THRUST LOG-IQ

Image-based Quantification of Logs

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Introduction to THRUST LOG-IQ

Image-based Quantification of Logs

1.1 THRUST – Intelligent UAV Systems

Developing UAV systems and AI-based analytics for large-scale aerial inspections since 2018

Sensors: LIDAR, RGB, Multispectral, Thermal

1.2 THRUST LOG-IQ: Image-based Quantification of Logs

Timely detection of windthrows using UAV imagery and AI analytics

Follow this link to watch a short introductory video

Implementation

Aerial UAV data gathering and AI-based software development

2.1 Implementation

From UAV flights to AI-based software development

1. Test UAV flights, equipment calibration, parameter optimization
2. Aerial UAV imagery acquisition and processing
3. Data exploration and annotation for AI model training
4. AI model training for windthrow detection
5. Automatic analytics pipeline development (windthrow detection, geolocation, and reporting)
6. Testing, validation, and demonstration

2.2 Aerial data gathering

Using THRUST heavy-duty GreenBee UAV

THRUST GreenBee UAV:

- 25 kg MTOM
- 6 meters wingspan
- Fully electric (zero emissions)
- Ultra-high-resolution RGB sensors

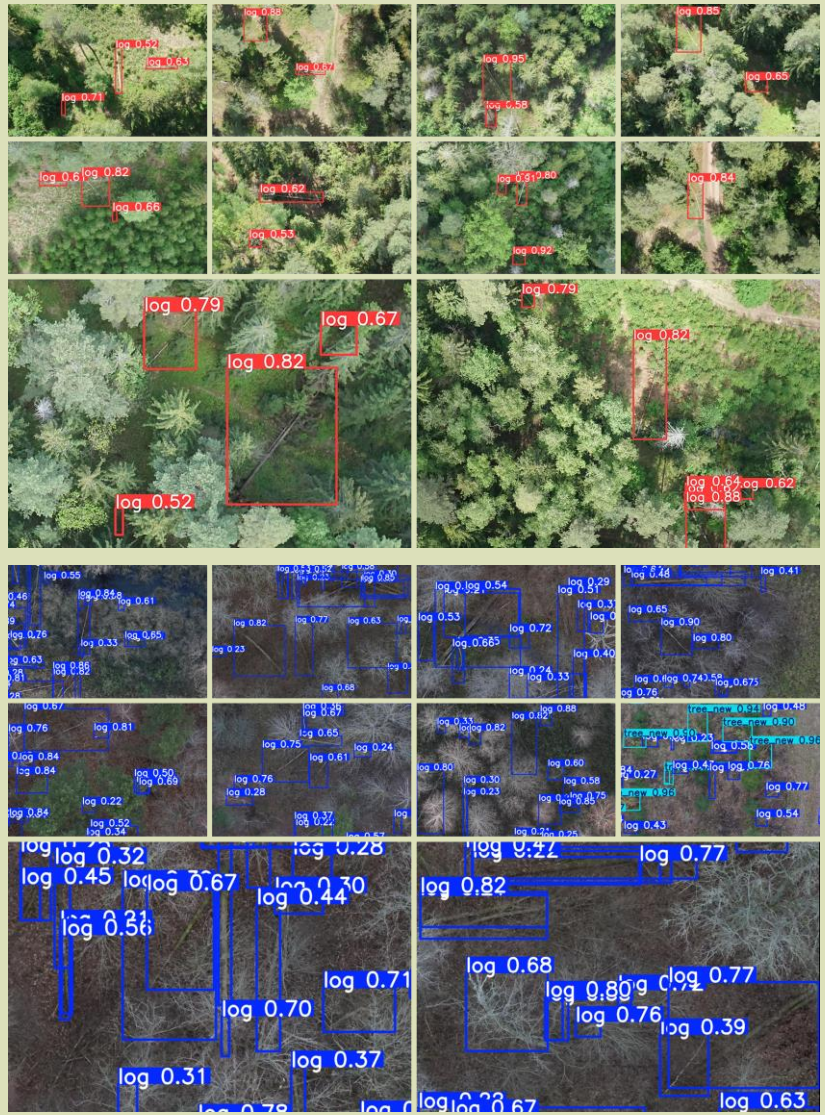
Aerial imagery acquisition (in Lithuania):

- Data collected from >500 km
- GSD 0.7-3 cm/px
- During various seasons
- At different conditions
- From diverse forested areas

2.3 AI model development

Data annotation and AI detection model training

- Diverse training datasets:
  - Dormancy, emerging foliage, and full vegetation seasons
  - Various forest types (species, age, density)
  - Various background and lighting conditions
- >10000 annotated windthrows used for training
- >90% detection accuracy achieved and demonstrated



2.4 Automation and reporting

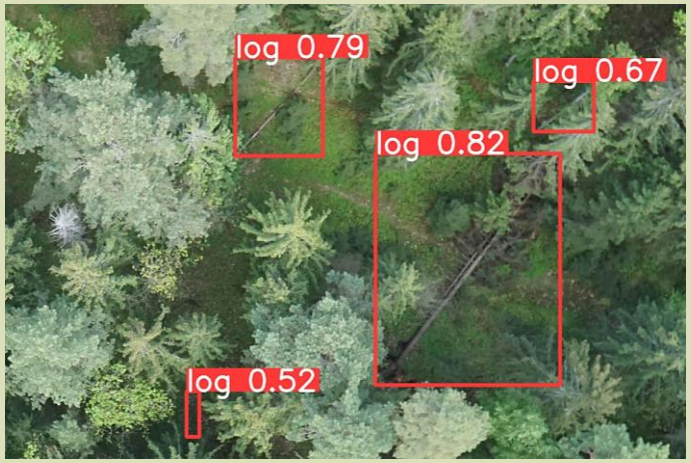
Efficient analytics pipeline and user-friendly reports

INPUT

Nadir RGB images of 1-3 cm/px GSD with GPS geolocation EXIF metadata

OUTPUT

GIS point vector layer with windthrow locations and attributes as well as statistics



Images with indicated windthrow detections for illustration

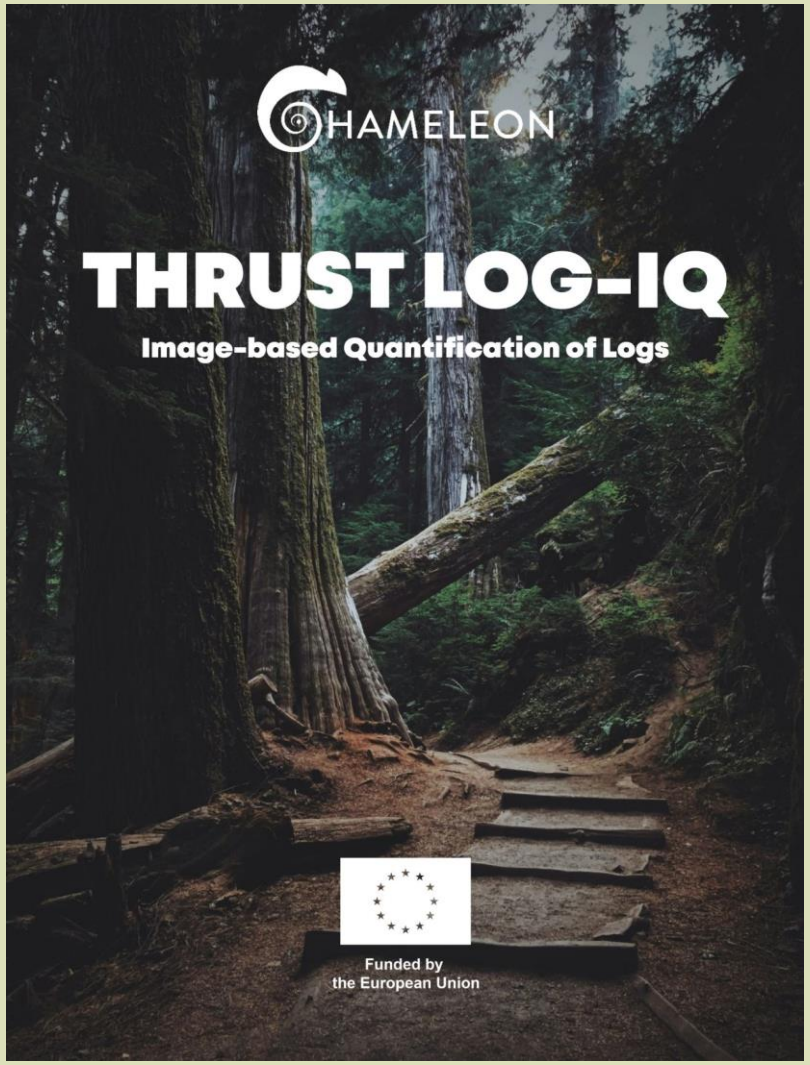
Dissemination and Exploitation

Applications and value proposition

3.1 Application potential

Value-added of high-efficiency large-scale windthrow detection

- ✓ **Improved Accessibility:** Quickly clearing roads and pathways for safe access.
- ✓ **Enhanced Emergency Response:** Facilitating timely action in emergency situations.
- ✓ **Personnel Safety:** Protecting field teams by identifying hazards in advance remotely.
- ✓ **Forest Conservation:** Supporting the maintenance and preservation of healthy forest ecosystems.



CHAMELEON

Thank you for your attention!
Do you have any questions?

THRUST
INTELLIGENT UAV SYSTEMS

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