



**UNDERGRADUATE THESIS**

**INTEGRATION OF BDCN-UNET AND OBIA FOR  
MULTISENSOR COASTLINE EXTRACTION ON  
THE ISLAND OF JAVA**

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2026**

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## STATEMENT OF ORIGINALITY

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Hereby declares that this undergraduate thesis contains no part of any other scientific work that has been submitted to obtain an academic degree at any higher education institution. Furthermore, it does not contain any work or opinions previously written or published by others, except for those which are explicitly cited in this thesis and listed completely in references.

And I declare that this scientific document is free from elements of plagiarism. If in the future indications of plagiarism are found in this Thesis, I am willing to accept sanctions in accordance with the applicable laws and regulations.

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## ABSTRACT

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As an archipelago, Indonesia has a long and dynamic coastline, making it vulnerable to changes caused by both natural factors and human activities. The diversity of coastal characteristics, particularly on the island of Java, renders conventional monitoring methods ineffective, necessitating a more adaptive approach. This study utilizes multisensor remote sensing data from Sentinel-1 (SAR) and Sentinel-2 (optical) across several coastal regions of Java. The research stages include preprocessing, reprojection, normalization, data fusion, image patching, labeling, and the division of training and test data. The method used is BDCN-UNet, with a testing scenario comparing the UNet model, BDCN-UNet, and BDCN-UNet with OBIA as post-processing on SAR, optical, and multisensor data. The results show that BDCN-UNet with OBIA delivers the best performance, with an average improvement of 0.3–0.5% in F1-score and IoU, and a reduction in RMSE of 0.2–0.6 m compared to without OBIA. The best performance was achieved on multisensor (Fusion) data with an F1-score of 93.48%, an IoU of 96.35%, and an RMSE of 5.15 m, followed by Sentinel-1 and Sentinel-2 data. These results indicate that the integration of OBIA improves segmentation quality by enhancing the connectivity of the coastline, while the use of multisensor data yields the most optimal results in coastline extraction.

**Keywords:** BDCN-UNet, OBIA, Multisensor, Coastline, Java Island

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Surabaya, June 08, 2026

Author,



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