Generating Cadastral Maps from Aerial Photos of Rural Areas

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SUMMARY

In the field of image processing, various image processing methods have been used to extract objects or boundaries in images. Before 2012, problems were usually solved by image processing, but after that, they started to solve problems using deep learning, and in particular, using deep learning methods specialized for images such as CNN (Convolutional Neural Network). Recently, more complex deep learning methods have been used to produce excellent results close to the intended ones. However, due to the complex nature of geospatial objects and obstacles such as moving objects or shadows etc., extraction of objects or semantic segmentation in images is usually not satisfactory. And there are few studies using deep learning in the cadastral field. In this study, a cadastral map was automatically created using a conditional GAN (Generative Adversarial Network), a deep neural network model, based on images acquired from airborne in rural areas, and the cadastral maps were classified and compared by category. Resnet and UNET were used to increase the computational efficiency of conditional GAN. The images used for processing are 33674 pieces of training data and 8419 pieces of test data set, with a total of about 42093 images. The study area includes Bucheon, Seongnam, Yeoju, Icheon, and Pyeongtaek, which are near the Seoul metropolitan area. The training used cadastral maps and images acquired from the airborne and generated trained model. The trained model create a cadastral map from the image dataset. The results were evaluated based on structural similarity (SSIM) and show that the AI based image segmentation is superior to other image processing results.

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