Lidar Remote Sensing of Forest

Spatial Analysis and Remote Sensing Lab
Sierra Nevada Research Institute, School of Engineering, UC Merced

Lidar

Lidar is an active remote sensing technology that measures properties of scattered light to find range and/or other information of a distant object. Lidar gives us the ability to generate 3-dimensional data with high spatial resolution and accuracy (Figure 1).

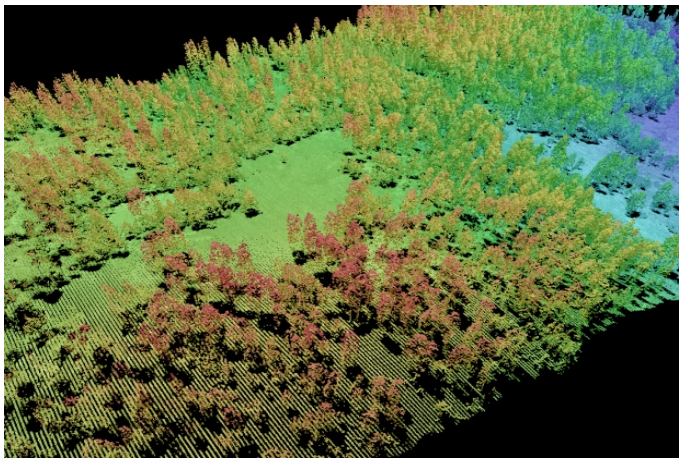

Figure 1: Lidar point cloud

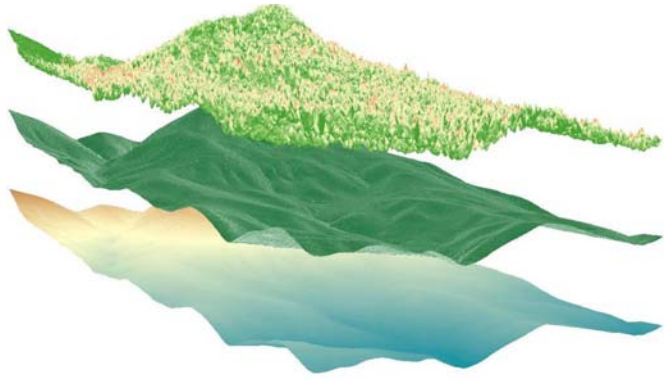

Figure 2: Top to bottom - CHM, DSM, DEM

Lidar Products

Products derived from the Lidar data include the Digital Elevation Model (DEM) and the Digital Surface Model (DSM). Subtracting DEM from DSM yields the Canopy Height Model (CHM) (Figure 2).

Forest Features from Lidar

Our lab has been developing novel algorithms to extract forest features from Lidar, including plot-level parameters such as mean tree height, canopy cover, canopy base height, and DBH (Figure 3), individual tree (Figure 4), and forest visualization (Figure 5). This information can be used in a range of forest and ecological research such as carbon/biomass management, biological conservation, fire hazards.

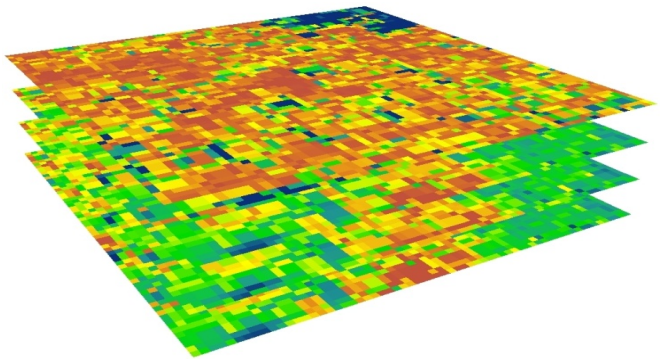

Figure 3: Top to bottom - canopy cover, mean height, canopy base height, DBH

Figure 4: Individual tree detection from Lidar point cloud

Figure 5: Forest visualization based on individual tree detection from Lidar

For more information, contact Prof. Qinghua Guo at qguo@ucmerced.edu. This project is funded by NSF, USFS, and DWR.