

Toward Large Scale Cadastral Mapping with Deep Learning: A Benchmark Dataset

Jeroen Grift (Netherlands), Claudio Persello (Italy) and Mila Koeva (Bulgaria)

Key words: Cadastre; Digital cadastre; Land management; Remote sensing; deep learning

SUMMARY

Approximately 70-75% of people worldwide have no access to a formal registration of land rights. This so-called land tenure gap could negatively impact essential developments and is therefore incorporated into several sustainable development goals of the United Nations. Fit-for-purpose land administration is a concept that focuses on closing this land tenure gap by concentrating on visible cadastral boundaries and the delineation of these boundaries by using remote sensing data. State-of-the-art studies that extracted visible cadastral boundaries automatically with remote sensing data are mainly based on deep learning. This technique is used to learn complex patterns by feeding large sets of training samples to so-called neural networks. In these studies, however, the full potential of deep learning was not utilized because of the small datasets used and the absence of studies on the transferability of the trained models to different geographical areas. To partly solve these limitations, we think creating a benchmark dataset for cadastral mapping is essential. We present a dataset that contains visible/non-visible cadastral reference data and imagery with a spatial resolution ranging from 0.1m to 10m. The cadastral reference data will be compared with topographic data to extract these boundaries' physical nature automatically. By overlapping these sources, several boundary statistics could be derived, such as the number of visible cadastral boundaries and the type of visible cadastral boundaries (ditch, road, hedge, etc.). This benchmark dataset could contribute to new developments in cadastral boundary delineation and could, in the future, be extended with imagery and cadastral reference data from other geographical regions.

Toward Large Scale Cadastral Mapping with Deep Learning: A Benchmark Dataset (12326)
Jeroen Grift (Netherlands), Claudio Persello (Italy) and Mila Koeva (Bulgaria)

FIG Commission 7 & 2 Annual Meeting 2023
Digital Transformation for Responsible Land Administration
Deventer, the Netherlands, 2–4 October 2023