



UNDERGRADUATE THESIS

DESIGN AND CONSTRUCTION OF AN INFORMATION SYSTEM FOR MONITORING VEGETATION DENSITY AND CONDITION BASED ON GOOGLE EARTH ENGINE USING MULTI-SPECTRAL VEGETATION INDICES OF LANDSAT 8 COLLECTION 2 IMAGERY IN SURABAYA

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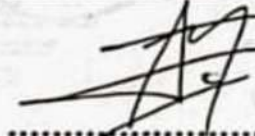
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STATEMENT OF ORIGINALITY

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Hereby declares that this thesis does not contain any part of another scholarly work that has been submitted to obtain an academic degree at any higher-education institution. Furthermore, this thesis does not contain any work or opinion previously written or published by another person, except where expressly cited within this thesis and fully listed in the bibliography.

I further declare that this scholarly work is free from any element of plagiarism. Should any indication of plagiarism be found in this thesis at a later date, I am prepared to accept sanctions in accordance with the prevailing laws and regulations.

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ABSTRACT

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Thesis Title : Design and Construction of an Information System
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Green open spaces play an important role ecologically, socially, aesthetically, and economically in supporting the quality of the urban environment; however, monitoring their condition in the City of Surabaya still requires an efficient, spatial-data-driven approach. This study aims to design and develop a vegetation monitoring information system based on Google Earth Engine (GEE) capable of identifying the role and influence of vegetation indices on urban environmental conditions. The system was developed using the Waterfall method, leveraging Landsat 8 Collection 2 satellite imagery from the 2020–2025 period, which was processed through six spectral vegetation indices NDVI, EVI, MSAVI2, NDMI, GNDVI, and NBR to measure vegetation density, chlorophyll content, canopy moisture, and vegetation stress levels. The results show that the system successfully presents vegetation-index visualizations as a cloud-based interactive map equipped with layer selection, interpretation legends, and index-value information, classifying vegetation density into low, medium, and high categories across the City of Surabaya. This system can serve as a decision-support and evaluation tool for the management of urban green spaces in a more effective and efficient manner, without requiring high-specification hardware.

Keywords: Vegetation Index, Google Earth Engine, Landsat 8, NDVI, Remote Sensing, Vegetation Monitoring, Geographic Information System.

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Surabaya, June 30, 2026

M. Mushthafainal Akhyar Myzandeo

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