Algorithm on extraction of trees in voxel-space from terrestrial laser scans

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We introduce an algorithm for automatic processing of registered terrestrial laser scans aiming at tree detection as well as estimation of stem diameters and tree heights. Sensor positions and the nominal point spacing of the scans are used as parameters to calculate local point densities in voxel data structure. Voxels of high point density are assumed to represent stem surface and selected as seeds for 3D region growing resulting in individual tree models and a set of classified stem points. Stem diameters are estimated upon circle fitting in consecutive heights combined with linear regression in order to smooth stem profiles. The algorithm was demonstrated on laser scanner data captured in an uneven-aged mixed stand.