**INDIVIDUAL TREE MEASUREMENT IN TROPICAL ENVIRONMENT USING TERRESTRIAL LASER SCANNING**

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**ABSTRACT:** Detailed forest inventory and mensuration of individual trees have drawn attention of research society mainly to support sustainable forest management. This study aims at estimating individual tree attributes from high density point cloud obtained using terrestrial laser scanner (TLS). The point clouds were obtained over single reference tree and group of trees in forest area. The reference tree is treated as benchmark since detailed measurements of branch diameter were made on selected branches with different sizes and locations. Diameter at breast height (DBH) was measured for trees in forest. Furthermore tree height, height to crown base, crown volume and tree branch volume were also estimated for each tree. Branch diameter is estimated directly from the point clouds based on three fitting models i.e. sphere, ellipse and cylinder. Tree branch volume is estimated based on the volume of the fitted models. Tree height and height to crown base are computed using histogram analysis of the point clouds elevation. Tree crown volume is estimated by fitting a convex-hull on the tree crown. The results show that the Root Mean Squared Error (RMSE) of the estimated tree branch diameter does not have a specific trend with branch sizes and number of points used for fitting process. This explains complicated distribution of point clouds over the branches. Overall cylinder model produces good results with most branch sizes and number of point clouds for fitting. The cylinder fitting approach shows significantly better estimation results compared to sphere and ellipse fitting models.