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Multi-resolution Networks for Ship Detection in Infrared Remote Sensing Images☆

Min Zhou[a], Minhao Jing[a], Dunge Liu[b], Zhenghuan Xia[b,*], Zhengxia Zou[a,**], Zhenwei Shi[a,**]

[a]*Image Processing Center, School of Astronautics, Beihang University, Beijing 100191, PR China*
[b]*State Key Laboratory of Space-Ground Integrated Information TechnologyBeijing 100191, PR China*

Abstract

Ship detection is a hot point of remote sensing image processing and analysis. Most current methods merely utilize a single resolution image and cannot take full advantage of registered multi-resolution images. In this paper, we proposed a novel ship detection method for multi-resolution infrared remote sensing images based on convolutional neural networks. With a specially designed layer of various size kernels, our net takes in registered multi-resolution images simultaneously, extracting more robust features and gives a more accurate detection result. Besides, as ship targets only occupy a few pixels in an infrared remote sensing image, to handle the extreme background-foreground imbalance problem in infrared remote sensing images, we introduce the focal loss to train our net. Compared with classical methods, experiments on visible bands and infrared bands of Landsat-8 satellite images demonstrate the effectiveness of our method.

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*Corresponding author: State Key Laboratory of Space-Ground Integrated Information TechnologyBeijing 100191, PR China. Tel: +86 010 68197493; Fax: +86 010 68197492.

**Corresponding author: Image Processing Center, School of Astronautics, Beihang University, Beijing 100191, PR China. Tel: +86 010 82339520; Fax: +86 010 82338798.

Email addresses: maxwell_xia@126.com (Zhenghuan Xia), zhengxiazou@buaa.edu.cn (Zhengxia Zou), shizhenwei@buaa.edu.cn (Zhenwei Shi)

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