

Output definition of the SimpleTree results

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1. Output description detailed

The detailed output files contain an entry row per cylinder. It contains the following fields:

- **branch_ID:** a unique ID per detected branch, -1 for the stem
- **branch_order:** the branch order in classical forestry sense, 0 for stem
- **segment_ID:** each cylinder belongs to a segment, the tree part between two neighboring branch junction. Each segment has a unique ID. Inside a segment the cylinders are ordered. The first segment is the closest to the root following the tree structure.
- **parent_segment_ID:** the unique ID of the parent segment of the cylinder's segment. topology information.
- **growth_volume:** the growth volume of a cylinder is the volume of the cylinder + the growth_volume of its children. The growthvolume of a root cylinder is the total tree volume and the growthvolume of a tip cylinder is the cylinder's volume.
- **growth_length:** same as the growth volume, just replaces the volume with the length in its definition
- **detection:** contains information of the detection type. Sphrefollowing is the SimpleTree method, Attractor depicts that the cylinders are detected with the method described in [1]
- **improvement:** RANSAC depicts that the cylinder is a "true" measurement, i.e. the cylinder fitting routine has been accepted and the cylinder was not statistical corrected.
- **startX:** the cylinder's start point x
- **startY:** the cylinder's start point y
- **startZ:** the cylinder's start point z
- **endX:** the cylinder's end point x
- **endY:** the cylinder's end point y
- **endZ:** the cylinder's end point z
- **radius:** the cylinder radius
- **length:** the cylinder length

- species: the species of the tree, is unknown_species as no detection is implemented
- ID: the name of the input point cloud. Derived from plot cloud's name if plot is processed
- length_to_leave: the longest path to a leave from the cylinder
- inverse_branch_order: All tip segments are initiated with 1, the other segments receive the max value of their children + 1.
- length_of_segment: the distance between the cylinders' segment start point and end point
- branch_order_cum: All tip segments are set to 1. A parent segment has as inverse branch order the sum of its children. For example a segment having to tip child segments will receive here a value of 2. See river networks
- cylinder_ID: a unique ID per cylinder
- cylinder_parent_ID: a direct link to the next cylinder in direction of the root
- reverse_pipe_order: All tip segments are set to 1. A parent segment has as inverse branch order the root of the sum of its squared childrens' reverse_pipe_order. For example a segment having to tip child segments will receive here a value of 1.41.
- Allometric_improved: Stating if the cylinder has been statistical corrected
- length_to_root: the length of the path to the root

2. Output description detailed

There is also one file generated for the plot level data. It contains one entry per tree:

- ID: the ID also given in the detailed file, e.g. the file name
- volume: the total volume of the tree
- length: the length of the stem
- height: the height of the tree
- DBH: the diameter at breast height derived from the stem cylinder with start point lower 1.3m and end point above 1.3m
- DBH_taper_linear: a DBH derived from a linear taper function. Should only be used if the cut above the DTM is above 1.3m (no cylinder exists for the previous mentioned DBH)
- cut_height: the height above ground where the QSM starts
- x_position: the x coordinate of the tree position
- y_position: the y coordinate of the tree position

References

- [1] J. F. Côté, R. a. Fournier, R. Egli, An architectural model of trees to estimate forest structural attributes using terrestrial LiDAR, *Environmental Modelling and Software* 26 (2011) 761–777.