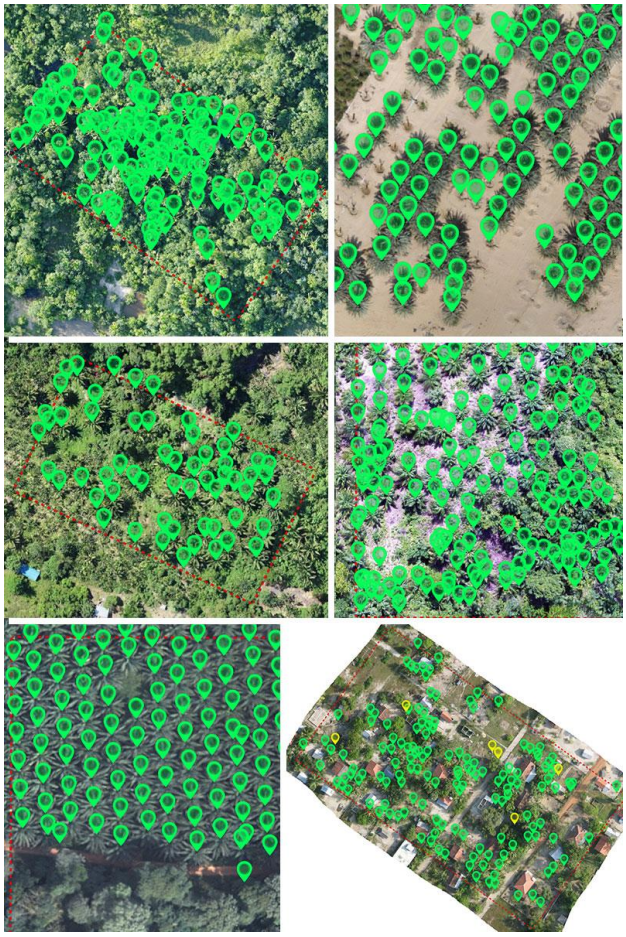
EO-FIN

Trees Counting



Palm trees counting over different countries (Ghana, Indonesia, Papua, Sri Lanka, and Brazil) (Source: https://feds.ae/saving-time-and-effort-training-an-ai-to-count-palm-trees/)

Product Category

■ Land Use	☐ Natural Disaster	☐ Coast Management	☐ Earth's Surface Motion
☐ Land Cover	☐ Climate Change	☐ Marine	

Financial Domain(s)

☐ **Investment management** ☒ **Risk analysis** ☒ **Insurance management** ■ **Green finance**

User requirements

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UN31: Need to link tree planting parcels to estimate the number of trees planted

Description

Tree counting require VHR satellite imagery to accurately and efficiently determine the number of trees within a specified area. This approach offers significant advantages over traditional ground-based methods, as it enables rapid, cost-effective, and large-scale tree counting without the need for time-consuming field surveys. This data, coupled with the ability to monitor changes over time, aids in assessing the value of forestry assets, estimating timber volume for investment or insurance purposes, and evaluating the environmental impact of forestry investments.

Spatial coverage target

Asset level

Data throughput

Rapid tasking ☒ High ■ Low

Data availability [ ] High [ ] Low

Product specifications	
Main processing steps	The process starts by inspecting optical VHR imagery (≤ 0.5 m) to identify a sample of individual trees to build a training dataset for a deep learning model. Then a deep learning model to be trained in optimoum way to detect the individual tree and, subsequently, identify the number of trees.
Input data sources	Optical: VHR based on the availability like Pleiades 1A/1B & NEO, WorldView2&3, and SPOT6/7 Radar: N.A Supporting data: N.A
Accessibility	Optical VHR imagery: commercially available on demand from EO service providers.
Spatial resolution	Optical VHR: ≤ 0.5 m
Frequency (Temporal resolution)	Optical VHR: Sub-daily to Daily
Latency	< 1 Day
Geographical scale coverage	Globally
Delivery/ output format	Data type: Raster File format: GeoTIFF
Accuracies	Thematic accuracy: 70-80% Spatial accuracy: 1.5-2 pixels of input data
Constraints and limitations	■ Cloud presence ■ Cost of VHR imagery ■ Lack of training data ■ Global inconsistency due to the diversity of tree species. ■ Limitations in homogeneous forests where the trees are connected.
Level of skills required by users to use the EO service	Skills: Essential Knowledge: Essential