

WHICH ARE THE NEAREST NEIGHBORS IN K-NN-BASED ALS INVENTORIES

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Technical Commission VII Symposium 2010

KEY WORDS: Forestry, Estimation, Detection, Feature, Laser scanning, Accuracy

ABSTRACT:

In distance-based estimation methods such as k nearest neighbours (k-nn) or k-means, the similarity between the target object and the reference data objects is measured with distances determined in the auxiliary data space. In the case of remote sensing-aided forest inventory, these auxiliary data are nowadays often derived from Airborne Laser Scanning (ALS). The good correlation between this new type of data and forest variables has greatly improved the estimation results compared with medium resolution satellite imagery or aerial photographs. Thus, in the case of k-nn, the ALS-based features guide the nearest neighbour selection to those that are similar to the target stand also in reality. One can, however, ask: "Which are the real nearest neighbours of a forest stand?" In the case of forests, this is not self-evident. There is an endless amount of combinations of stand densities, development stages, tree species distributions, site types etc. The user makes one kind of decision of the most important variables defining similarity in real-life when selecting parameters for the estimation process via cross-validation; one may e.g. put more weight on the success of estimation of stand volume than that of tree species detection. In this study, we took a closer look at the characteristics of the nearest neighbours selected for forest stands based on Euclidean distances calculated from ALS features, aerial photograph features, a combination of these two data sources, and actual field variables.

TOPIC: Lidar and laser scanning

ALTERNATIVE TOPIC: Remote sensing applications