

## Deep Supervision Based-Unet to Detect Buildings Changes from VHR Aerial Imagery

**Authors :** Shima Holail, Tamer Saleh, Xiongwu Xiao

**Abstract :** Building change detection (BCD) from satellite imagery is an essential topic in urbanization monitoring, agricultural land management, and updating geospatial databases. Recently, methods for detecting changes based on deep learning have made significant progress and impressive results. However, it has the problem of being insensitive to changes in buildings with complex spectral differences, and the features being extracted are not discriminatory enough, resulting in incomplete buildings and irregular boundaries. To overcome these problems, we propose a dual Siamese network based on the Unet model with the addition of a deep supervision strategy (DS) in this paper. This network consists of a backbone (encoder) based on ImageNet pre-training, a fusion block, and feature pyramid networks (FPN) to enhance the step-by-step information of the changing regions and obtain a more accurate BCD map. To train the proposed method, we created a new dataset (EGY-BCD) of high-resolution and multi-temporal aerial images captured over New Cairo in Egypt to detect building changes for this purpose. The experimental results showed that the proposed method is effective and performs well with the EGY-BCD dataset regarding the overall accuracy, F1-score, and mIoU, which were 91.6 %, 80.1 %, and 73.5 %, respectively.

**Keywords :** building change detection, deep supervision, semantic segmentation, EGY-BCD dataset

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