

**IN INNOVATION,
THE QUESTION IS NOT
WHY,
BUT WHY NOT?**

Real-time Vegetation Monitoring System

**Innovative solutions for all
voltage level**

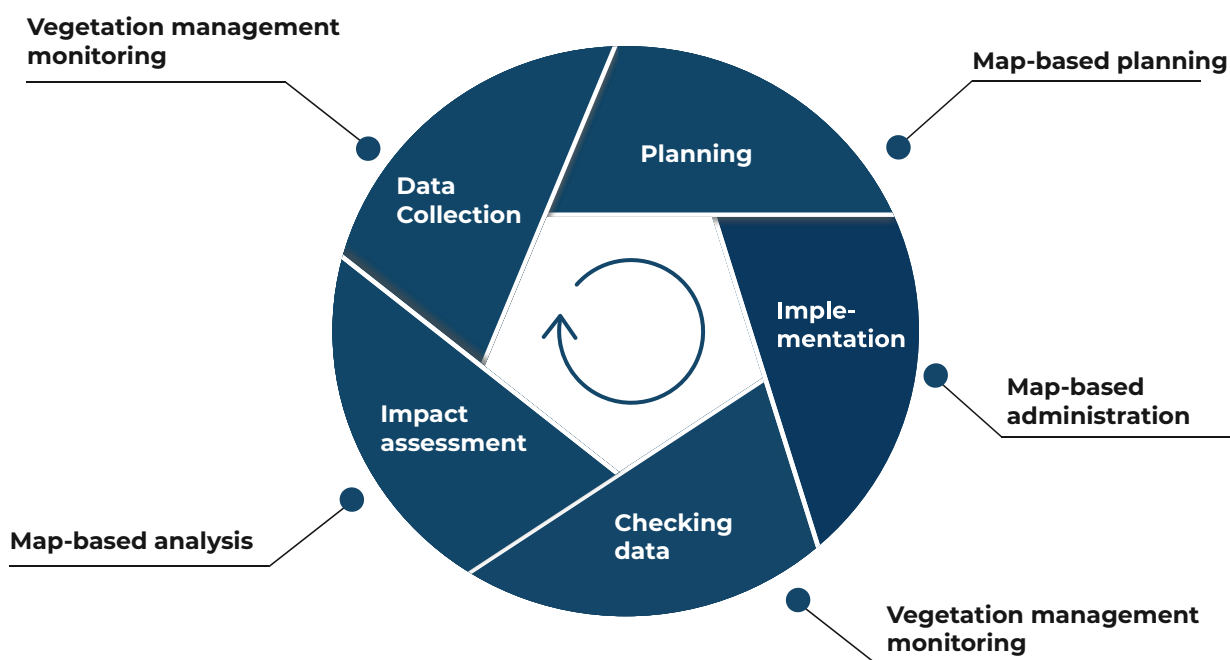


Why is vegetation management **so important**

Neglected vegetation can cause malfunctions and even life-threatening situations, for example when branches come into contact with power lines.

In dry conditions, the proximity of vegetation to power lines can increase the risk of fire. Unfortunately, this is becoming increasingly common and we have seen the potential consequences of this in recent years.

In addition, overgrown bushes or lianas can obstruct access to network infrastructure, which can significantly hamper the work of installers.



How it works?

Vegetation monitoring system

A properly operating vegetation management system helps to **increase the efficiency** of the network by **reducing safety and outage risks, optimise costs**. The graphic above illustrates how this works.

Area of application

medium and high voltage networks

Vegetation Zone Determination

The height and safety zone classification is specified by the customer and the system is parameterised accordingly.

Based on our experience, for high voltage, this is 30-50 m distance from the **EDGE** conductor on both sides, i.e. **SUM 60-100 m** band - where the vegetation height categories are defined by the customer.

For medium voltage, the safety zone is the distance from the **EDGE** conductor of 5 to 7 meters, the vegetation height from the conductor is 1 to 3 meters.

Basically, we are looking at 2 main things. One is whether the vegetation is within the safety zone and how tall it is.

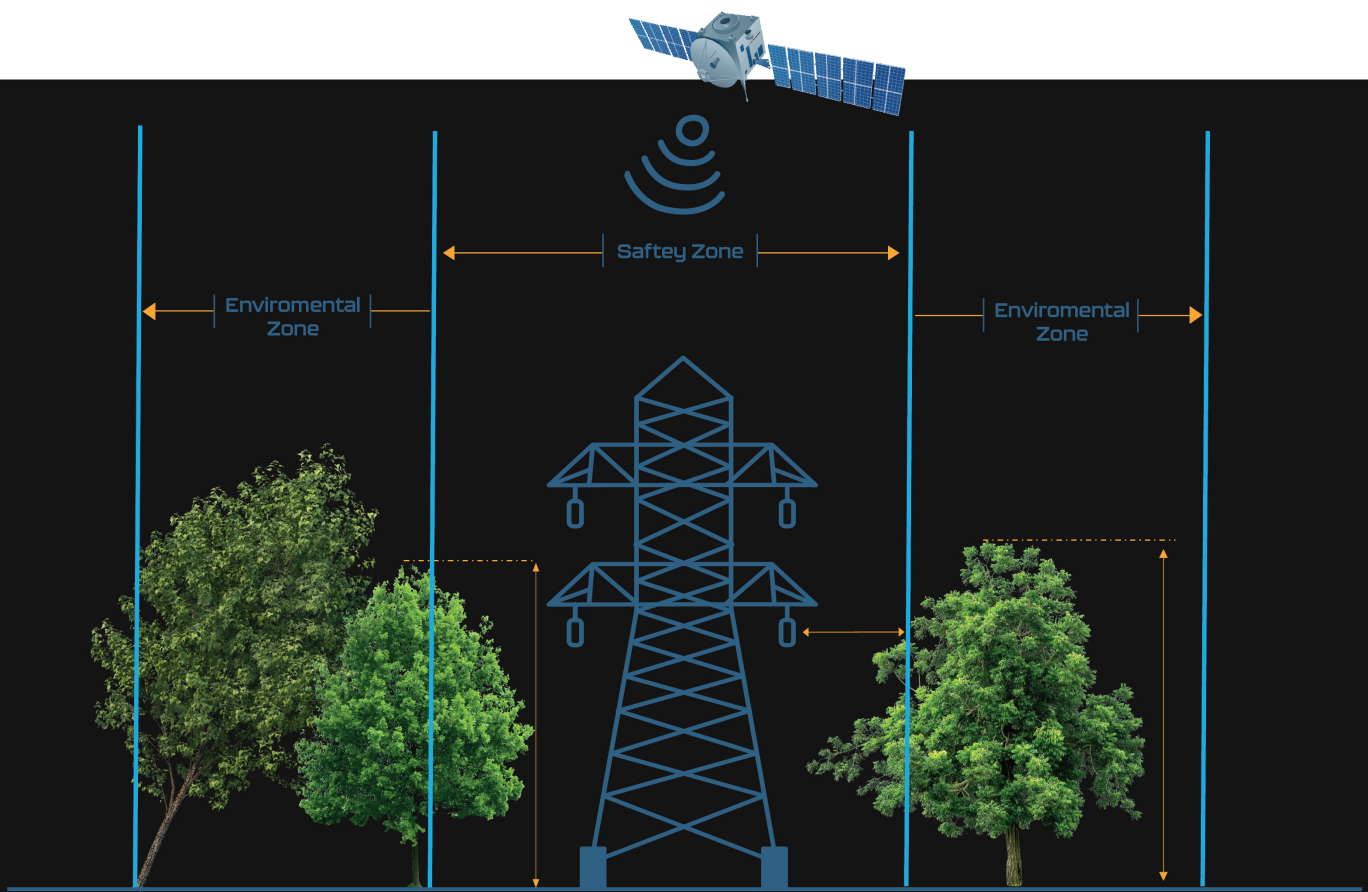
This determines the classification of the plant.

Dangerous (1-3 metres from the wire)

Increased attention to change (4-5 metres from the wire, depending on vegetation type)

Regular

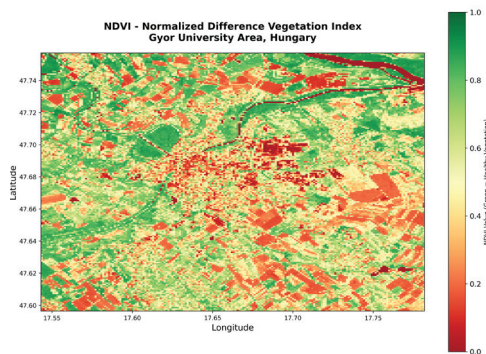
In a broader sense, we can also look at the environmental zone, where we typically need to look at plants whose height may cause a tree to break its conductor.



System Overview

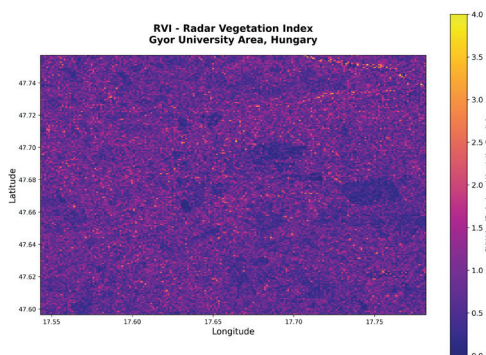
Research Area

Scientific Background of the Completed Development



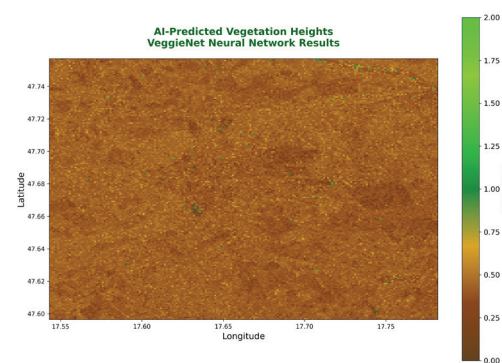
NDVI (Normalized Difference Vegetation Index)

This plot shows the vegetation health index derived from satellite data. Green areas indicate healthy vegetation, while brown/red areas show bare soil, water, or unhealthy vegetation. NDVI values range from 0 (no vegetation) to 1 (dense, healthy vegetation).



RVI (Radar Vegetation Index)

This displays radar-based vegetation measurements that can penetrate cloud cover and work in all weather conditions. Purple areas indicate low vegetation density, while yellow/orange areas show higher vegetation density. This complements optical NDVI data.



Vegetation Height (AI Prediction)

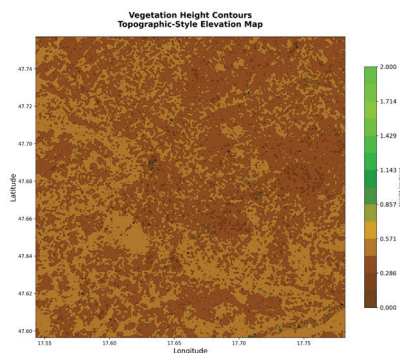
This is the main result - AI-predicted vegetation heights in meters. Brown areas represent low vegetation (0-1m), green areas show medium vegetation (1-10m), and bright green shows tall vegetation (10m+). This is what the trained neural network predicts.

Model: Trained VeggieNet Model | Max Height: 3.4m | Data: REAL Copernicus Satellite Data

System Overview

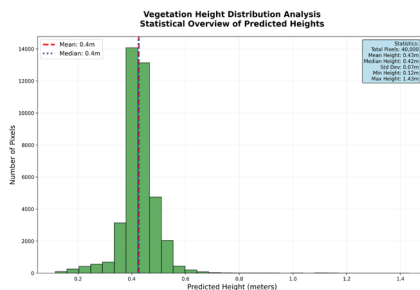
Research Area

Scientific Background of the Completed Development



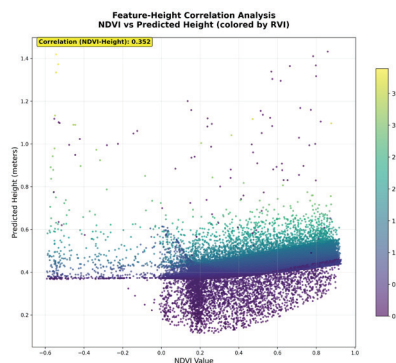
Height Contours

A topographic-style visualization of vegetation heights using contour lines. Like elevation maps, each line represents areas of equal vegetation height. This helps identify gradual height transitions and vegetation patterns.



Height Distribution Analysis

A histogram showing how vegetation heights are distributed across the area. The x-axis shows height in meters, y-axis shows pixel count. The red dashed line indicates the average height. This helps understand the overall vegetation structure.



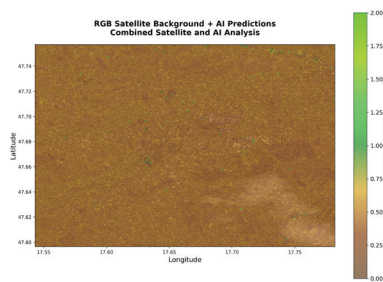
Feature-Height Correlation

A scatter plot showing the relationship between NDVI values (x-axis) and predicted heights (y-axis), colored by RVI values. This reveals how vegetation indices correlate with height predictions and validates the AI model's logic.

System Overview

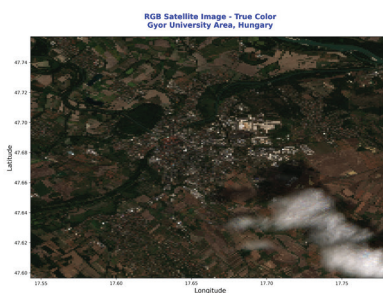
Research Area

Scientific Background of the Completed Development



Satellite + AI Overlay

This combines the satellite background image with the AI height predictions as a semi-transparent overlay. It shows how the predicted vegetation heights align with actual geographical features visible in the satellite imagery.

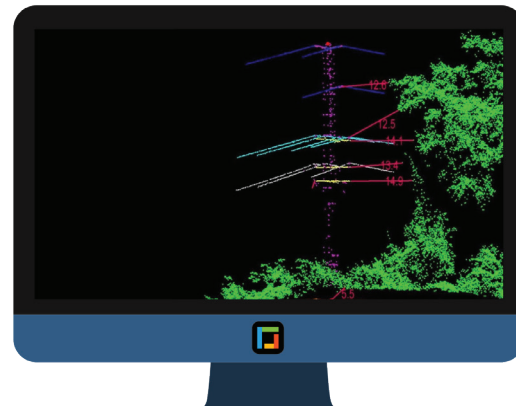
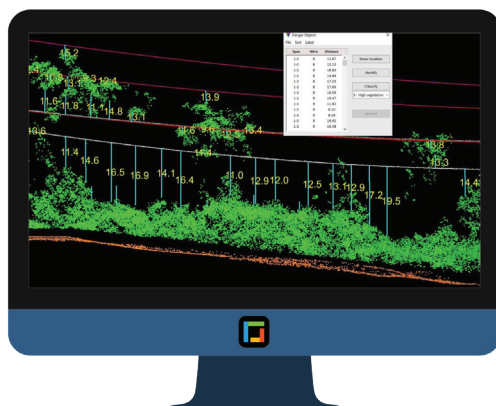


RGB Satellite View (True Color)

Natural color satellite imagery showing the area as it would appear to the human eye. This provides geographical context, helping identify buildings, roads, water bodies, and different types of vegetation for better interpretation of the AI results.

Overall Purpose

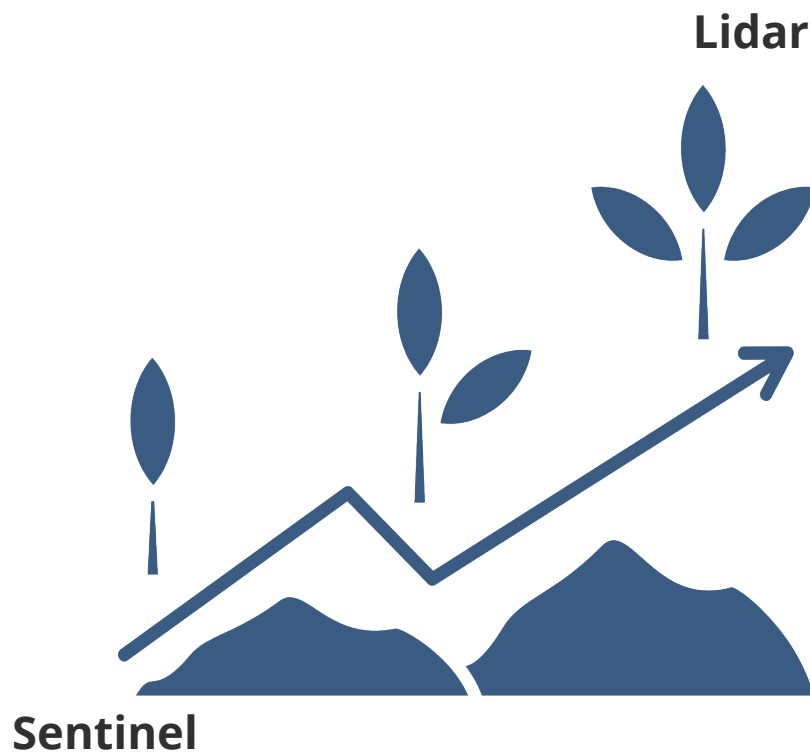
Together, these plots provide a comprehensive analysis of vegetation height prediction, from input satellite data through AI processing to final results, suitable for professional presentations to clients, urban planners, and environmental scientists.



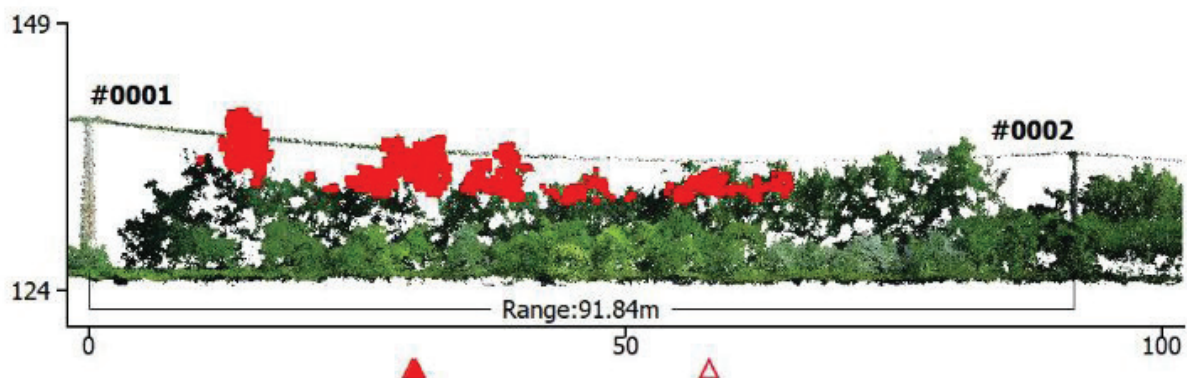
The validation of the completed neural networks is always performed using lidar-precision measurements.

System Overview

R&D outcomes are fully integrated into the system



We implement the learning stages of the neural network, starting from low-resolution. Sentinel data and progressing through a complex modeling process—approaching, but never fully reaching, lidar-level precision. Throughout the training process, we utilize a vast number of training samples, and every validation procedure concludes with a representative lidar-based verification.

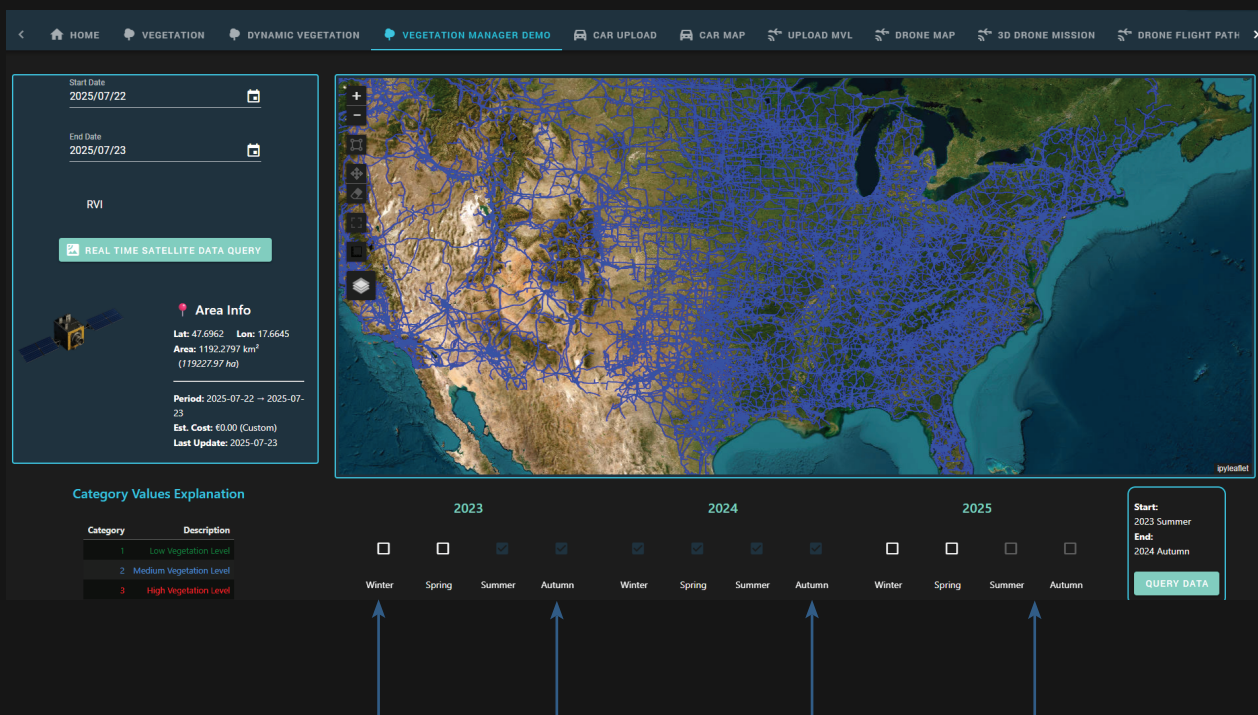


Map Based Dynamic Vegetation Management

The system is capable of providing fully real-time satellite data.



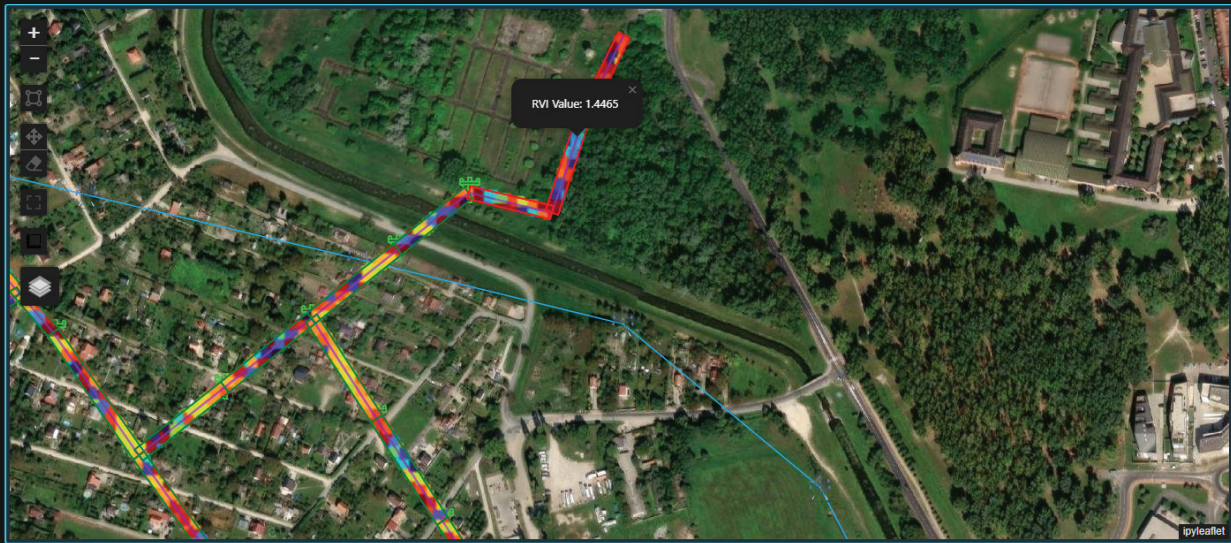
We provide the service at a rate of 5 EUR per year per kilometer, with no upfront fee, as a monthly subscription.



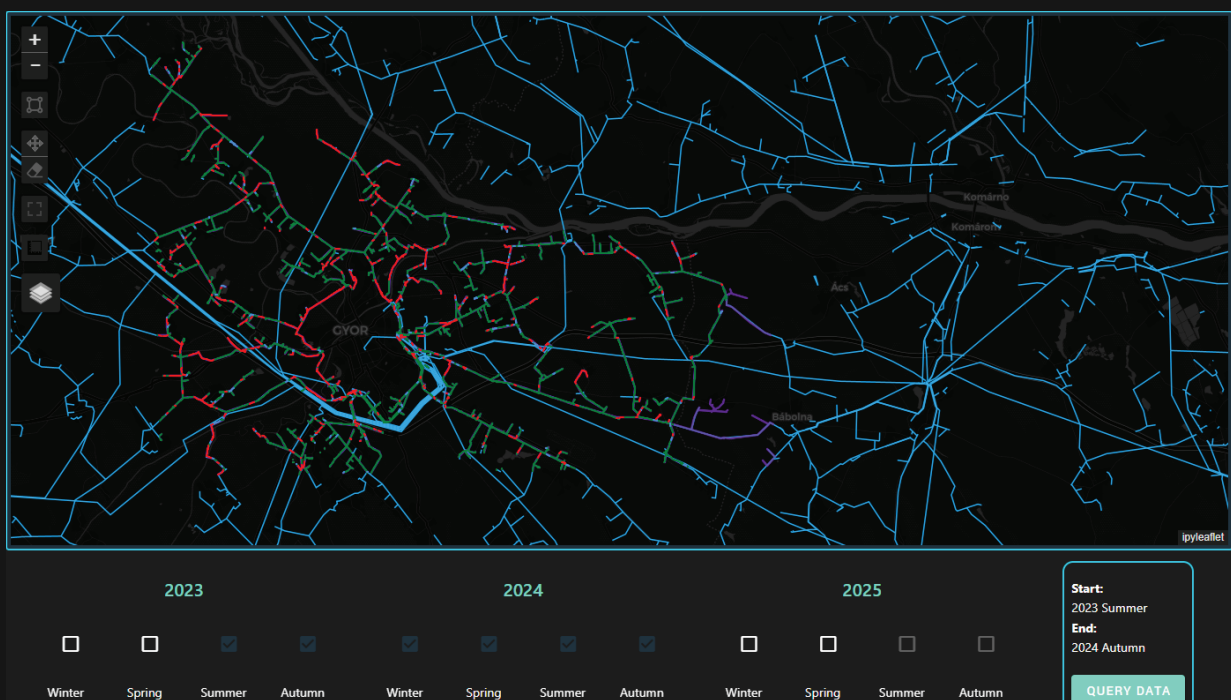
Historical time series vegetation data for future modeling.

Visualization and Data Support for **Decision-Making**

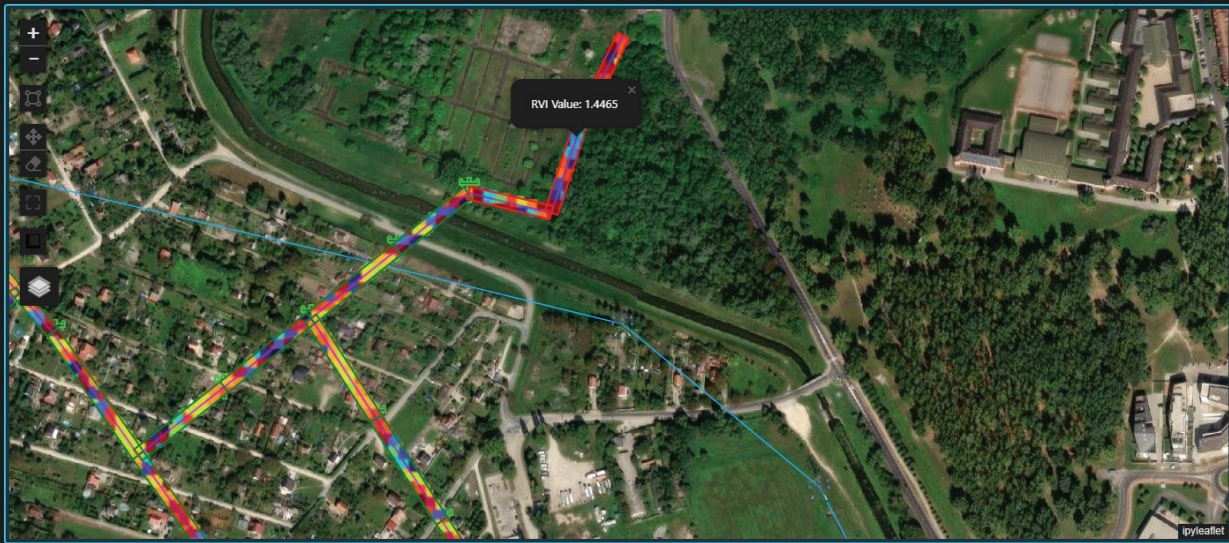
Custom vegetation indices enable precise location identification, which also supports monitoring the health status of vegetation within the safety zone.



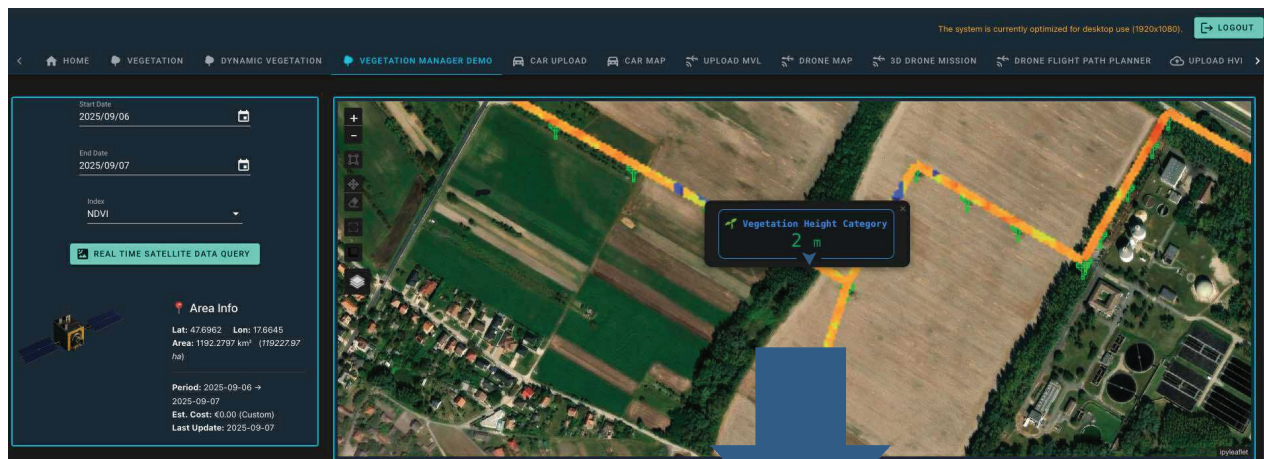
We highlight high-risk areas using color coding. Continuous data updates and the display of historical time series data support decision-making.



GPS-based Mapping **with Elevation Classification**



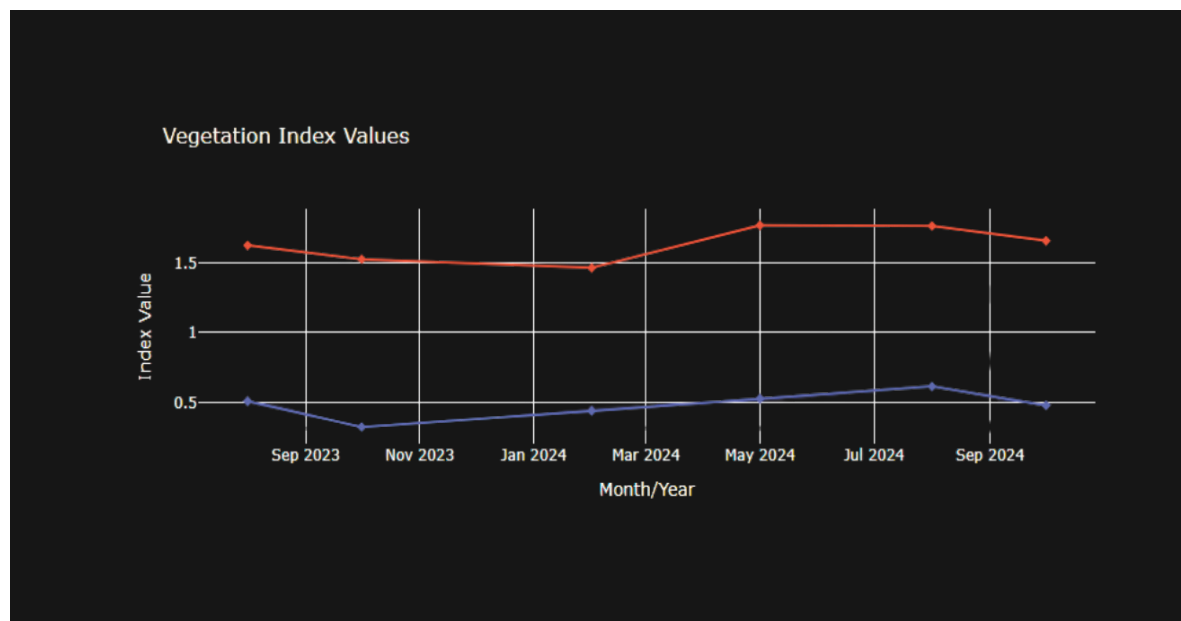
AI Based **Vegetation Height Estimation**



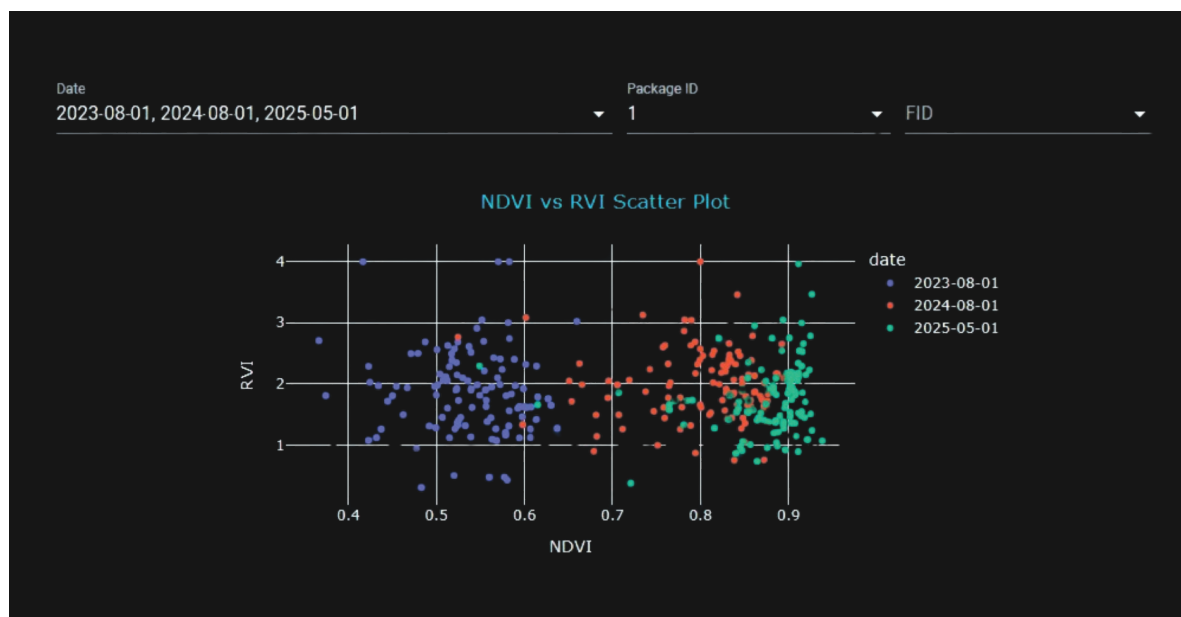
Real-time reporting Dashboards

This system is complemented by a reporting module that also provides real-time reporting.

Querying
historical
vegetation
data

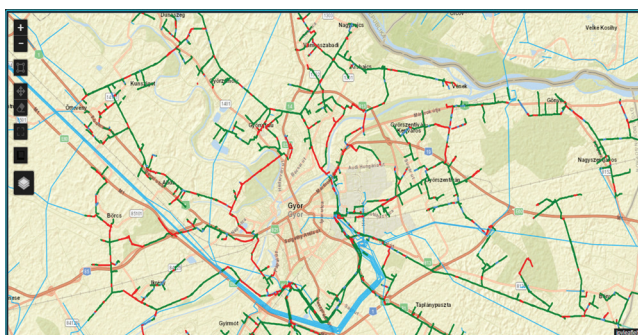


Distribution
of historical
vegetation
indexes



Dynamic matrix

Together, these plots provide a comprehensive analysis of vegetation height prediction, from input satellite data through AI processing to final results, suitable for professional presentations to clients, urban planners, and environmental scientists.



The Vegetation Dynamic Risk Matrix, once the time dimensions are set, displays the distribution of risks. This distribution is fully synchronized with the map visualization, which clearly indicates the specific risk classification assigned to each power line section. This approach enables vegetation management interventions to be carried out at the right location and at the right time.

Risk Matrix

Risk	20%	40%	60%	80%	100%
5	0,00% 0 segments	0,00% 0 segments	0,00% 0 segments	0,00% 0 segments	5,39% 104 segments
4	0,00% 0 segments	0,00% 0 segments	0,00% 0 segments	2,02% 50 segments	1,35% 26 segments
3	0,00% 0 segments	0,00% 0 segments	0,00% 0 segments	68,56% 1 699 segments	68,50% 1 322 segments
2	0,00% 0 segments	9,77% 363 segments	86,08% 1 608 segments	15,20% 379 segments	0,00% 0 segments
1	100,00% 466 segments	90,23% 3 537 segments	13,92% 260 segments	14,12% 350 segments	24,77% 478 segments

Field data capture **Application**

With the HAWK System you are able to set up a working field application in just 2 weeks.

Continuous data collection, visualization, and monitoring

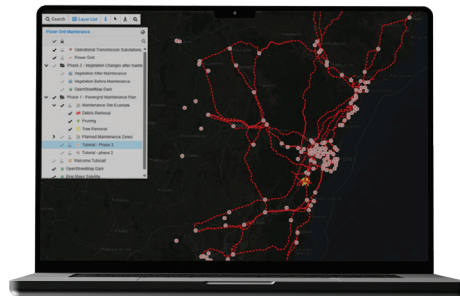
Flexible Data Location

Our app empowers you to capture data anytime, anywhere. Utilize GPS for automatic location or manually pinpoint and draw for ultimate flexibility.



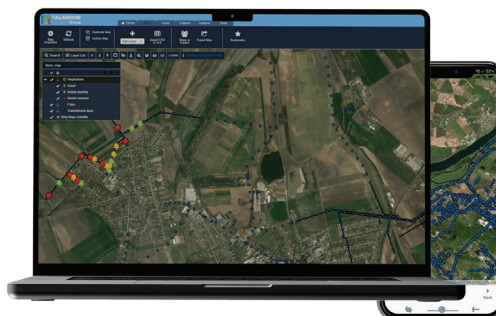
Online, Offline Access

Work seamlessly with or without an internet connection. Download offline maps to access data in remote areas.



Ensure clean data – every time

Build forms with logic, required fields, and easy-to-use options. No coding



HAVE A QUESTION? CONTACT US

If you have any questions or need guidance about our services, please contact us using one of the contact details below!

Learn more about how we can help you automate your business and achieve your goals.



In innovation, the question is not why,
but **WHY NOT?**

USA, Canada, South-America, Australia:

TALAMONE Group LLC
Fort Lauderdale, USA
contact@talamonegroup.com
www.talamonegroup.com

Research and Development Centre:

HAWK MACHINE VISION LLP
Vancouver, Canada
contact@talamonegroup.com
www.talamonegroup.com

Europe Division:

HAWK SYSTEM s.r.o.
Levice, Slovakia
contact@hawk-system.com
www.hawk-system.com

