

Automatic Detection of Building, Surface Area, and Roof Type in UAV Imagery Using Deep Learning

Saugat Nepal, Sagar Raj Giri, Dinesh Lamichhane, Ganesh Lamichhane and Sachit Baral (Nepal)

Key words: Informal settlements; Land management; Photogrammetry; Spatial planning; Urban renewal; Building Footprint; UAV Images; Object-Based Segmentation; Deep Learning

SUMMARY

The availability of high-resolution remote sensing images and the advancement of computer vision applications have shifted the automatic extraction of building footprints to the next level. So, automatic detection and segmentation of buildings have become essential in many computer vision applications. It has been one of the major research areas, which is in trend nowadays. Identifying regions in an aerial image and levelling them into different classes is challenging. Getting a high-resolution hyperspectral image is costly, so we introduced a low-cost high-resolution image to extract the building footprint. For this, we used UAV for image acquisition. The obtained image is then processed and fed to the model. We have used a CNN model for the segmentation of the building footprint. The accuracy of the segmentation model is 97.17% in training data with a loss of 7.75%, val_loss of 17.50% and val_accuracy of 93.86%. After the detection of buildings, the data aids in various aspects and underscores the importance of building detection and its applications across multiple fields such as urban planning and development, disaster management, environmental monitoring, real estate and property management, security and surveillance, technological innovation, and public health by providing essential data for efficient decision-making and planning.

Automatic Detection of Building, Surface Area, and Roof Type in UAV Imagery Using Deep Learning (12930)
Saugat Nepal, Sagar Raj Giri, Dinesh Lamichhane, Ganesh Lamichhane and Sachit Baral (Nepal)

FIG Regional Conference 2024 - Nepal

Climate Responsive Land Governance and Disaster Resilience: Safeguarding Land Rights

Kathmandu, Nepal, 14–16 November 2024