UNDERGRADUATE THESIS

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

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APPROVAL SHEET

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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.

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ABSTRACT

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Thesis Title	:	Integration of BDCN-UNet and OBIA for Multisensor Coastline Extraction On the Island of Java
Advisors	:	1. Dr. Faisal Muttaqin, S.Kom., M.T 2. Fetty Tri Anggraeny, S.Kom., M.Kom.

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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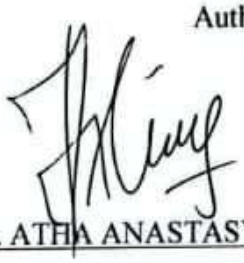
The author acknowledges that this thesis is far from perfect and is not without its shortcomings, both in terms of structure and content. Therefore, the author sincerely welcomes constructive criticism and suggestions from all parties as a basis for evaluation and improvement in the future. In closing, despite all its limitations, the author hopes this thesis can provide benefits and broaden the readers' knowledge, particularly in the field related to this research. May this thesis serve as a meaningful contribution to the advancement of knowledge and future research.

Surabaya, June 08, 2026

Author,



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