



A web platform for forest point cloud processing algorithms

a 3DForEcoTech COST Action initiative

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2nd GEOBENCH Workshop, Krakow, Poland | 23-24 October 2023

This presentation is based upon work from COST Action 3DForEcoTech CA20118, supported by COST (European Cooperation in Science and Technology).

Motivation

- Plenty of point cloud processing solutions has been developed to process forest point clouds
- Multiple solutions for the same problem available



➡ How to help a user to **speed up the search** for a solution?

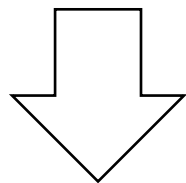
➡ How to help a user to choose **the “right” solution** (= the best for the user’s needs)?



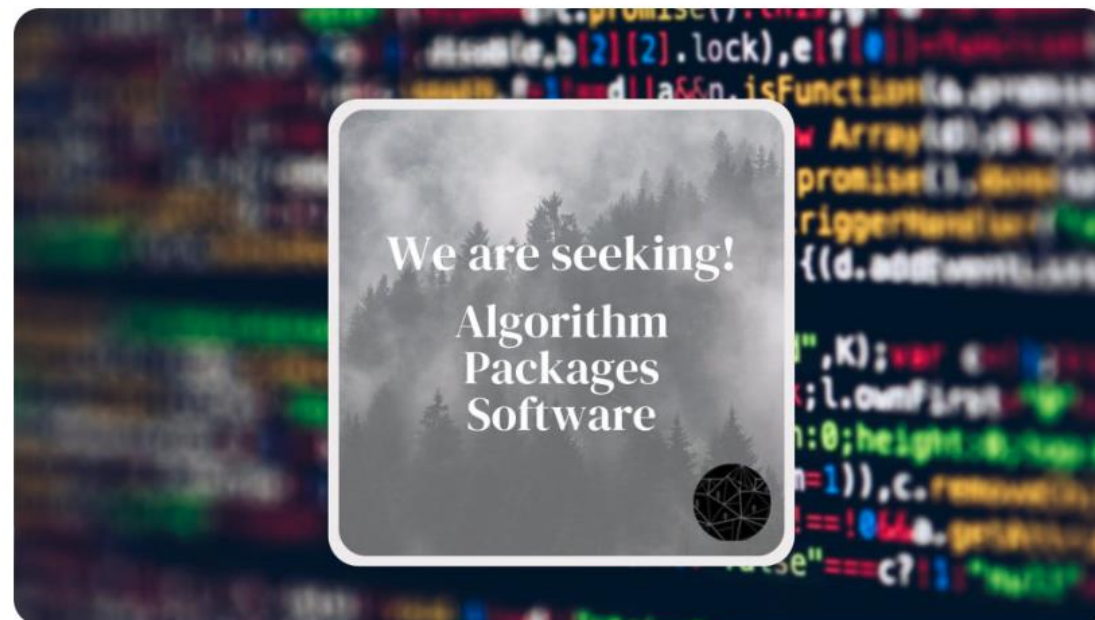
← NEWS

We are seeking! Algorithm Package Software

Within the 3DForEcoTech COST Action www.cost.eu/actions/CA20118, we want to create a workflow database of all solutions for processing detailed point clouds of forest ecosystems. If you are a developer, tester or user do not hesitate to submit the solution/algorithm [Here](#)



25 solutions identified and tested

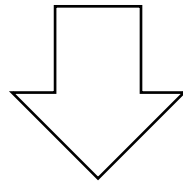




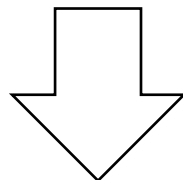
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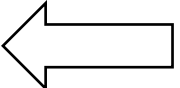


Web platform / database



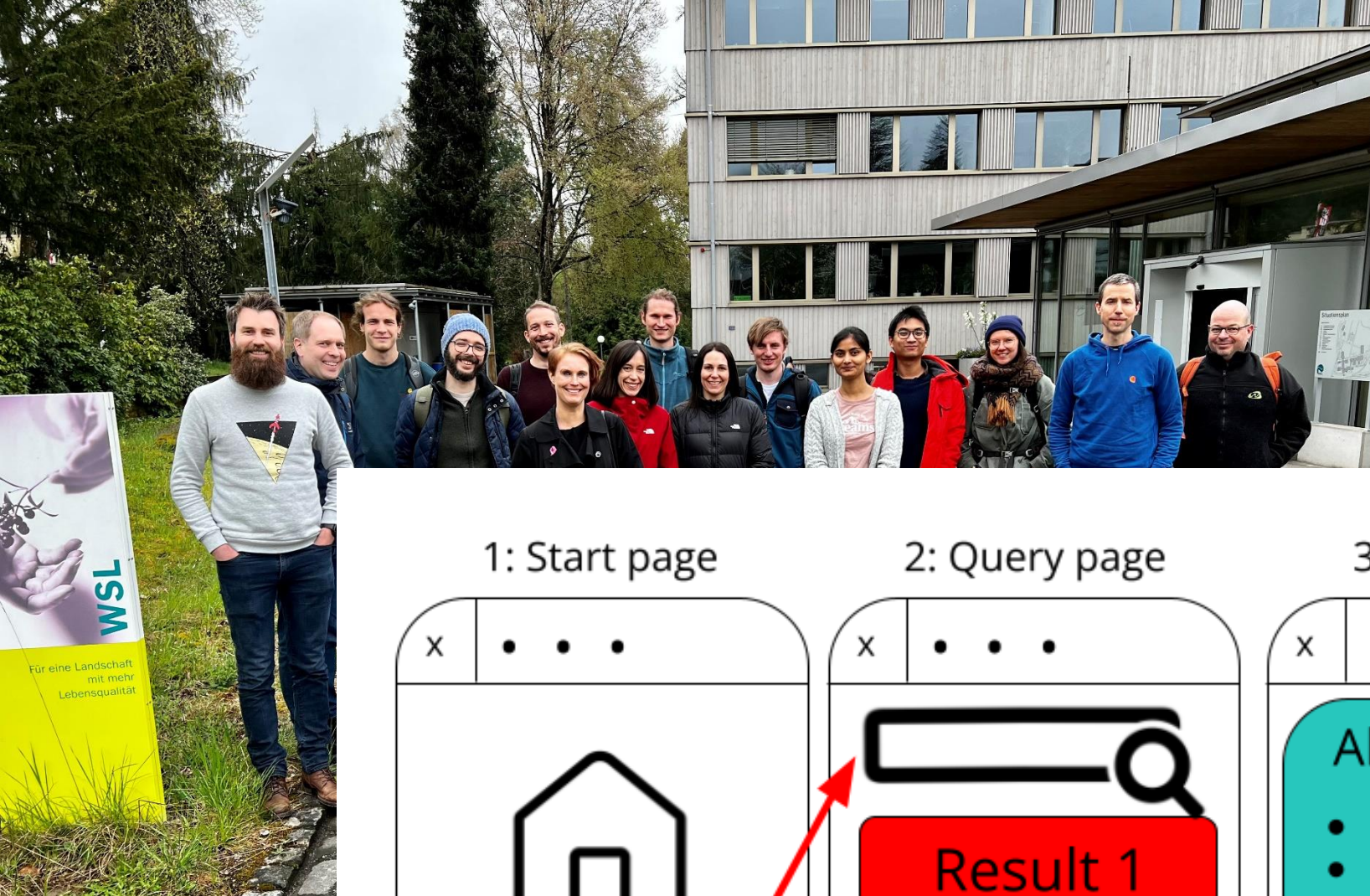
General idea of the platform

- A searchable database
- Dynamic / extendable (updates, new solutions, ...)
- Installation guides and issue reports
- Performance measures for helping to choose the "right" algorithm (performance, processing time, ...)
- Feedback from users
- Use-friendly

 **Hackathon!**

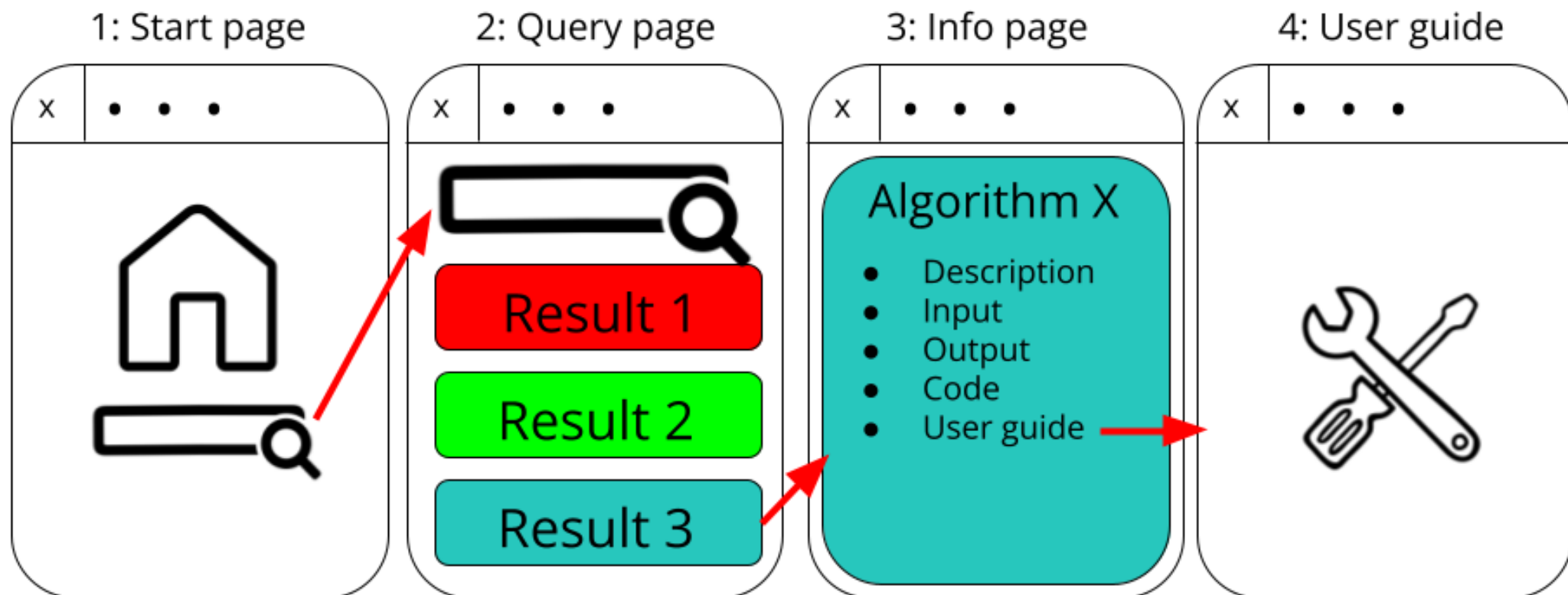


WG1 and WG3 recap
WSL, Switzerland
April 2023



Recap WG1 and WG3
WSL, Switzerland
April 2023

Prototype of the web platform





POINTCLOUD TECHNOLOGY

- ☐ TLS single scan
- ☐ TLS multiscan (single file)
- ☐ Mobile LS
- ☐ SfM pointclouds

INPUT FORMAT

- ☐ .Las / .Laz
- ☐ Other
- ☐ Batch processing (multiple files)

APPLICABILITY

- ☐ Plot level
- ☐ Tree level

PRE-PROCESSING

- ☐ Data fusion
- ☐ DTM
- ☐ Height normalization
- ☐ Voxelization

OUTPUT PARAMETERS

- ☐ Individual tree detection
- ☐ DBH
- ☐ Diameters along stem
- ☐ Tree Height
- ☐ Trunk Volume
- ☐ Leaf-wood classification
- ☐ LAI
- ☐ QSM
- ☐ Crown Parameters
- ☐ Total leaf area

Submit solution

rTLSDeep

Availability: Open-Source
Licence:
Implementation: R package

[KNOW MORE](#)

Forest-taxator

Availability: Open-Source
Licence:
Implementation: c++

[KNOW MORE](#)

TLS2trees (fsct_lite)

Availability: Open-Source
Licence:
Implementation: Python

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Treetool

Availability: Open-Source
Licence: GPL-3
Implementation: Python

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3DFIN

Availability:
Licence:
Implementation:

[KNOW MORE](#)

dendrocloud

Availability: Open-Source

Feedback

Brycefrank/Allometric

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Availability: Open-Source
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FSCT

Availability: Open-Source
Licence:
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TLSeparation

Availability: Open-Source
Licence: MIT
Implementation: Python

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LiDAR 360

Availability: Commercial-Software
Licence:
Implementation: Standalone

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3DForest

Availability: Open-Source



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☐ TLS single scan

Performance measures

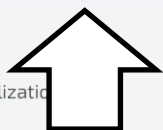
- accuracy



- processing time



- ...

☐ Data fusion☐ DTM☐ Height normalization☐ Voxelization

Hackathon

(selected solutions only!)

☐ Trunk Volume☐ Leaf-wood classification☐ LAI☐ QSM☐ Crown Parameters☐ Total leaf area

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← DATABASE

FSCT

Main specifications

Pointcloud technology: TLS single scan, TLS multiscan (single file), Mobile LS, SfM pointclouds
Input format: .Las / .Laz, Batch processing (multiple files)
Pre-processing: DTM, Height normalization
Output parameters: Individual tree detection, DBH, Diameters along stem, Tree Height, Trunk Volume, Stem segmentation

Information and availability

Availability: Open-Source
Licence:
Implementation: Python
Owner/Author contact: sean.krisanski@utas.edu.au

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Subjective assessment

Settings: Very good
Ease of use: Very good
Usability: Good

3DForEcoTech

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Usability: Good

FSCT (Forest Structure Complexity Tool)

URL: <https://github.com/SKrisanski/FSCT>

Date: 18 September 2022

Author: Sean krisanski

Description: this tool was developed to do automatic plot scale measurements from high resolution data such as Terrestrial Laser Scanner (TLS), Mobile Laser Scanner (MLS), Terrestrial Photogrammetry, above or below canopy UAS photogrammetry or similar. The segmentation with Aerial Laser scanning (ALS) is still at border line. There is one thing to notice is if the point cloud is not with high resolution, then the segmentation model will label the stems as vegetation points.

The output of this tool is presented at the YouTube channel:

<https://youtu.be/rej5Bu57AqM>

1. Installation: the installation process is very easy, however you might encountered with a few errors based on the configuration of you computer. The instructions will also work for the Windows 10 with 16 GB or 32 GB RAM but the processing time will vary between 7 to 8 hrs. if you are processing point cloud data of 2 GB size. However, the basic setup for this tool is as below:

FSCT Public

main 1 branch 0 tags

Go to file Add file <> Code

SKrisanski Update README.md 68e2f1e on Sep 18, 2022 157 commits

data	Fix training script.	last year
model	.	2 years ago
readme_images	Added semantic segmentation training tools. Note: Work in progress.	2 years ago
scripts	Bug fix	10 months ago
tools	.	2 years ago
.gitignore	.	10 months ago
LICENSE	.	2 years ago
README.md	Update README.md	10 months ago
requirements.txt	Fix requirements	last year
setup.py	.	2 years ago

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or m.mokros@ucl.ac.uk

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