gas perspective. The Ministry assesses deforestation in New Zealand every two years to meet international reporting obligations under the United Nations Framework Convention on Climate Change and the Kyoto Protocol.
The Ministry also provides deforestation mapping to the Ministry for Primary Industries for use by their compliance teams monitoring deforestation under the New Zealand Emissions Trading Scheme.
Under this contract the consortium will field check over 7,000 forested areas, covering approximately 84,000 hectares. These areas have already been identified in satellite imagery as having experienced forest disturbance during 2017 and 2018. The primary objective is to determine what the current land use of each area is and therefore identify the areas of deforestation.
UAV Mapping NZ will manage the flying programme which entails over 200 flying hours across every district in the country. Multiple fixed wing Cesna 172 aircraft operated by Rotorua based Action Aviation will be used.
The images, such as that shown here of a recently harvested forest block, will then be input into a machine learning algorithm for land cover analysis. Matt Lythe, Managing Director of Lynker Analytics says “our machine learning process will deliver a classification system that will firstly apportion land cover to sub-areas within each forest block. This will generate detailed land cover information which we can then use to make final determinations of overall land use at a block level.” He goes on to say, “the detail and consistency of the information from the modelling will make the final land cover class very data driven and defensible.”
Forestry expert on the team, Ollie Belton from Carbon Forest Services adds “this approach will allow a more refined set of land-use classifications that aligns with both domestic and international rules on land-use, land-use change, and forestry. We will be able to accurately assess whether or not each block has been re-planted, is naturally re-generating, has suffered natural damage or has been converted to grazing or another purpose.”
Scheduled for completion by 30 June this year the Consortium will also offset the aviation emissions associated with the project in accordance with the Ministry for the Environment’s Measuring and Reporting Greenhouse Gas Emissions using high quality New Zealand units from permanent forest sinks.

Lynker Analytics are a New Zealand company with specialist expertise in data science, geospatial analytics and machine learning. They have developed sophisticated tools to

extract new knowledge and insights about the earth's surface and built environment from satellite imagery, aerial photography, drones, Lidar and other data sets. Using neural networks and related AI techniques, Lynker Analytics can monitor and quantify change in the environment at local, city or national scales to support better decision making.

Carbon Forest Services is a leading provider of assessments for New Zealand landowners to assess carbon forestry entitlements and deforestation obligations. They have carried out over 300 detailed assessments to determine carbon forest eligibility ranging from small plantation woodlots, natural forest reversion projects, to major forest estates comprising tens of thousands of plantation hectares. Carbon Forest Services provides ongoing services to approximately 200 clients who are registered forestry participants under the emissions trading scheme.

Based in Ohakune, UAV Mapping NZ provide aerial remote sensing services through both manned fixed wing light aircraft and helicopter operations. The staff at UAV Mapping NZ possess a wide range of experience and skillsets. From UAV operators, commercial pilots, technical trades and former Armed Forces personnel they specialise in the capture of high resolution ortho imagery and point cloud data for projects of various sizes and complexity.

Source: https://www.scoop.co.nz/stories/BU2002/S00054/identifying-forest-loss-using-artificial-intelligence.htm