

Internship presentation

Tree object detection using airborne images and LiDAR point clouds

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Section 1

Introduction

Goal of the internship

- Diagram RGB + LiDAR \rightarrow DL model \rightarrow bounding boxes around trees

Additional goals

- Find all trees, including covered trees

Additional goals

- Find all trees, including covered trees
- Extract more information from the point cloud than its surface

Section 2

State-of-the-art

YOLOv8 model

- Architecture

YOLOv8 model

- Architecture
- Results and performance

AMF GD YOLOv8

- Architecture

NEON dataset

- Creation process

NEON dataset

- Creation process
- Example images

Section 3

My dataset of trees

Data available in the Netherlands

- Point cloud

Data available in the Netherlands

- Point cloud
- RGB images

Data available in the Netherlands

- Point cloud
- RGB images
- CIR images

Data available in the Netherlands

- Point cloud
- RGB images
- CIR images
- Public trees

Class labels

- Tree

Class labels

- Tree
- Tree_LiDAR

Class labels

- Tree
- Tree_LiDAR
- Tree_RGB

Class labels

- Tree
- Tree_LiDAR
- Tree_RGB
- Tree_low_hard

Spatial extent

- Image with full dataset extent

Spatial extent

- Image with full dataset extent
- Replaced by image with annotated areas

Annotation material

- RGB images

Annotation material

- RGB images
- Point cloud from above, colored by height, on a given interval

Annotation material

- RGB images
- Point cloud from above, colored by height, on a given interval
- Point cloud in 3D

Annotation material

- RGB images
- Point cloud from above, colored by height, on a given interval
- Point cloud in 3D
- Google StreetView images

Temporal shift

- Cut trees

Temporal shift

- Cut trees
- New small trees

Temporal shift

- Cut trees
- New small trees
- Replaced trees

Location shift

- Images of all data types on the same coordinates

Section 4

Experiments

Section 5

Results

Section 6

Potential future improvements

Section 7

Conclusion