

SUCCESS CASE 2.2024

Analytics4Vegetation

USING ARTIFICIAL INTELLIGENCE TO PROMOTE EFFICIENCY IN VEGETATION MANAGEMENT



THE CHALLENGE

Of the 84,000 kilometres of high and medium-voltage electricity networks managed by E-REDES, around 80% are overhead, and nearly 40% of these cross forested areas. These characteristics tend to increase the level of network security risk, particularly in the context of **climate change and extreme weather events in forested areas**.

Vegetation control covers two topics addressed by regulation: line protection zones and fuel management strips. To ensure compliance with the safety distances between trees and infrastructure, E-REDES promotes **vegetation management plans** based on regular inspections, carried out through field operations, drone flights and helicopters. The consumption of human and financial resources associated with this management, as well as the rise of critical infrastructure security and forest protection among the priorities in public agendas, required innovative approaches and leaps in efficiency.

THE SOLUTION

In 2022, **Analytics4Vegetation** was created. Using artificial intelligence (AI) models, this solution **forecasts vegetation growth**, taking into account the different vegetation species, climate, soil, altitude and other growth factors. Alongside this central system, complementary tools were developed to strengthen the response to the strategic priority of **automating processes** and ensuring a more **proactive and preventive approach to vegetation management**.

Analytics4Vegetation foresees the following lines of action:

- **Update and centralisation of data:** information from various sources (e.g., LiDAR sensors, satellite information, inspection reports, type of vegetation, soil) is collected and processed.

- **Analytical and predictive models:** advanced machine learning models are used to estimate the growth of vegetation in the vicinity of overhead lines, taking into account the stipulated safety distances.
- **Personalised dashboards:** financial, vegetation and operational information are centralised, allowing for better-informed decisions and actions.
- **Automation of operations:** the system is integrated with the operational asset management and the mobility systems in the field, enhancing automation throughout the process, from data collection to the creation and assignment of maintenance orders (web services).

RESULTS

- **Reduction of the effort associated with data extraction, information processing and order generation.** The automation of complex processes, which used to be carried out manually, led to an 80% reduction in necessary personnel effort. The solution was adopted as the main means of communication with external service providers, reducing email exchanges by around 90%.
- **Contractual and budgetary control.** An auditing process carried out considering historical intervention data and vegetation data collected by Analytics4Vegetation detected that in 30% of locations and at that moment, vegetation was too close to the electricity lines. Work orders were sent to external providers for cutting this vegetation. This functionality allows for greater control over the work performed by E-REDES service providers. This process generates savings of around €1M/year.
- **Greater efficiency in vegetation management.** The model predicts the 'optimum' moment for intervention in the field and reconciles scheduled interventions in fuel management strips, allowing for savings of around €1,5M/year.
- **Greater safety.** The solution provides more reliable and up-to-date information on risk areas.
- **Greater employee satisfaction.** The dashboards, providing aggregated, personalised and easy-to-consult information, guarantee a better user experience.
- **Contribution to biodiversity protection.** The solution enables the preparation of more exact and balanced pruning plans.

AWARDS RECEIVED BY THE INITIATIVE

- Portugal Digital Awards 2022 (category Best Future of Intelligence Project).
- Kaizen Awards Portugal 2023 (category Analytics).
- National Innovation Award 2023 (Technology segment, Artificial Intelligence and Machine Learning category).
- Digital with Purpose Global Award 2023.