Details & Capabilities

OKO

Energy | Metallurgy | Oil & Gas Production | Road Management

Digital platform for automated monitoring of linear assets using UAS and artificial intelligence models.

Key functionalities:

✓ Automated inspection of extended linear assets with UAS

✓ Rapid automated processing of acquired data

✓ Detection of defects and hazardous situations

Remote Vegetation Assessment

✓ Vegetation inventory in complex environments: urban settings, inaccessible areas without road infrastructure

✓ Segmentation of boundaries for individual vegetation objects: trees, shrubs, windthrows, deadwood, burnt areas

✓ Digital modeling of forest stand structure

✓ Determination of key quantitative and qualitative characteristics: total height, trunk diameter, canopy diameter, stratum/species, wood/biomass stock, etc.

✓ Evaluation of canopy layering and sanitary state

✓ Clustering of individual vegetation objects and forest management planning

Power Line Pole Detector

Result: Trained model for recognition of low-voltage (10kV) power line poles in 4 classes for snowy and snow-free periods.

In progress: Expanding dataset and retraining model for high-voltage poles (35kV, 110kV, 220kV, 330kV, 500kV).

Model metrics:

✓ 95.6% — Intermediate pole

✓ 92.4% — Two-legged anchor pole

✓ 92.0% — Two-legged anchor pole with isolator

✓ 99.5% — Three-legged anchor pole

Overall recognition accuracy for all pole classes: 94.9%

Power Line Insulator Defect Detector

Result: Model for recognition of 22 classes of defects on power line insulators.

In progress:

✓ Collecting additional datasets and retraining the model

✓ Searching for open testing sites to expand training data

Model metrics (examples):

✓ 52.5% — Glass insulator contamination (disc type)

- ✓ 30.5% — Absence of glass insulator (disc type)

- ✓ 70.1% — Polymer insulator contamination (disc type)

- ✓ 73.3% — Crack in ceramic insulator (disc type)

- ✓ ...up to 99.5% for porcelain insulators (rod type)

Overall recognition accuracy across all defect classes: 76.1%

Recognition of Illegal Construction in Protected Zones

Algorithm functionality:

- ✓ Segmentation of structures

- ✓ Creation of protected zone boundaries

- ✓ Determination of structure area

- ✓ Determination of structure center coordinates

- ✓ Identification of structures within protected zones

- ✓ Monitoring changes on orthophoto maps over time

Detection and Documentation of Quarries and Soil Disturbance

Algorithm functionality:

- ✓ Segmentation of ground cover disturbances

- ✓ Detection of people and special machinery in the disturbance area

- ✓ Generation and distribution of violation reports

Recognition of Oil and Saltwater Spills on Surface

Algorithm functionality:

- ✓ Segmentation of oil and saltwater spills on the ground surface
- ✓ Spill area calculation
- ✓ Classification of spill severity
- ✓ Generation and distribution of violation notifications

AI-Powered Fire Monitoring System

Algorithm functionality:

- ✓ Integration with Lesokhranitel software
- ✓ Detection of smoke with onboard AI
- ✓ Automated report generation
- ✓ Georeferencing of smoke events
- ✓ Detection radius >30km
- ✓ Tracking growth and forest changes through repeated surveys
- ✓ Creation of additional thematic layers and models: terrain, road networks, water bodies, land use