

Aboveground Biomass Estimation of Northern Hardwood Forest Using UAS Lidar

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October 30, 2023

Abstract

Above-ground biomass (AGB) is one of the key features of understanding forests. Thanks to lidar's ability to observe the structural characteristics of forests, much research has successfully estimated AGB over diverse forests using airborne lidar (light detection and ranging) data. However, a limited number of studies have focused on the AGB of hardwood forests, which include more complex structural characteristics and require higher-quality lidar data. In this study, we explore the structural information derived from UAS (unoccupied aerial system) lidar data with high point density and estimate the AGB of a hardwood forest, the Martell Forest, Indiana, USA. Particularly, a deep learning-based approach by subplots is proposed in this paper to utilize high-dimensional information of UAS lidar data, considering conventional methods by plots showed the inability to fully exploit the potential of UAS lidar. The experimental results in this paper demonstrate that the UAS lidar data can be alternatively used to investigate hardwood forests in the northern USA.

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Keywords: above-ground biomass, lidar, unoccupied aerial system