Mohamad Khalif

Portfolio

GEODETIC ENGINEER

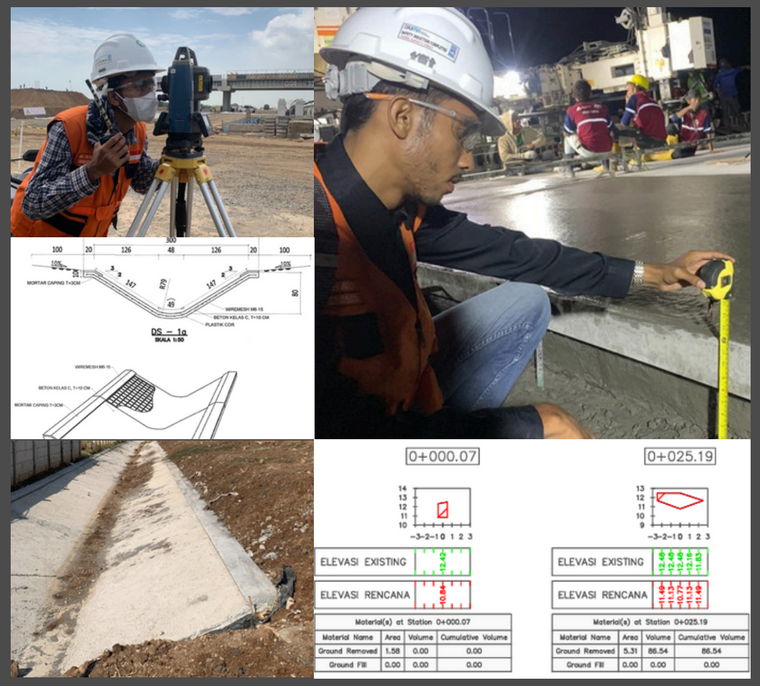
Introduction

I'm a Geodetic Engineering fresh graduate, a little mix between a researcher and a field practitioner. I'm quite adaptive, can work independently but also enjoy teamwork. I love problem-solving, critical thinking, and paying attention to details is really important for me. I'm also the type who's open to feedback and learns new things quickly — whether it's tools, workflow, or project challenges. I have experience in several academic and field projects. I'm very interested in terrestrial surveying, remote sensing, and cloud-based data platforms like Google Earth Engine to create interactive web-based maps. Besides that, I'm also interested in AI/ML, especially in geospatial analysis. During college, I've been involved in various projects such as terrestrial surveys, hydrography, aerial mapping, and of course remote sensing as my favorite field. During my internship in the Probowangi Toll Road project, I handled staking out points and land volume calculations for cut-and-fill analysis based on field coordinates.

Throughout my academic journey, I'm quite fluent in using geospatial software such as ArcMap, QGIS, and ENVI. Coding is also an important part of my work: Python, PGAdmin, Java (Google Earth Engine), and MATLAB are my daily tools. I have used TensorFlow & Keras to build vegetation classification models from high-resolution satellite imagery, and in my thesis, I successfully analyzed and created a multitemporal aerosol distribution map of Jakarta (2021–2024) using Sentinel and MATLAB. My friends usually call me "the vibe coder" — because I love exploring new things and finding ways to blend geospatial science, remote sensing, and AI/ML into impactful solutions.

PT. Virama Karya (Probowangi Toll Road Package 1)

During this internship, I served as a surveyor assistant, responsible for staking out the Top Subgrade, Lean Concrete, and Rigid Pavement to ensure precise alignment with the planned coordinates and elevations.
In my final internship report, I performed land volume calculations using long and cross-section maps to identify cut and fill areas based on the marking coordinates.



PTSL (Pendaftaran Tanah Sistematis Lengkap) Lamongan, Kec. Solokuro

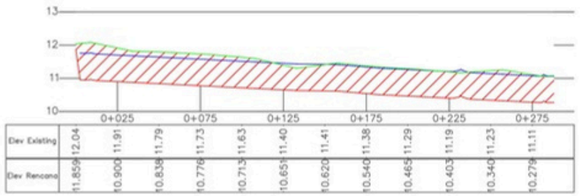
In this experience, I was given the opportunity to participate in the PTSL program with a project to map several village boundaries with local residents and determine and supervise the installation of ICP (Independent Control Point) markers for photography from a UAV.

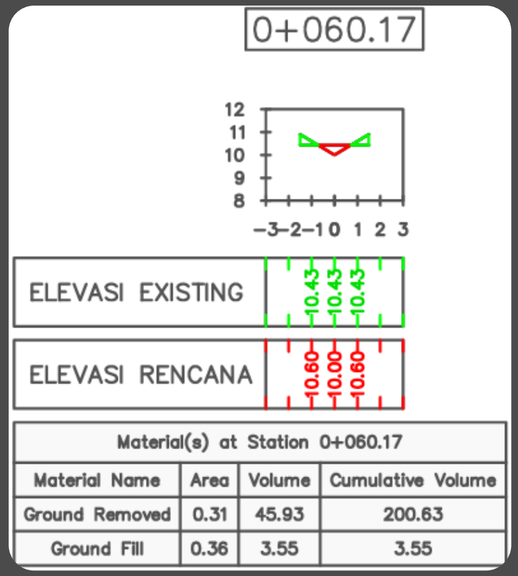
BPN (Badan Pertanahan Nasional) Malang City

At the BPN Office, I also had a hybrid experience in filling out the SU (Measurement Letter) and validating the coordinates of the land location on the provided WEB.

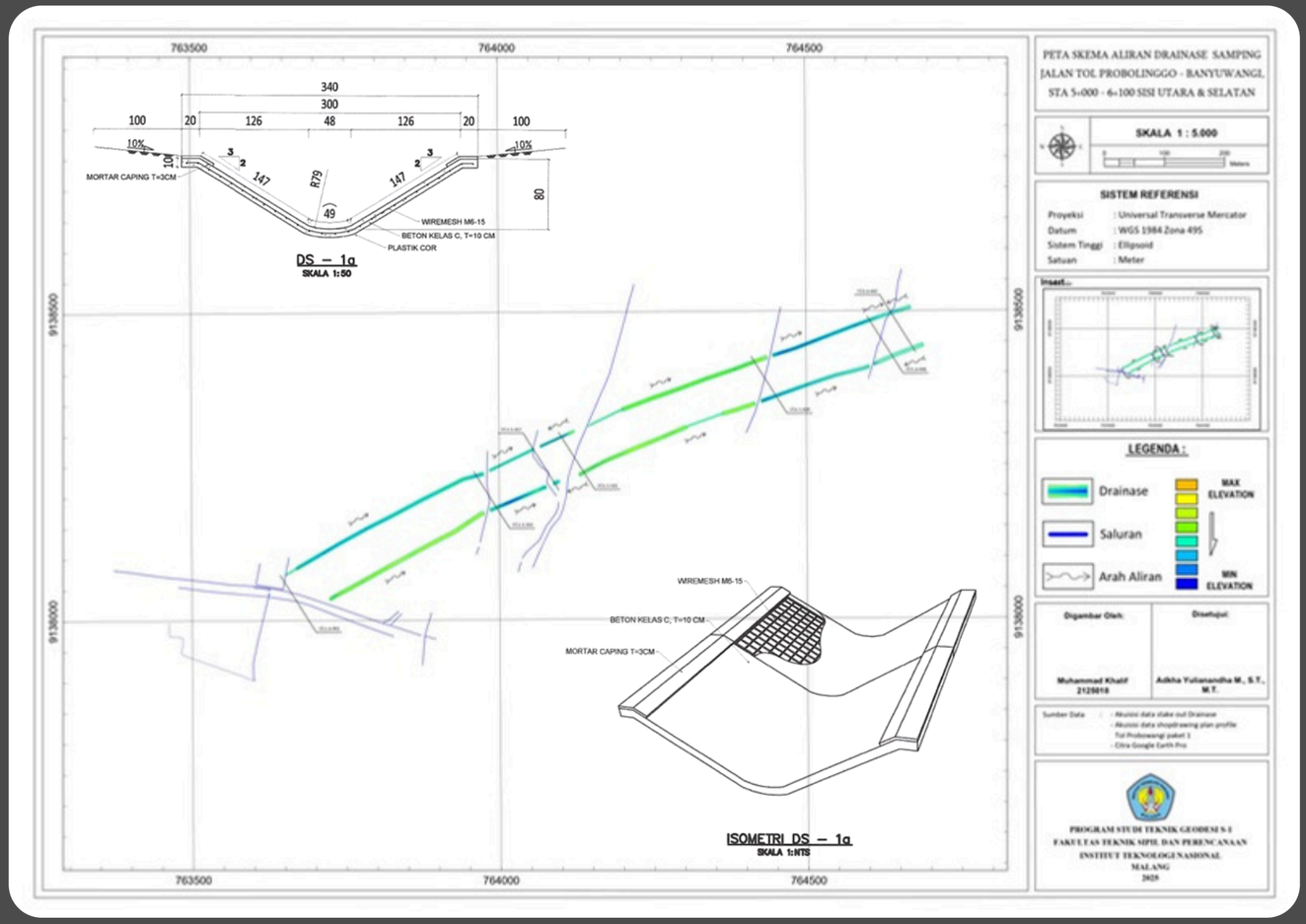
Cut & Fill Project

Station	Cut Area (Sq.m.)	Cut Volume (Cu.m.)	Reusable Volume (Cu.m.)	Fill Area (Sq.m.)	Fill Volume (Cu.m.)	Cum. Cut Vol. (Cu.m.)	Cum. Reusable Vol. (Cu.m.)	Cum. Fill Vol. (Cu.m.)	Cum. Net Vol. (Cu.m.)
0+000.066	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+025.185	5.31	86.54	86.54	0.00	0.00	86.54	86.54	0.00	86.54
0+050.459	5.74	139.75	139.75	0.00	0.00	226.29	226.29	0.00	226.29
0+075.521	6.30	150.93	150.93	0.00	0.00	377.22	377.22	0.00	377.22
0+100.979	6.03	156.95	156.95	0.00	0.00	534.17	534.17	0.00	534.17
0+126.201	5.68	147.67	147.67	0.00	0.00	681.84	681.84	0.00	681.84
0+151.428	5.81	144.97	144.97	0.00	0.00	826.81	826.81	0.00	826.81
0+176.657	5.47	142.40	142.40	0.00	0.00	969.21	969.21	0.00	969.21
0+201.874	5.34	136.32	136.32	0.00	0.00	1105.53	1105.53	0.00	1105.53
0+227.099	5.29	134.00	134.00	0.00	0.00	1239.53	1239.53	0.00	1239.53
0+252.103	5.13	130.27	130.27	0.00	0.00	1369.80	1369.80	0.00	1369.80
0+277.549	5.13	130.58	130.58	0.00	0.00	1500.38	1500.38	0.00	1500.38
0+302.767	4.88	126.20	126.20	0.00	0.00	1626.58	1626.58	0.00	1626.58





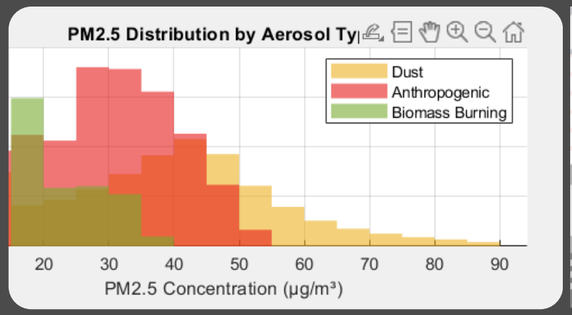
Material(s) at Station 0+060.17			
Material Name	Area	Volume	Cumulative Volume
Ground Removed	0.31	45.93	200.63
Ground Fill	0.36	3.55	3.55

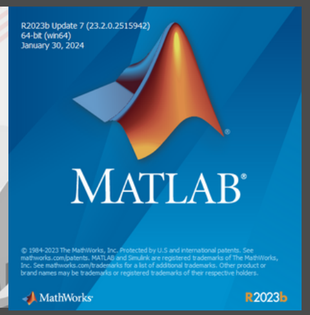


Terrestrial Survey Strategy for Determining Cut and Fill Volumes of Side Drainage in the Planning

This study aims to design a terrestrial survey strategy to support the calculation of cut and fill volumes for side drainage channels in the Probowangi Toll Road construction project, specifically at STA 5+000 – 6+000. The approach utilizes existing elevation data and planned drainage design data to analyze elevation differences between the current ground surface and the proposed drainage channel design. This calculation is essential to ensure optimal earthwork balance, improve drainage flow efficiency, and support a sustainable and cost-effective construction process.

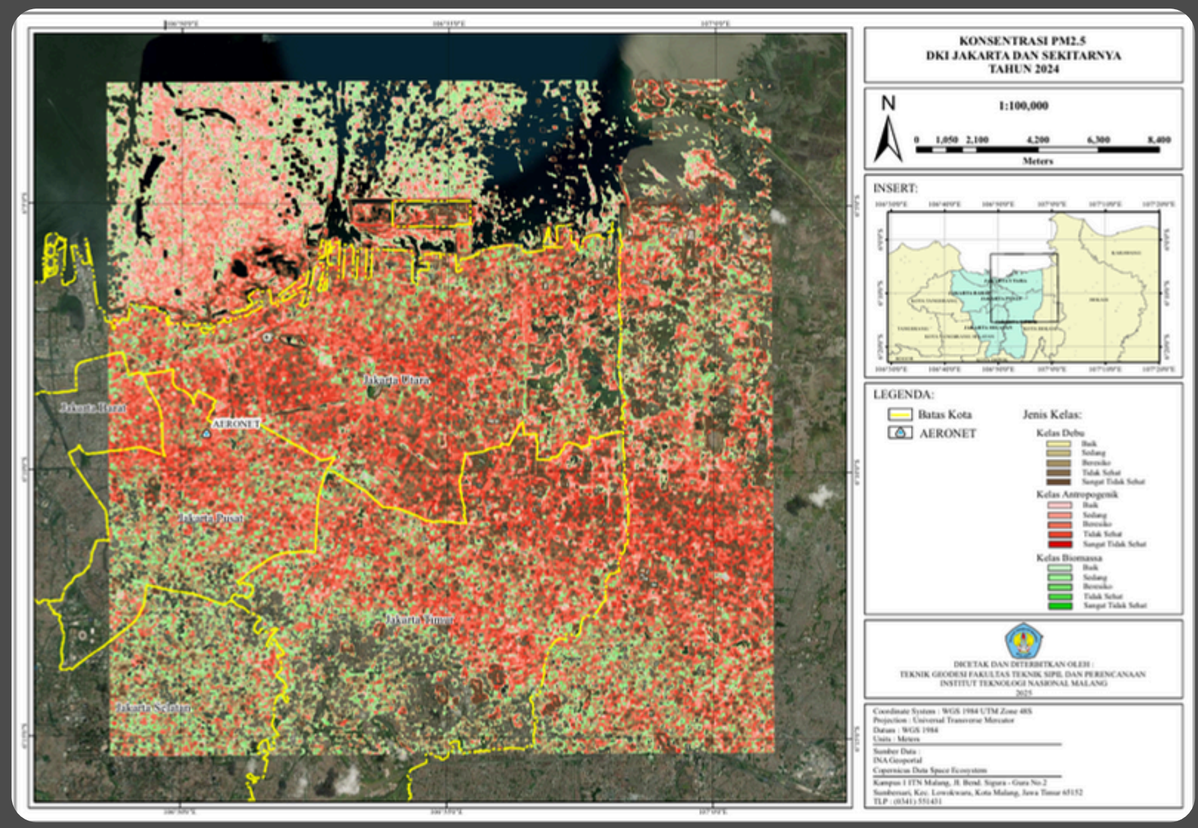
Recent Studies





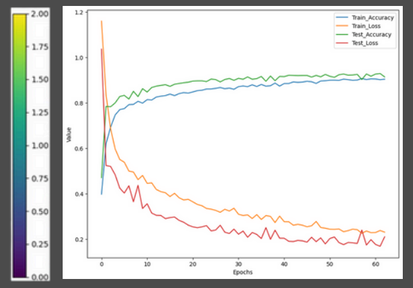
Analysis of PM2.5 Main Component Concentration Using Multitemporal Satellite Imagery and AERONET Data

This research focused on the Jakarta Metropolitan Area (DKI Jakarta and surroundings) and analyzed the concentration of PM2.5 using multi-temporal satellite data from Sentinel-2A and Landsat-8 OLI. The study applied several atmospheric analysis methods, including the Dispersion Coefficient (DC), Ångström Exponent (AE), and Normalized Gradient Aerosol Index (NGAI) to estimate aerosol distribution and identify dominant particulate components. Validation was conducted using Aerosol Optical Depth (AOD) data from the AERONET BMKG Jakarta site to ensure model accuracy and reliability.

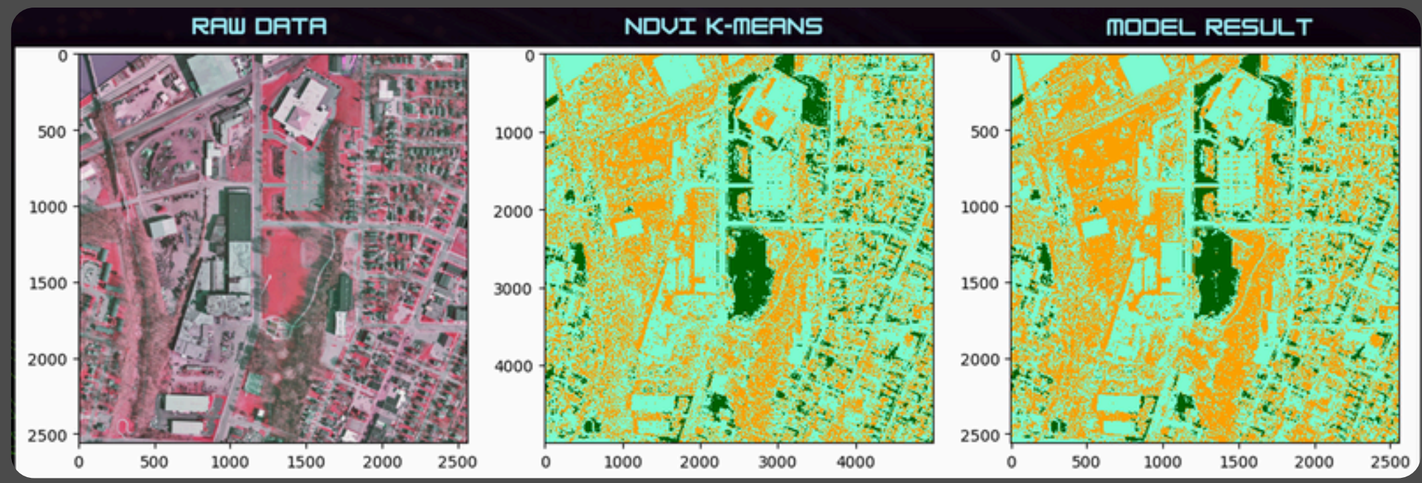


[Click here for More information about this project]

DeepLearn (AI)



	precision	recall	f1-score	support
0	0.96	0.89	0.92	938886
1	0.90	0.84	0.87	739332
2	0.82	0.95	0.88	1071984
3	0.98	0.87	0.92	395526
accuracy			0.89	3145728
macro avg	0.91	0.89	0.90	3145728
weighted avg	0.90	0.89	0.89	3145728

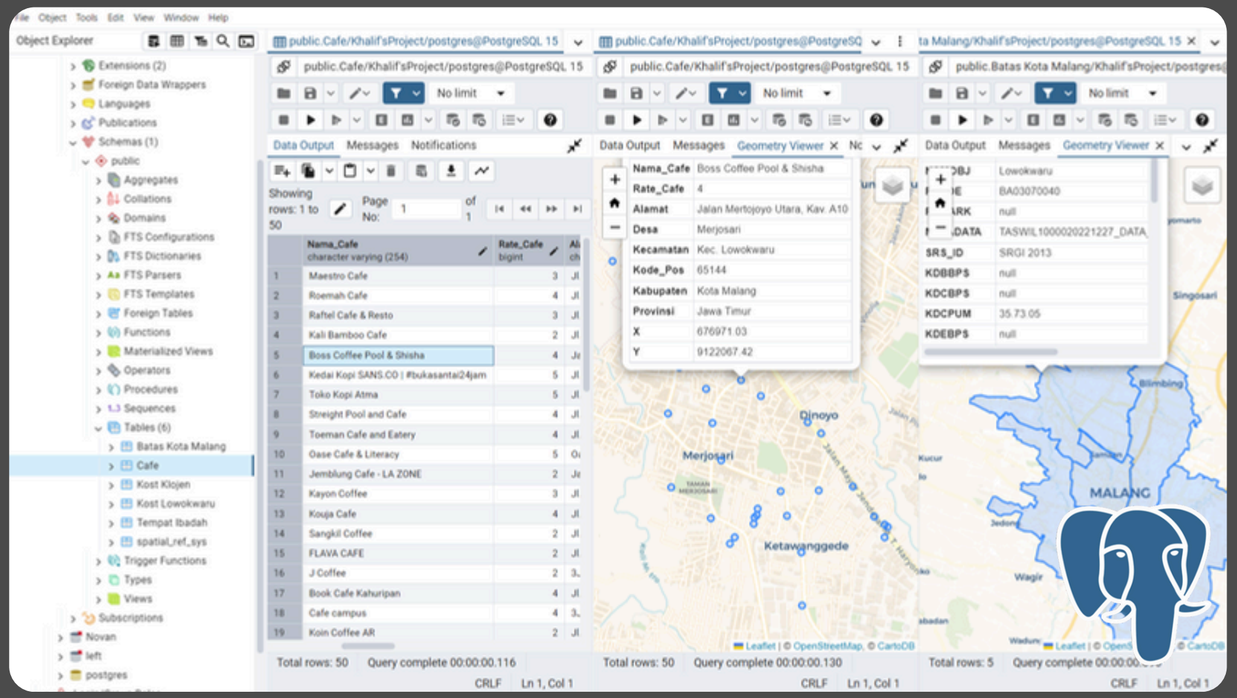


Built an NDVI-based K-Means classification model for vegetation analysis using TensorFlow and Keras.

This project focuses on leveraging remote sensing and machine learning to analyze vegetation patterns using high-resolution imagery. By applying the Convolutional Neural Networks (CNN) method, the project aims to classify and spatially map vegetation areas. The development was carried out using the Python programming language with support from libraries such as rasterio, matplotlib, numpy, pandas, scikit-image, and Pillow to facilitate raster processing, spatial visualization, and computational image feature analysis.

Click here for More information about this project

Web Map

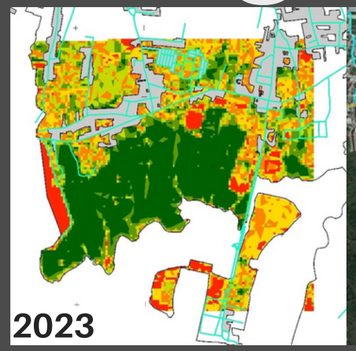


Integration of WebMap with PostgreSQL and GeoServer as the spatial database and server

This project focuses on developing an interactive web-based mapping system for managing and visualizing spatial data efficiently. The system integrates PostgreSQL as the main database, enhanced with the PostGIS extension to store and analyze geospatial data such as points, lines, and polygons. GeoServer is used to publish spatial data online through standard web services (WMS/WFS), allowing users to access, visualize, and interact with maps directly from the web without the need for specialized GIS software.

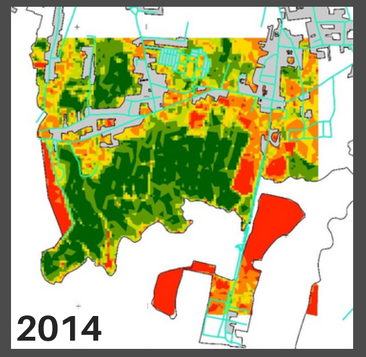
Click here for More information about this project

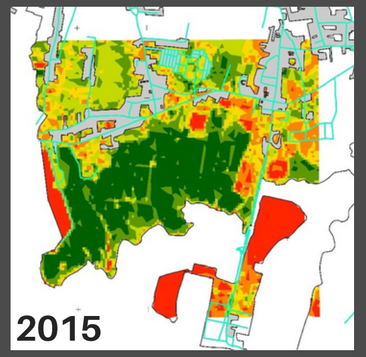
Mangrove Changes

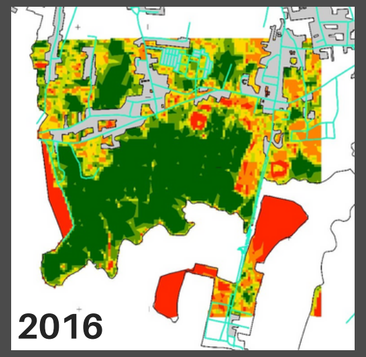


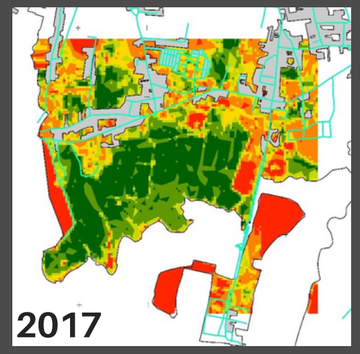
Mangrove Analysis using Google Earth Engine (Case Study: Pemogan, South Denpasar, Bali)

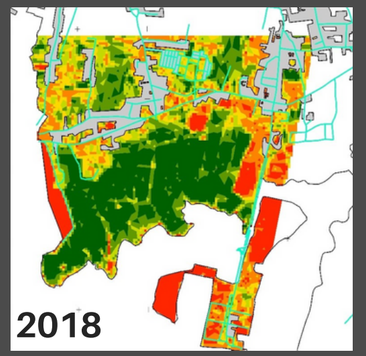
In this project, I analyzed mangrove vegetation changes from 2014 to 2023 using Google Earth Engine (GEE) and supporting GIS software. I started by collecting and processing multi-temporal satellite imagery (Landsat and Sentinel) through GEE, applying cloud masking, and calculating vegetation indices such as NDVI to measure mangrove density. The results were then exported, refined, and classified in ArcMap, including reclassification, raster-to-polygon conversion, and area calculation for each vegetation density class. To ensure accuracy, I compared the results between Landsat and Sentinel imagery and validated anomalies caused by cloud cover using alternative datasets from USGS Earth Explorer.

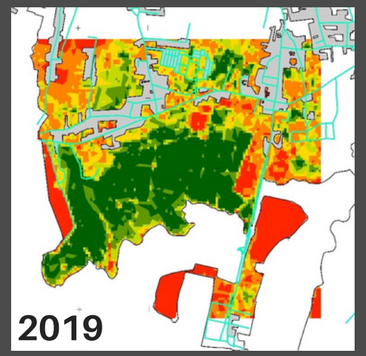


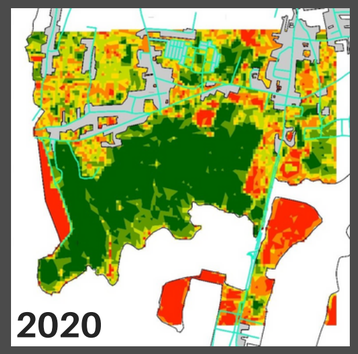


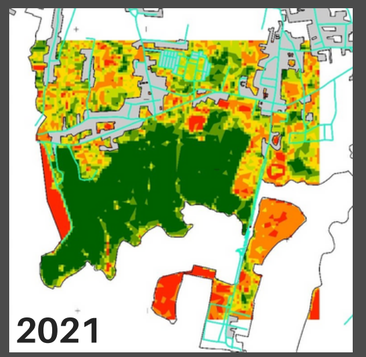


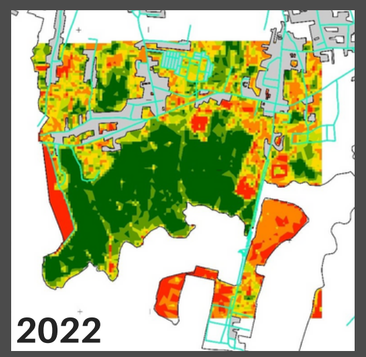






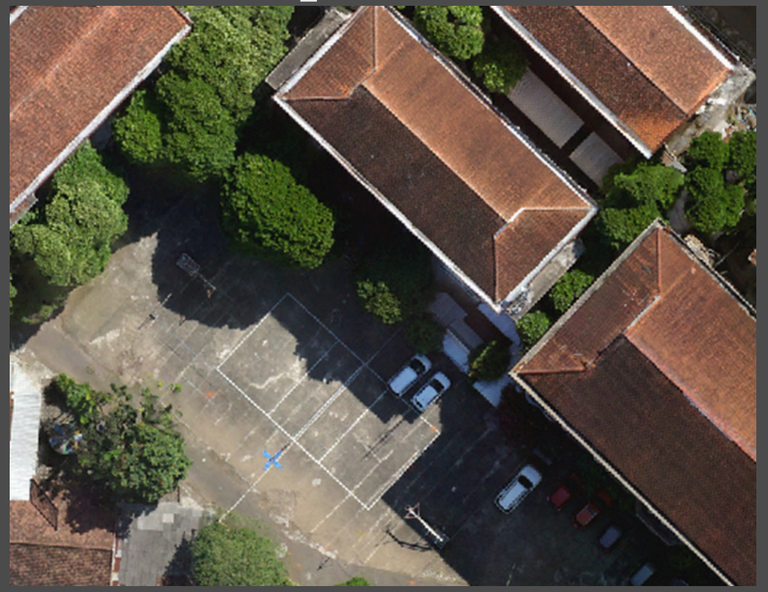






Click here for More information about this project

Orthophoto



AERIAL MAP
OF THE SUMBERSARI VILLAGE AREA
LOWOKWARU DISTRICT, MALANG CITY,
EAST JAVA, INDONESIA

Count	X error (m)	Y error (m)	Z error (m)	XY error (m)	Total (m)
4	0.113385	0.0392823	0.014451	0.119997	0.120864

Table 3. Control points RMSE.
X - Longitude, Y - Latitude, Z - Altitude.

Count	X error (m)	Y error (m)	Z error (m)	XY error (m)	Total (m)
5	0.208833	0.277197	0.938687	0.347059	1.00079

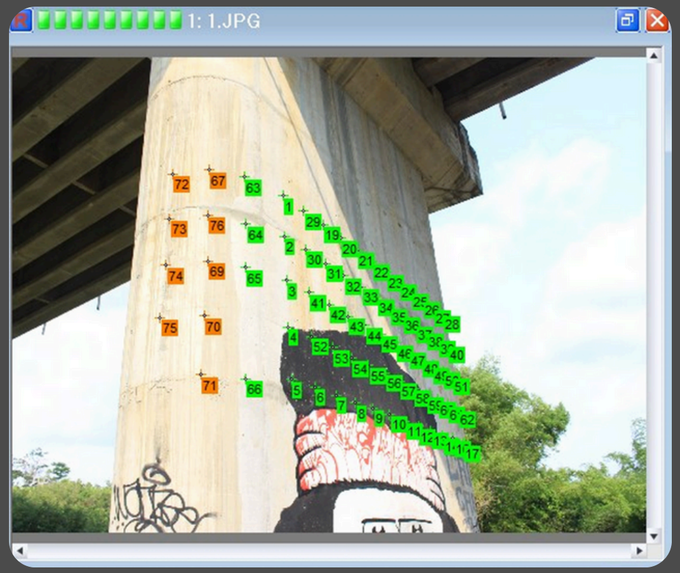
Table 4. Check points RMSE.

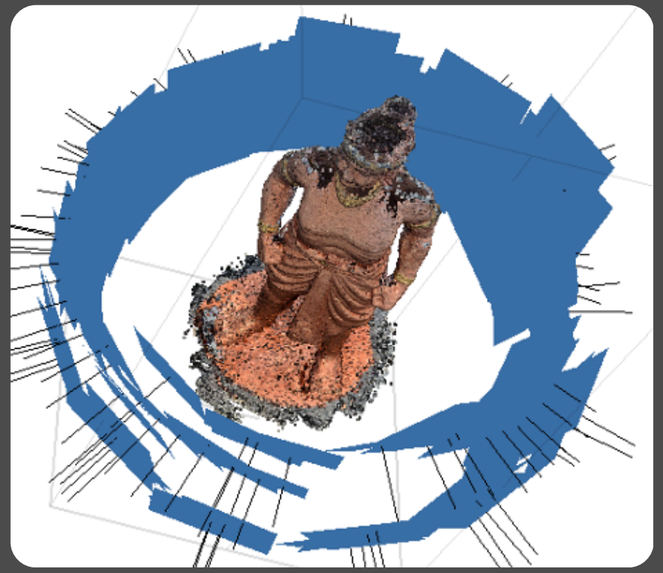
Aerial Mapping

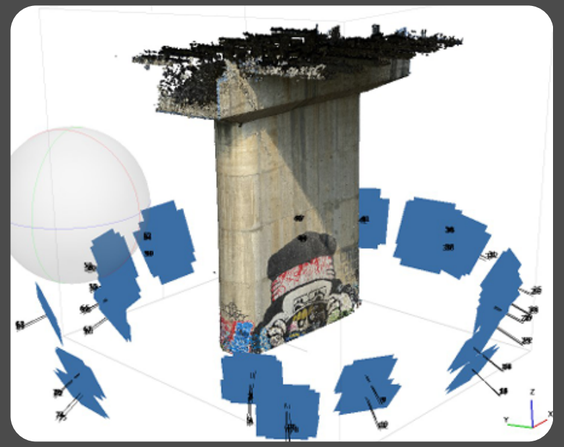
This project was carried out by a group in which I was responsible for data processing. It focuses on orthophoto generation using aerial imagery acquired from UAVs. The workflow involved the placement of Ground Control Points (GCPs) and Independent Control Points (ICPs) to ensure spatial accuracy. The process included photo alignment, dense cloud generation, mesh construction, and the creation of Digital Elevation Models (DEM) and orthomosaics for large-scale mapping. The final outputs achieved a ground resolution of 2.09 cm/pixel, with RMSE accuracy below 1 meter for both GCP and ICP validation.

Click here for More information about this project

3D Modelling







3D Model

This 3D modeling project utilized a smartphone camera with convergent image acquisition and was processed using Agisoft Metashape. The main purpose of this project is to monitor and analyze structural deformation over time, focusing on detecting potential damage, measuring positional or shape changes, and ensuring the safety and integrity of infrastructures such as bridges and monuments.

Click here for More information about this project

Certificate of Internship

SERTIFIKAT KERJA PRAKTIK

Diberikan Kepada :

Mohamad Khalif

MAHASISWA PROGRAM STUDI TEKNIK GEODESI S-1
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG
ATAS PARTISIPASI DALAM PEMBANGUNAN JALAN TOL
PROBOLINGGO - BANYUWANGI PAKET 1

Dalam kegiatan Kerja Praktik 2024 yang diselenggarakan pada
25 Juli 2024 - 25 September 2024
oleh PT. VIRAMA KARYA

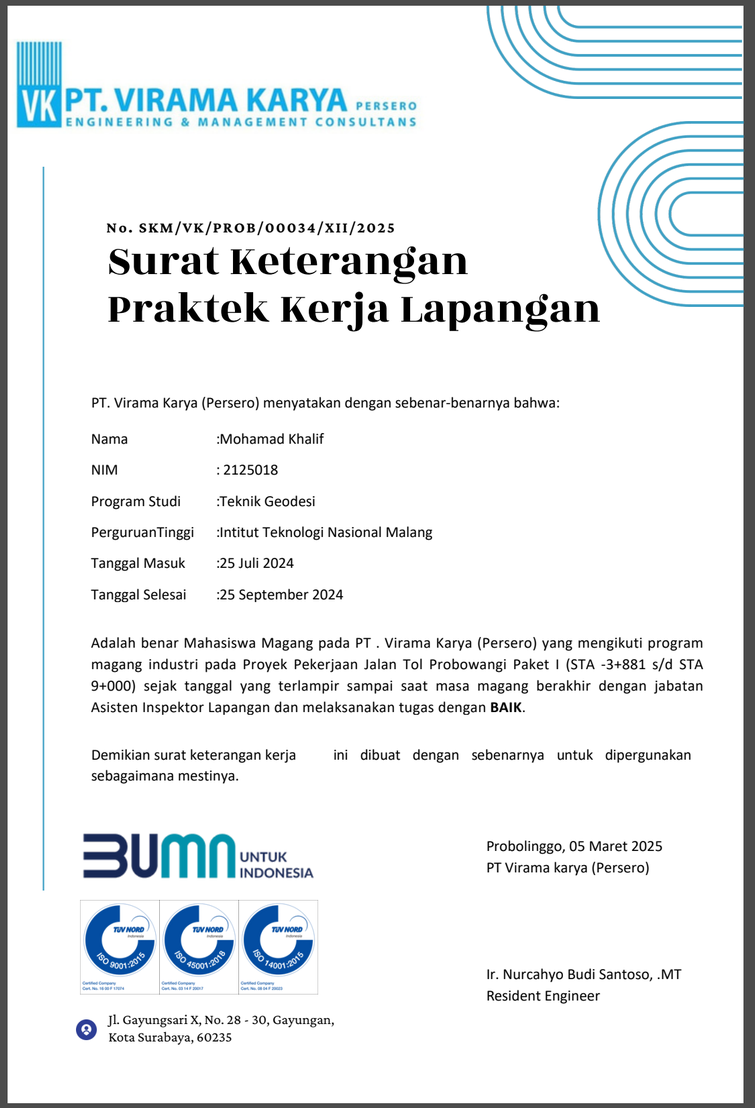
Mengetahui,

Ketua Program Studi
Teknik Geodesi

Ir. Dedy Kurnia Sunaryo, M.T.
NIP.Y.10330600413

RESIDENT ENGINEER

Ir. Nurcahyo Budi Santoso, M.T.



PT. VIRAMA KARYA PERSERO
ENGINEERING & MANAGEMENT CONSULTANS

No. SKM/VK/PROB/00034/XII/2025

Surat Keterangan Praktek Kerja Lapangan

PT. Virama Karya (Persero) menyatakan dengan sebenar-benarnya bahwa:

Nama	:Mohamad Khalif
NIM	: 2125018
Program Studi	:Teknik Geodesi
PerguruanTinggi	:Intitut Teknologi Nasional Malang
Tanggal Masuk	:25 Juli 2024
Tanggal Selesai	:25 September 2024

Adalah benar Mahasiswa Magang pada PT . Virama Karya (Persero) yang mengikuti program magang industri pada Proyek Pekerjaan Jalan Tol Probowangi Paket I (STA -3+881 s/d STA 9+000) sejak tanggal yang terlampir sampai saat masa magang berakhir dengan jabatan Asisten Inspektor Lapangan dan melaksanakan tugas dengan **BAIK**.

Demikian surat keterangan kerja ini dibuat dengan sebenarnya untuk dipergunakan sebagaimana mestinya.

Probolinggo, 05 Maret 2025
PT Virama karya (Persero)

Ir. Nurcahyo Budi Santoso, .MT
Resident Engineer

Jl. Gayungsari X, No. 28 - 30, Gayungan,
Kota Surabaya, 60235

Certificate of Participation

SERTIFIKAT

041/B.3/HMG-I/XI/2023

Di Berikan Kepada :

Mohamad Khalif

Atas Partisipasinya Sebagai :

Anggota Publikasi Dekorasi Dokumentasi

Kegiatan Dies Natalis Teknik Geodesi ITN Malang Ke-38 Tahun 2023 dengan tema "Geodesy For Indonesian Sustainable Development" Yang Diselenggarakan Pada Tanggal Rabu, 26-27 Juli 2023

Ketua Program Studi Teknik Geodesi ITN Malang	Ketua Himpunan Mahasiswa Geodesi	Ketua Pelaksana Diesnatalis Teknik Geodesi Ke-38
Silvester Sari Sai, S.T., M.T.	Jusman Prahara	Radian Anugrah
NIP.Y. 1030600413	NIM. 20.250.55	NIM. 20.25.034

SERTIFIKAT

No. 100/RDS/IMGI/XII/2022

MENGUCAPKAN TERIMAKASIH KEPADA

Muhammad Khalif

Sebagai Koordinator Sie Dokumentasi & Dekorasi penyelenggara program kerja IMGI

DIES NATALIS IMGI XXIX

Yang diselenggarakan pada tanggal

3 Desember 2022

Candra Dwi Wibowo

Sekretaris Jenderal IMGI

HIMPUNAN MAHASISWA GEODESI
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

SERTIFIKAT

003/B.3/HMG-I/XI/2021

Diberikan Kepada:

Mohamad Khalif

2125018

Atas Partisipasinya Sebagai :

PESERTA

Dalam "Geodesi Menyapa (GEMA)" Dengan Tema From Virtual To Mutual "Menciptakan Lingkungan Kekeluargaan Yang Membantu Pembentukan Karakter Geodet Muda" Yang Diselenggarakan Pada 04 Desember 2021 - 19 Maret 2022 Melalui Room Zoom Meeting

Kaprodi Teknik Geodesi ITN Malang	Ketua Himpunan Mahasiswa Geodesi	Ketua Pelaksana
Silvester Sari Sai, S.T., M.T.	Ikhsan Hidayat	Dawid Wahyuda N.Daya
NIP.Y.1030600413	NIM. 19.25.012	NIM. 19.25.004

SERTIFIKAT

004/B.3/HMG-I/X/2022

Di berikan Kepada :

Muhammad Khalif

Atas Partisipasinya Sebagai :

PANITIA

Dalam Geodesi Menyapa (GEMA) yang bertemakan "Memperkenalkan dan mewujudkan mahasiswa yang profesional dalam solidaritas serta kreativitas pada era milenial"

Ketua Program Studi Teknik Geodesi ITN Malang	Ketua Himpunan Mahasiswa Geodesi	Ketua Pelaksana Geodesi Menyapa
Silvester Sari Sai, S.T., M.T.	Jusman Prahara	Arafiq Petu
NIP.Y. 1030600413	NIM. 20.25.055	NIM. 20.25.001

SERTIFIKAT

022/B.3/HMG-I/II/2023

DIBERIKAN KEPADA:

MOHAMAD KHALIF

ATAS PARTISIPASINYA SEBAGAI:

PESERTA

Dalam Kegiatan *Study Excursion* 2023 dengan tema **"Mewujudkan Generasi Muda Yang Berkompeten Dan Siap Menjadi Surveyor Sukses"** yang diselenggarakan pada tanggal, 21-24 Februari 2023 oleh HMG ITN MALANG

Ketua Program Studi Teknik Geodesi	Ketua Umum Himpunam Mahasiswa Geodesi	Ketua Pelaksana *Study Excursion*
SILVESTER SARI SAI, S.T., MT	JUSMAN PRAHARA	GABRIEL E. V. LADO GHENONG
NIP.P.1030600413	NIM. 20.25.055	NIM. 21.25.017

CERTIFICATE

89-XI/PK-ITN/2024

DIBERIKAN KEPADA :

MOHAMAD KHALIF

Sebagai Peserta

KULIAH TAMU TECHNOPRENEURSHIP

" KECERDASAN FINANSIAL GENERASI GEN Z "

Malang, 23 Nopember 2024

DR. LILA AYU RATNA W, ST., MT	NYOMAN SUGIARTHA ARIANTARA
Kepala Pusat Karir ITN Malang	Ketua Umum Ikatan Alumni ITN Malang

TOEFL Prediction

INSTITUT TEKNOLOGI NASIONAL MALANG

LANGUAGE LABORATORY UNIT
NATIONAL INSTITUTE OF TECHNOLOGY MALANG
Jl.BendunganSigura-gura No.2Malang(0341)551431ext.261

CERTIFICATE

OF ACHIEVEMENT

NO. 1578/TPT/lab.bhs/ITN/VIII/2025

This certifies that

Name : MOHAMAD KHALIF

Registration Number: 2125018

Test Date : 11 August 2025

has taken a PREDICTION TEST for the TOEFL administered by the Language Laboratory Unit - ITN Malang.

SCALED SCORES

Listening Comprehension	48
Structure and Written Expression	42
Reading Comprehension	48
Overall Score	460

Head,

Rini Anjarwati, S.Pd.,M.Pd

NIP. 9000000549