Building Extraction in High Resolution Satellite Imagery Using Deep Learning

Muhammad Shoaib[1], S Ghuffar[1],

[1]*"Department of Space Science, Institute of Space Technology, Islamabad, 44000, Pakistan"*

Abstract

From the past few years deep learning is the hot topic in the field of remote sensing and computer vision. In the field of remote sensing deep learning is used in many key areas such as automatically detecting objects from the satellite imagery such as building, road networks and forests etc. In this paper our main focus is to extract the buildings from high resolution images. Due to small data set we have used several data augmentation techniques such as random cropping, flipping and rotation images to improve the accuracy of the model. In this paper we use a U-Net type fully convolutional network for segmentation of the buildings from satellite imagery. We have trained our model using high resolution satellite imagery of Islamabad, which is taken from GeoEye-1 satellite. The training is performed using the open source Pytorch machine learning library. The results show that the U-Net type model achieves the F1 score of around 0.85 with an average Kappa value of 0.8 for the test area.

Keywords: Deep Learning, Remote Sensing and GISc, Building Extraction, U-Net, Data Augmentation
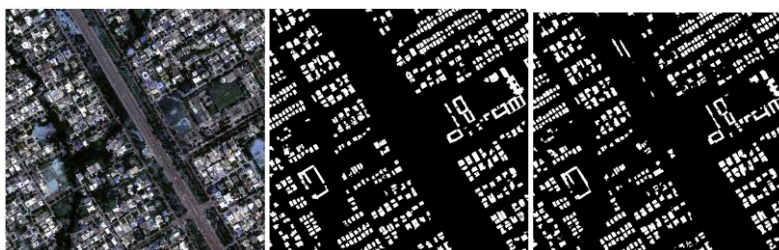
Figure 1. From left to Right Original Image, Ground Truth, Predicted Image

Figure 2. From left to Right Zoomed Original Image, Zoomed Ground Truth, Zoomed Predicted Image

[1] Corresponding Author: Muhammad Shoaib
ORCID:
Email address: hafiz.shoaib2022@gmail.com
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