Modeling Forest Attributes using Airborne Laser Scanning: A Meta-analysis

The accurate estimation of the tree attributes, including crown cover, crown density, diameter at breast height (dbh), height, and biomass are important as they are commonly used to update inventory information, test research hypotheses, explore management options, and write silvicultural prescription.. Although traditional methods of measuring trees and stand level variables are more accurate, they are time consuming and tedious, and are difficult to measure in inaccessible areas. With the advent of new remote sensing technologies, such LiDAR (Light Detection And Ranging) and high resolution imageries, it allowed us to capture three-dimensional information of forest vegetation. The integration of LiDAR technology makes the process of measurement of tree and forest attributes more efficient which helps in the informed decision-making process and the sustainable management of forest resources. This research aims to review and analyze scientific papers that used various airborne laser scanning technologies (unmanned aerial vehicle, airborne, and spaceborne) to estimate forest and individual tree attributes. For this process, the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol will be applied to find and extract studies of our interest and subsequently analyze the information contained within them. This study will focus on the applied methods which include remote sensing datasets and Modeling techniques used, and their accuracy. The methodology used in this study will be able to compare and contrast the methods and approaches of LiDAR metrics vs radar or passive optical satellite data and, the accuracy of models derived from airborne laser scanning technologies to estimate various tree and forest level attributes.