Characteristics of manual and automatically tree species classification in mixed forest (Yamagata University Research Forest)

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A low degree of knowledge combined with a complex structure of mixed forests is the reason why researchers still investigate in mixed forest research for getting a deeper understanding. Especially mixed forests in Japan are influenced by the characteristically relief and the climate conditions. There is a high demand on accurate information about tree species of mixed forests. This high demand requires accurate investigation possibilities included by an easier access to the needed information's (Fritz, 2013). Methods to get accurate information on a large scale with easy access to the desired information are needed. Previous studies show the applicability of drones for forest applications (Torresan et. al, 2016). Images taken with a drone offer new methods to get information of forests like distribution, health condition or automatically classifications of tree species. For example, Onishi & Ise (2018) reached accuracies of up to 90 %. But these studies also illustrated that there are limitations and gaps in knowledge for the applicability of using UAV. Especially, a lot of those high accuracies were reached in forest plantations. There is a need of more detailed information about how to get more accurate information in real forests by using drones (Michez et al., 2016).

The Yamagata Research Forest offers the opportunity to study mixed forests with different conditions in different parts of the forest for doing automatically classifications of tree species. Till now two study sites were defined and image were taken with a camera detecting the visual spectrum of the light. Also, images were taken during different seasons (summer and autumn). After taking the images they needed to be processed. A first step is to generate orthomosaics by merging the images using Photoscan from Agisoft. As a result, DEMs, orthomosaics and 3D models were generated and can be further analyzed. In the next step the segmentation and classification of tree species should be done in an object-based way using feature information of the trees. After processing the images, it should be possible to create a model for deep machine learning which will be able to do the classification on its own.

During the last year the first image taking took place in different seasons in the Yamagata University Research Forest. Also, the image processing with Photoscan was finished. The first images were analyzed manually to check how it is possible to separate tree species automatically. To find out what are the important factors for doing automatically classification is the actual research status. Further, the presentation handles the comparison of manually and automatically ways for doing separations in this research. The results will be first approaches to do automatically classification/separations of tree species.

Literature:

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