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CREATING FOREST INTELLIGENCE WITH 20TREE.AI

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Forests are essential for life on Earth and a sustainable future. The “lungs of the Earth” mitigate climate change by acting as a carbon sink. Moreover, they provide the timber for products we use every day. However, forests are under pressure. A large driver is deforestation due to agricultural expansion, replacing forests with farmland. In fact, agriculture is the biggest driver of deforestation and resources are often used unsustainably. Furthermore, climate change has a massive impact on forests in the form of severe drought, forest fires and insect pest outbreaks. There is a need for an up-to-date insight into the Earth’s forests, to improve decision making by forest industry, governments and agricultural organisations, to react to these threats in an early stage and to create and apply prevention policies.

On the ground, it is barely possible to get a full understanding of the richness of resources in a forest area or predict any potential risks to the health of plants and trees. Comprehensive, manual surveying and data collection in forested areas can take months, with considerable pressure on budgets and manpower.

20tree.ai uses a combination of artificial intelligence (AI), high-quality and high-resolution optical satellite imagery and radar data, and (cloud) computing power to generate forest intelligence. Using a type of AI called machine learning, algorithms are created that can “learn” from experience. For example, in the case of deforestation, the algorithm is fed with many cases of deforested areas, and it learns what deforestation looks like. In this way, the machine learning algorithm can detect deforestation patterns and predict high risk areas. It even makes it possible to detect patterns that cannot be spotted by humans yet. The global, daily availability of satellite data combined with AI and complex data poses a potent technology for understanding natural and human induced phenomena affecting forests.

Application scenario

Monitoring of forest status and preservation.

Digital technologies

Artificial intelligence, satellite imagery, neural networks and (cloud) computing power.

Socio-economic impact

- Economic: efficient forest management.
- Environmental: forest health, sustainability.
- Social: education; urban green spaces.

More info: 20tree.ai



Purpose of the tool

The purpose of 20tree.ai is to merge complex satellite data with artificial intelligence and computing power to turn them into actionable insights. By feeding satellite data, including high spatial and temporal resolution optical and radar data, into deep learning algorithms, highly accurate insights are created and patterns revealed, which might not be visible yet to the human eye.



Figure 0-1. Fish bone pattern style deforestation. Alongside the main road several small roads reach into the forest, an indication that more deforestation is about to happen. Imagery by DigitalGlobe.

Description of the tool

The combination of artificial intelligence, satellite imagery and (cloud) computing power enables the efficient monitoring of forest health and detection of forest threats. The generated forest intelligence helps corporates, non-governmental organisations (NGOs) and policy-makers to combat deforestation and make forest management more sustainable. Regularly, new satellite data is processed, which is used to train a series of neural networks. By also using radar data, forests can be monitored independent of daytime or clouds covering the area. Cloud computing provides the resources for the training, making it possible to be completed in just a short time. The neural networks can then draw insights into forest health that are otherwise invisible to the human eye. Clients can check on specific factors of interest, including tree species, height and diameter, growth and productivity, as well as harvesting potential, allowing them to monitor those variables over time and take appropriate reactive measures, with improved impact.

Areas of socio-economic impacts

Social	Raising awareness around the need for reforestation and restoring valuable ecosystems; improvement of urban green spaces; conservation of forests.
Economic	Prediction of short and long-term impacts of investments; “Which trees to plant, when and where?”
Environmental	Insights into forest health and threats, like deforestation, drought, insect plagues, soil health, storm damage, and other forest disturbances.