Forest Parameter Retrieval and Estimating Potential Growth Area by using Unmanned Aerial Vehicle (UAV) Observed Remotely Sensed Data

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Estimating forest biophysical parameters through remotely sensed methods, e.g. Satellite information, gives high attention to various people including foresters and policy makers. Despite the convenience of satellite data, there are issues of utilizing them for precise estimations of forest information, regarding to cloud covers (optical data), rugged terrains and wetness (Synthetic Aperture Radar) and resolution. Methods for accurately measuring biophysical parameters are a key component for quantitative evaluation regarding to various forest applications. Recently, cases are being reported with the utilization of Unmanned Aerial Vehicles (UAVs) for the observation of forests for various studies, including forest parameter extraction. Here we also challenge and focus on utilizing the use of UAV for observing the forest area and to analyze the collected data for estimating the individual tree parameters including tree heights and Diameter at Breast Height (DBH) at the Japanese cypress planted forests. Furthermore, from the estimations made from the UAV observation, additional process is taken to compute the individual stem volume. Sample plots was generated at 10m×10m square using systematic sampling method, then the stem volume per unit area was calculated within each sample plots. This information was used as a training data and it was processed with various environmental factors to estimate the potential site productivity of the study area. The potential growth area was estimated with the Maximum Entropy (MaxEnt) method and the probability distribution was computed. The classes was divided into 9 category from <200 m^3/ha up to >900 m^3/ha in a 100 m^3/ha interval. The approach has shown that there are potentials for estimating forest parameter and the site productivity by utilizing UAVs even at a dense forested area with heterogeneous microtopography.

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