M. Tsaqif Wismadi

Fjordgata 38, 3AA
7010, Trondheim
Norway

Phone: +47 930 26 125
Email: m.t.wismadi@gmail.com
LinkedIn: www.linkedin.com/in/tsaqifwismadi/

SUMMARY

Tsaqif is a **Geospatial Data Scientist**, **Urban Data Analyst**, and **PhD Candidate in Urban Transportation Modelling** who is proficient at examining urban systems and resolving spatial development issues using Geo-Information Science and data statistics. He has spent the last six years working in multidisciplinary teams to deliver high-quality masterplans and public policies by leveraging cities' big data. Many of his projects involved the spatial sector (i.e. transport, housing, real estate, tourism, urban design, and telco). His typical workflow consists of (but not limited to) API calls, relational database management, data cleaning-exploration-analytics, dashboarding, 3D visualization and AI modelling. Additionally, in the last two years, he has been focusing his interest on urban transport modelling and worked on projects such as AI-based traffic congestion modelling, four-step travel demand modelling for public transport provision, and network analysis for proximity-based coverage.

EDUCATION

M.Sc., Geo-Information Science and Earth Observation (ITC) - Universiteit Twente, The Netherlands
2020 - 2022, GPA: 7.63 / 10

- ***The Relation Between Street Pattern and Traffic Congestion, An Investigation Through Machine Learning Approach***

  This thesis research involved the development of a machine learning model for predicting traffic congestion, by using street pattern indices and recorded traffic data. The study's goal is to comprehend and quantify the changes in the urban system (traffic and street morphology) in Barcelona as a result of the recently enacted superblock policy.

B.Urp., Urban and Regional Planning – Universitas Gadjah Mada, Indonesia
2015 - 2019, GPA: 3.72 / 4

- ***The Urban Design-Based Revitalization of Prawirotaman's Tourism Corridor, Yogyakarta***

  This thesis project involved a 3D design process for the tourism corridor of Prawirotaman's Street by applying several design concepts such as walkability, visual appeal, social interaction and circulation. This project aims to revitalise the existing district systems and make them less congested and more appealing.

EXPERIENCE

PhD Candidate – *Norwegian University of Science & Technology*, 2023-2026

- Performed data cleaning and feature engineering of Norwegian Travel Survey Data
- Created Power BI data dashboard for Trondheim's municipality stakeholder presentation
- Conducted statistical analysis and quantitative forecasting on Trondheim's transportation demand
- Conducted geospatial analysis and mapping on urban transportation mobility in Trondheim
- Wrote academic journal article for research dissemination

Urban Planner - *Shirvano Consulting*, 2019-2020

- Transformed geospatial analysis results into an applicable real estate and housing strategy
- Formulated tourism masterplan for several municipalities and villages in Central Java, Indonesia
- Developed relevant smart cities policy frameworks and infrastructure deployments for several cities in East Java, Indonesia
- Formulated an avalanche-risk-sensitive outer road masterplan for the city of Wonosobo, Indonesia

Urban Data Analyst - *Egis Group*, 2017-2018

- Acquired, managed, and analysed source-agnostic geospatial data for various construction projects
- Developed data dashboards for site monitoring and evaluation
- Tailored and transformed various geodata for transport engineering purposes
- Drafted multiple transport blueprints and analyses into applicable transportation plans for the national government
- Conducted various urban modelling and geospatial analyses such as land suitability analysis, network analysis, and disaster vulnerability analysis

Assistant Lecturer - *Gadjah Mada University*, 2016-2018

- Taught several urban analytics courses such as urban information systems, transportation planning, land use planning, urban design studio, and spatial theory

SKILLS

Geospatial analyses and modelling • Location-based service • Remote sensing • Web services API
Location intelligence • Transport modelling • Big data processing • Relational database management
Dashboarding • Geocoding • Data cleaning • Data analytics and visualization • Spatial statistics
Programming • Machine learning • Distributed computing • Agent-based modelling • Web GIS
3D design • Policy drafting • Governmental affairs • Stakeholder engagement • Business acumen
Project management • Teaching and mentoring • Presentation • Public speaking • Research

SOFTWARE COMPETENCIES

ArcGIS Pro • ArcGIS Online • QGIS • ERDAS • SNAP • ILWIS • CARTO • Geoplot • PostGIS • NetLogo
PostgreSQL • SPSS • MySQL • Google Earth Engine • Contextily • Apache Dask • Apache Spark
Hadoop • Tableau • Python • JavaScript • ScikitLearn • NumPy • Pandas • Geopandas • Matplotlib
Seaborn • PySal • SciPy • Somoclu • Urllib • TensorFlow • SketchUp • Lumion • V-Ray • CityEngine
CorelDRAW • Adobe InDesign • Adobe Premiere Pro • Microsoft Office • Mendeley Referencing

LANGUAGES

- Indonesian: Native
- Norwegian, Bokmål: Beginner level (A1)
- English: Proficient (IELTS: 8.0)
- Dutch: Beginner level (A1)

HONOURS AND AWARDS

- **Marie Sklodowska-Curie Fellowship**
  A three-year additional research funding from the European Commission for early-stage researchers undergoing doctoral training - Total grant: €28,000

- **PERSEUS Doctoral Programme**
  Fully employed – fully funded PhD Candidate programme at Norwegian University of Science and Technology (NTNU), Trondheim, Norway

- **Studeren in Nederland Scholarship (StuNed), 2020-2022**
  Fully funded 2 years master's scholarship from The Nuffic Neso, Netherlands
  Total grant: €56,900

RELEVANT PROJECTS

- **Traffic congestion modelling using machine learning in Barcelona, Spain, 2022**

In 2019, Barcelona enacted a superblock policy to promote walkability and increase the number of public spaces in the city. To evaluate the traffic impact of this newly implemented policy, I created a traffic congestion model using a machine learning (random forest) algorithm. The project began with the retrieval of traffic sensor data from the governmental catalogue of *opendata-ajuntament.barcelona.cat* via an API call using Urllib, which was followed by extensive data management and cleansing with PostgreSQL, statistical exploration and analysis with Pandas-Seaborn, and machine learning modelling with Scikit. By the end of it, the ML model had determined which kind of change in street morphology has the highest influence on the increased congestion levels in Barcelona.

Figure 1. Modelling The Change of Congestion post The Implementation of Superblock, Barcelona, Spain

- **Analysing healthcare coverage using network analysis in Kigali, Rwanda, 2021**

Rwanda is a country that has shown a significant improvement in the public health sector in the past years. Despite all the policy interventions in Rwanda's health sector, tangible physical development also needed to be done. I was asked to perform a proximity-based analysis to determine the priority area for health centre provision in Kigali. With the limitation of available spatial data, I retrieved several sets of street and route data from *openstreetmap.org* and combined them with the coordinate points of the existing health centres in Kigali. By using the ArcGIS Network Analysis extension, I examined the spatial coverage of the current health centres and delineated the priority area for health centre provision.

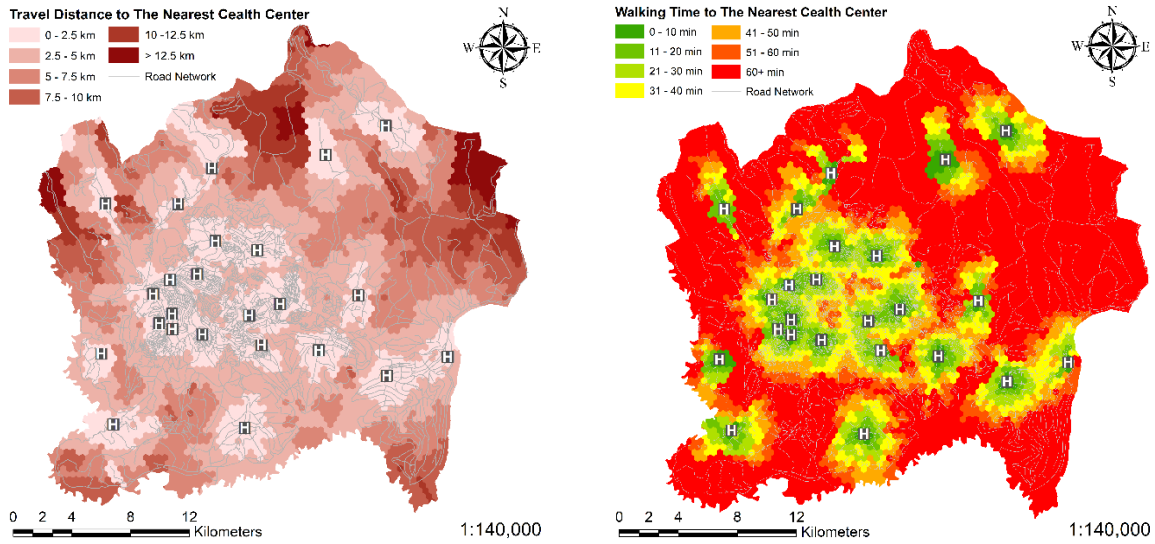


Figure 2. Proximity-Based Service Analysis for Health Centre in Kigali, Rwanda

- **Big data analytics and dashboard visualization of Netherlands flight's trend, 2021**

One of the Netherlands' private banks intended to launch a new membership programme that would include the creation of airport lounges. Using the most recent global flight data, they want to know which global airports and airlines have the best connectivity to Dutch airports, as this will help them decide where to locate their future lounges. To meet this requirement, I designed an interactive data dashboard that displays not only the aggregated trend of flights in the Netherlands but also departure spreads and airline share. The project started with an API data retrieval from *openflights.org*, followed by the cleaning of a massive set of three years' worth of global flight data using Apache Dask and setting up a database using PostgreSQL. Finally, the post-processing database was linked and visualized using Tableau.

Figure 3. Interactive Dashboard of Netherland's Flight Data

- **DSAS-based remote sensing for early erosion detection in North Holland, Netherlands, 2021**

Coastal erosion is an annual issue that occurs on the Netherlands' shoreline. With the rate of sea level rise increasing, a more efficient method of detecting coastal erosion than field measurement has become more important than ever. In this project, my team and I were experimenting with remote sensing-based techniques using the digital shoreline analysis system (DSAS) to model the erosion-prone area along the North Holland coastline. Aside from hyperspectral images, the project combined several datasets from PDOK, including the digital elevation model (DEM), land cover, and bathymetry data. Finally, the delineation of erosion-prone areas is visualised using ArcGIS Pro, and its result was compared to the Dutch official coastline trend to ensure spatial precision.

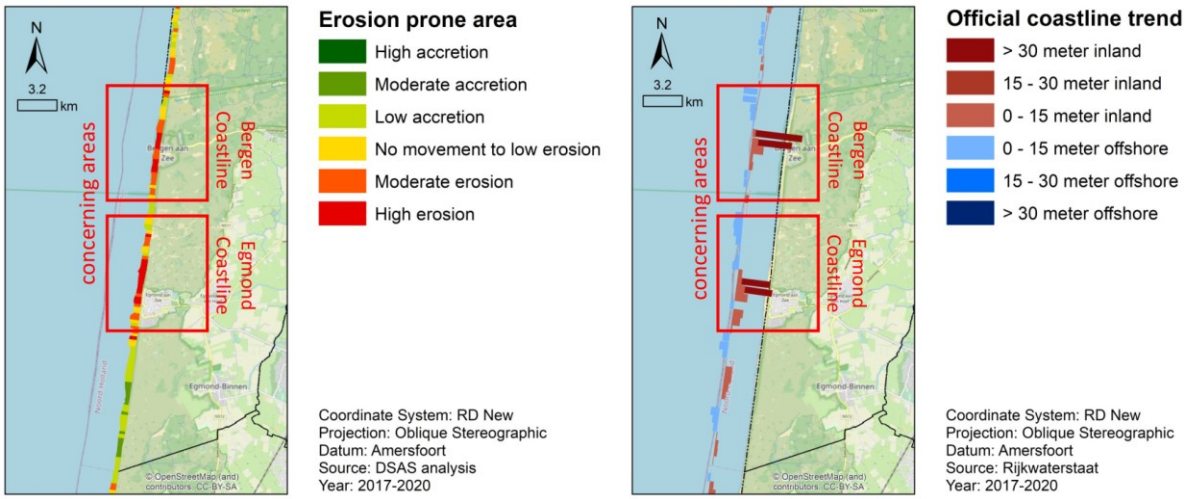


Figure 4. Comparing DSAS Erosion Prone Area with The Dutch Official Coastline Trend, North-Holland, Netherlands

- **Modelling Land Price Spatial Distribution with Regression Analysis in Ahmedabad, India, 2021**

As the city of Ahmedabad rebrands itself as a historic city, informal slum settlements keep spreading and plummeting the overall land price of the city. In this project, my objective was to study the spatial relationship between land price and slum distribution. The study was conducted by collecting land price samples from various locations in Ahmedabad and their distances to essential urban facilities as potential explanatory variables. The variables were then chosen using the Pearson correlation test and implemented as driving factors of land price. A regression formula was then developed, and spatial extrapolation was modelled and mapped using ArcGIS Raster Extrapolation. The land price model was then overlaid on slum locations, resulting in a comparable scene of analysis.

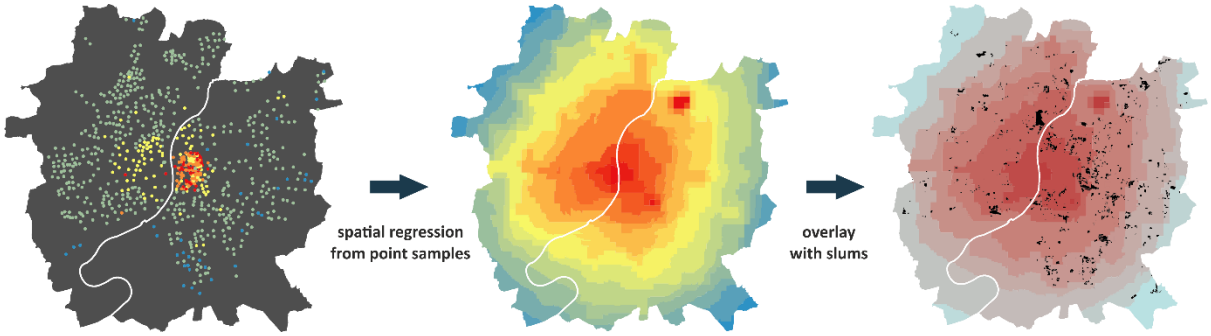


Figure 5. Spatial Regression of Land Price in Ahmedabad, India

- **Forest-based regression for predicting tick bite cases density in Utrecht, Netherlands, 2021**

In the Netherlands' central region, incidents of Lyme Borreliosis (LB) transmitted by Ixodes Ticks are a recurring problem during the summer. In light of this situation, the municipality of Utrecht wants to know the critical areas where tick bite cases typically occur, as well as the natural factors that drive their breeding. After learning about the characteristics of Ixodes ticks, my team and I attempted to model the spatial spread of tick bite cases using forest-based regression techniques. We used Google Earth Engine to retrieve some remote sensing data such as land cover, NDVI, and surface temperature as potential explanatory variables, while the tick bites cases location from 2015 (retrieved from *tekenradar.nl*) served as our reference of the response variable. Once the model was built and tuned, we applied it to 2016 remote sensing data and calculated the predicted tick bite density. Eventually, the model works and achieves r-square accuracy of 0.68.

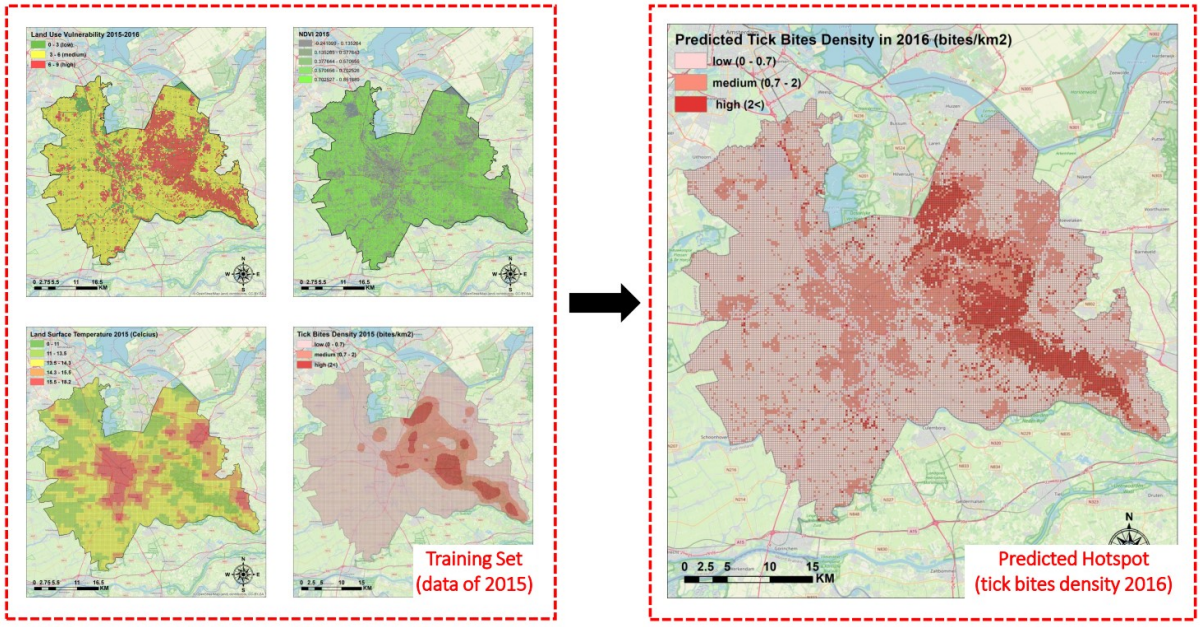
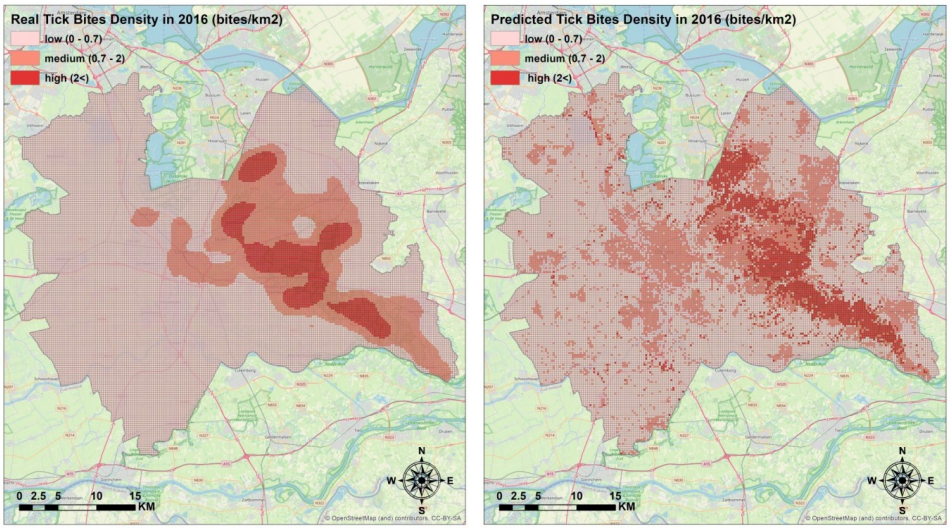


Figure 6. Using LUV, NDVI, LST, and Tick Bite Density in 2015 to predict Tick Bite Density in 2016, Utrecht, Netherlands



The predicted hot spot map manages to resemble the actual tick bites density distribution with r-square value of 0.683 .

Figure 7. The Comparison of The Actual Tick Bites Density and The Predicted Tick Bites Density in Utrecht, Netherlands

OTHER PROJECTS

- **Forecasting Bird's Observer Intensity using Machine Learning in The Netherlands, 2021**
  Birds migration analysis and machine learning modelling using *waarneming.nl* (big) crowdsourced data, including database creation with PostgreSQL, data analysis with Pandas, and machine learning modelling with Scikit.
- **Analysis of Urban Growth through Remote Sensing in Kampala, Uganda, 2021**
  Modelling the urban settlement spreads of Kampala between 1975 to 2020 using the spatial logistic regression model (SLR) on the NetLogo environment. The modelling was based on land use data from the local authority which are combined with land cover data that was generated using Google Earth Engine.
- **Inequality and Social Deprivation Mapping in Enschede, Netherlands, 2021**
  The analysis and identification of Enschede's neighbourhood inequality and deprivation level, based on each neighbourhood's demographic composition, household income, and property prices data that was retrieved from the CBS portal. These data were combined, calculated, and mapped with ArcGIS.
- **Highest and Best Use Valuation (HBU) of TAMZIS's Property, Central Java, Indonesia, 2020**
  A private property market valuation project which involved the estimation of land prices relative to the infrastructure access and nearby competition. The appraisal was conducted using the cost approach and income capitalization approach using Microsoft Excel.
- **Masterplan of Sikunang Village, Dieng, Indonesia, 2019**
  A formulation of a village tourism masterplan which focuses on leveraging natural attraction and agriculture tourism in Dieng Plateau, Central Java, Indonesia. This project consisted of landscape master planning using SketchUp and a tourism business plan formulation.
- **Masterplan of Outer Road, Wonosobo, Indonesia, 2019**
  A blueprint design on the newly built economic corridor located in Keseneng-Candiyasan, Wonosobo, Indonesia. It consisted of urban design guidelines, land use documents, and detailed engineering design (DED) using AutoCAD.
- **Assessment of Palapa Ring Broadband, Ministry of Communication Indonesia, 2018**
  Assisted infrastructure expert in conducting a literature review and content analysis for the assessment of the newly enacted national internet broadband connection in Indonesia.
- **Masterplan of Umbulrejo Village, Gunung Kidul, Yogyakarta, Indonesia, 2018**
  A formulation of extreme sport tourism (i.e. rock climbing, cave expedition, and cliff paragliding) masterplan and business plan in Umbulrejo Village, Yogyakarta. The project consisted of landscape master planning (Sketch Up), site planning (AutoCAD), and community training.
- **Research of Housing Career in Indonesia, Ministry of Public Housing Indonesia, 2018**
  Conducted qualitative research to investigate the housing career dynamic of typical Indonesian households between 2000 and 2015.
- **Integrated Toll Roads Development of Hang Nadim, Batam Island, Indonesia, 2017**
  Acquired, managed, and analysed several sets of geospatial data using PostgreSQL and ArcGIS for the toll road development of Hang Nadim – Muka Kuning – Batu Ampar. This project also involved the creation of a data dashboard for site monitoring and evaluation using Tableau.
- **Western Indonesia National Roads Improvement Project, Sumatera Island, Indonesia, 2017**
  Generated and managed multiple Geotech datasets (i.e. digital elevation model (DEM), digital surface model (DSM), shapefile, and raster data) to be used by the Geotech and Civil engineers. This project involved extensive data management and data conversion between different engineering teams using Oracle.

REFERENCE CONTACTS

- **Dr. Jiong (Jon) Wang | University of Twente**
  Assistant Professor in Urban Remote Sensing and Geospatial Analysis
  Email: **j.wang-4@utwente.nl**

- **Dr. Fran Meissner | University of Twente**
  Assistant Professor in Critical Geodata Studies and Geodata Ethics
  Email: **f.meissner@utwente.nl**

- **Dr. Eng. Muhammad Sani Roychansyah | Gadjah Mada University**
  Associate Professor in Compact City and Spatial Planning
  Email: **saniroy@ugm.ac.id**

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

_____ Date: 15 March 2024

[M. Tsaqif Wismadi]