

Estimating Forest Attributes from Spherical Images.

WANG Haozhou¹, John A. Kershaw

Basal area (BA), diameter at breast height (DBH), and tree height (HT) are the most popular attributes measured in forest inventories to describe forest structures and conditions. However, measuring these attributes requires different equipment, and, although these instruments are small and portable, using them in the field one by one is time consuming and labor intensive. What's more, traditionally these tools only record numeric digits and the only way means of verification is revisiting the exact measurement sites within the forest. Several studies show that digital cameras open opportunities to obtain permanent visual records which can be verified without revisiting forest and can provide traditional forest attributes. The recent development of consumer-grade spherical cameras shows the ability to rapidly and efficiently obtain full view of panorama from single exposures. In this study, BA, DBH, and HT attributes are obtained from spherical image pairs taken at different heights and post-processing using a custom-made open source image analyzing software package. The geometry and algorithm are derived based on manual selection of tree key points (tree base, tree tip, tree trunk edges) on spherical images in the software. The photo measured attributes are compared with field inventory records to evaluate the feasibility of this method. Our current results show good similarity with traditional field measured data. Although manual processing of images is required indoors, the technique saves considerable field time. Also, automatic image processing could be developed in the future.

¹ Presenting Author