Isabelle Tingzon

issatingzon@gmail.com issa-tingzon.github.io issa-tingzon issatingzon

Experience

The World Bank Group — Washington DC, USA
Geospatial Data Scientist — *Jan 2025 - Present*
Disaster and Climate Risk Data Fellow — *Feb 2023 - Dec 2024*

- Leading AI-driven climate resilience initiatives, leveraging drone orthomosaics, satellite imagery, LiDAR data, street view imagery, and deep learning models (SAM, Mask R-CNN, CNNs) to generate nationwide maps of building stock characteristics in support of government-led adaptation programs for resilient housing and infrastructure.
- Delivered technical training on AI-enabled building delineation and roof classification to government staff, community mappers, and disaster responders as part of capacity-building initiatives in the Caribbean.
- Providing geospatial data analysis support across various thematic areas under GFDRR, including Nature-based Solutions (NBS), Disaster-Fragility, Conflict, and Violence (D-FCV) Nexus, and Disaster Risk Analytics (DRA).
- Authored a successful grant proposal that secured 50K USD to scale AI-driven climate initiatives in the Caribbean, which was featured in the UNFCCC Technology Executive Committee Information Note on "AI for Climate Action in Developing Countries: Opportunities, Challenges, and Risks", launched at COP29.
- Presented at key conferences: Applied Machine Learning Days (AMLD) 2024, Climate Informatics 2024, ICCV'23 AI for Humanitarian Assistance and Disaster Response Workshop, and American Geographical Society Fall Symposium 2023.

United Nations Children's Fund (UNICEF) — Barcelona, ESP
Data Science Consultant — *Oct 2023 - Jan 2025*

- Led our AI-enabled global school mapping initiative, leveraging computer vision (CV) and Earth Observation (EO) data in support of Giga, a UNICEF-ITU initiative aimed at achieving universal school connectivity.
- Built an end-to-end pipeline for large-scale school mapping using high-resolution Maxar satellite imagery, weakly supervised computer vision models (ViTs, CNNs), and explainable AI (XAI) techniques.
- Deployed models in 10+ countries across Africa and Central Asia, generating national-scale maps of school location predictions using Dell's high-performance computing (HPC) infrastructure.
- Co-developed a human-in-the-loop model validation tool to assist government partners in discovering non-geolocated school infrastructure and improving the quality and completeness of official school location data.
- Facilitated knowledge transfer by presenting technical concepts to UNICEF country offices, government agencies, and ministries of education through comprehensive reports, training sessions, and presentations.
- Published at the AAAI 2025 Special Track on AI for Social Impact (oral, top 5% of 469 submissions)
- Awarded Best Innovative Technology Application Award at the IEEE Connecting the Unconnected (CTU) Summit 2024.

AI4EO Future Lab | Technical University of Munich (TUM) — Munich, DEU
Beyond Fellow — *Aug 2022 - Jan 2023*

- Investigated the applications of geospatial ML for building attribute recognition and evaluated the cross-country generalizability of ML models trained on urban form features vs. multispectral Sentinel-2 satellite images.
- Collaborated with TU Berlin and the Mercator Research Institute on Global Commons and Climate Change (MCC) on building type classification using the EUBUCCO dataset for the downstream application of building energy conservation.

Thinking Machines Data Science — Taguig City, PHL
Machine Learning Researcher (L3), GeoAI Team Lead — *Mar 2018 - Jul 2022*

- Led a team of 7 ML researchers and engineers in developing our GeoAI product, leveraging ML and CV for building delineation and classification, land use and land cover classification, and socioeconomic class classification from high-resolution satellite images to support high-CAPEX decision-making by major telcos in Southeast Asia.
- Generated high-resolution, nationwide poverty maps in the Philippines using ML/DL, satellite imagery, geolocated social media data, and volunteered geographic information to support targeted humanitarian interventions by UNDP Philippines and the Zero Extreme Poverty Movement 2030.
- Accelerated the detection of 350+ migrant settlements in Colombia using ML and time-series Sentinel-2 satellite images in the context of the Venezuelan mass migration crisis; model predictions were ground-validated by local contributors in Colombia using mobile apps and shared with local NGOs and international development agencies, enabling more efficient humanitarian operations. Collaborators: iMMAP Colombia and Premise Data.
- Conducted field visits in Bogota and La Guajira to assess the living conditions of Venezuelan migrants situated in informal settlements in Colombia and developed grant proposals resulting in USAID-funded AI for humanitarian action projects worth 55K USD. Collaborators: UNICEF Colombia and iMMAP

- Co-authored successful grant proposals under the Sustainability Team, resulting in two AI for climate action projects worth 150K+ USD funded by the CCAI Innovation Fund and the Lacuna Fund.

Technical Skills

Data Science Tools: Python, Pytorch, SQL, BigQuery, Jupyter, Pandas, NumPy, SciPy, Scikit-learn, Weights & Biases
Geospatial Tools: QGIS, GDAL, GeoPandas, Rasterio, Google Earth Engine (GEE)
Cloud Computing: GCP, AWS, Azure

Education

University of the Philippines Diliman — Quezon City, PHL
Master of Science in Computer Science — *Aug 2015 - Jan 2018*
- Grade: 1.15 (1.00 highest; 5.00 lowest)
- PCARI Scholarship

University of the Philippines Diliman — Quezon City, PHL
Bachelor of Science in Computer Science — *Jun 2011 - Jun 2015*
- Grade: 1.36 (1.00 highest; 5.00 lowest)
- Magna Cum Laude
- Phi Kappa Phi Honor Society

Awards

1st Place Innovative Technologies, IEEE Connecting the Unconnected (CTU) Challenge 2024	Dubai, UAE | Oct 2024
Women in AI (WAI) Asia and the Pacific (APAC) 2024: AI for Social Good Award	Sydney, AUS | Jun 2024
Best Poster Runner-up, International Future Lab AI4EO Symposium 2022	Munich, DEU | Oct 2022
Best Paper, NeurIPS 2020 Workshop on Machine Learning for the Developing World (ML4D)	Dec 2020
Best Paper and Best Presenter at KDD 2020 Fragile Earth Workshop	Jul 2020

Volunteer Experience

Tutorials Lead | Climate Change AI (CCAI) - Core Team — 2020 - Present
- Manage the CCAI tutorial series; co-organized the tutorials track at the Tackling Climate Change with Machine Learning Workshop at ICLR'24, NeurIPS'23, ICLR'23, NeurIPS'22, & NeurIPS'21, leading to the development of 25+ tutorials.

AI/ML Tech Lead | Women Who Code Manila — 2017 - 2024
- Facilitated monthly study group sessions; co-organized "Filipinas in Tech 2022: Women in Data Science", featuring leading Filipina data scientists as speakers and panelists, with a focus on career development and special topics.

Publications

Tingzon, I., Ozturk, U. C., & Dotu, I. (2025). Large-scale school mapping using weakly supervised deep learning for universal school connectivity. *Proceedings of the AAAI Conference on Artificial Intelligence, 39*(27), 28449-28457. doi:10.1609/aaai.v39i27.35067

Tingzon, I., Cowan, N. M., & Chrzanowski, P. (2024). Mapping housing stock characteristics from drone images for climate resilience in the Caribbean. *Environmental Data Science, 3*, e29. doi:10.1017/eds.2024.46

Tingzon, I., Cowan, N. M., & Chrzanowski, P. (2023). Fusing VHR post-disaster aerial imagery and LiDAR data for roof classification in the Caribbean. In *Proceedings of the IEEE/CVF International Conference on Computer Vision Workshops (ICCVW)*, 2023, pp. 3740-3747. doi:10.1109/ICCVW60793.2023.00402

Tingzon, I., Miraflor, J.M., Zhu, X.X., & Kochupillai, M. (2023). Towards impactful applications of AI4EO in the Global South. *2023 Joint Urban Remote Sensing Event (JURSE)*, pp. 1-4. IEEE. International Future Lab AI4EO Symposium 2022. **Best Poster Runner-up**. doi:10.1109/JURSE57346.2023.10144197

Maksabedian Hernandez, E. J., Tingzon, I., Ampil, L., & Tiu, J. (2021). Identifying chronic disease patients using predictive algorithms in pharmacy administrative claims: An application in rheumatoid arthritis. *Journal of Medical Economics, 24*(1), 1272-1279. doi:10.1080/13696998.2021.1999132

Fatehkia, M., Tingzon, I., Orden, A., Sy, S., Sekara, V., Garcia-Herranz, M., & Weber, I. (2020). Mapping socioeconomic indicators using social media advertising data. *EPJ Data Science, 9*(1), 22. doi:10.1140/epjds/s13688-020-00235-w

Ledesma, C., Garonita, O.L., Flores, L.J., Tingzon, I., & Dalisay, D. (2020). Interpretable poverty mapping using social media data, satellite images, and geospatial information. NeurIPS'20 Machine Learning for the Developing World (ML4D) Workshop. **Best Paper.** abs/2011.13563

Tingzon, I., Dejito, N., Flores, R.A., De Guzman, R., Carvajal, L., Zapata Erazo, K., Contreras Cala, I.E., Villaveces, J. Rubio, D., & Ghani, R. (2020). Mapping new informal settlements using machine learning and time-series satellite images: An application in the Venezuelan migration crisis. In *Proceedings of 2020 IEEE/ITU International Conference on Artificial Intelligence for Good (AI4G)* (pp. 198-203). IEEE. KDD'20 Fragile Earth Workshop. **Best Paper, Best Presenter.** doi:10.1109/AI4G50087.2020.9311041

Tingzon, I., Orden, A., Sy, S., Sekara, V., Weber, I., Fatehkia, M., Garcia-Herranz, M. & Kim, D. (2019). Mapping poverty in the Philippines using machine learning, satellite imagery, and crowd-sourced geospatial information. *The International Archives of Photogrammetry, Remote Sensing, and Spatial Information Sciences*, XLII-4/W19, 425–431. doi:10.5194/isprs-archives-XLII-4-W19-425-2019

Invited Talks and Presentations

- **AI for Climate Action in Developing Countries: Opportunities, Challenges and Risks**. The World Bank Land Conference 2025, Session on "Building Resilience through Effective Land Administration, Geospatial Systems and Digital Twins". 7 May 2025. Washington DC, USA.
- **Bridging Data Gaps in the Global South: Harnessing Geospatial Data for Climate Resilience and Universal Connectivity**. "Building Data Together: Building-related Open Microdata Technical Workshop" at the OECD Laboratory for Geospatial Analysis. 24 Jan 2025. Paris, France.
- **Large-scale School Mapping using AI and Satellite Images for Universal School Connectivity.** Erasmus Mundus Giga Meet. 28 Nov 2024. Campus Poblenou, Universitat Pompeu Fabra (UPF), Barcelona, Spain.
- **UNICEF Giga: AI-enabled School Mapping.** AI4Development Conference. 28 Oct 2024. Barcelona, Spain.
- **Advancing Universal School Connectivity through AI-enabled School Mapping.** IEEE Connecting the Unconnected Summit 2024 | IEEE Future Networks Works Forum. 14-15 Oct 2024. Dubai, UAE.
- **Mapping Housing Stock Characteristics from Drone Images for Climate Resilience in the Caribbean.** Climate Informatics 2024. 22 Apr 2024. Alan Turing Institute, BMA House, London, UK.
- **Applied Machine Learning Days (AMLD), Swiss Federal Institute of Technology Lausanne (EPFL).** Invited Panelist and Presenter for the tracks "Accelerating Climate Change Action Through Machine Learning" and "AI & Space: Algorithms for Socio-economic Benefits". 25-26 Mar 2024. SwissTech Convention Center. Lausanne, Switzerland.
- **Building Climate Resilience in the Caribbean using AI, Drone Images, and Street View Photos.** Guest Lecturer at the Columbia Climate School. 20 Mar 2024. Columbia University, New York City, USA.
- **Mapping Housing Stock from Drone Images and Street View Photos for Climate Resilience in the Caribbean.** Lightning Talk at the American Geographical Society Fall Symposium, Geography 2050: The Changing Map of Risk, Hazards, & Finance. 16 Nov 2023. Columbia University, New York City, USA.
- **Generating Exposure Data Layers using AI & Earth Observation for Housing Resilience in the Caribbean.** Risk Data Library Workshop. 14 Nov 2023. The World Bank Headquarters, Washington DC, USA.
- **Tackling Climate Change with AI: From Energy to Agriculture to Disaster Response.** Co-presented with Priya Donti at the 6th Indonesia's SDGs Annual Conference 2023. 7 Nov 2023.
- **Climate Change and Machine Learning: Opportunities, Challenges, and Considerations.** 9th Annual Public Policy Conference (APPC). 19 Sep 2023. Asian Institute of Management, Makati City, Philippines.
- **Harnessing Digital Innovation for Inclusive and Sustainable Risk Management.** Invited Panelist at the GFDRR Partnership Days 2023. 22 May 2023. The World Bank Headquarters at Washington DC, USA.
- **Towards Responsible and Impactful Applications of AI and Earth Observation.** Deeplearning.ai Pi & AI Event, Building Ethical AI Companions: Balancing Innovation with Responsible Design. 20 May 2023.
- **Tutorial on Land Use and Land Cover (LULC) Classification using Pytorch and Google Earth Engine.** Co-authored with Ankur Mahesh. Climate Change AI Summer School 2022. 19 Aug 2022.
- **Research and Challenges of ML/AI against COVID-19 and Climate Change in the Context of Developing Countries.** Invited Panelist at Practical Machine Learning for Developing Countries Workshop ICLR 2021. 8 May 2021.
- **Detecting Informal Settlements using Machine Learning, Satellite Images, and Mobile Apps.** Lightning Talk at the Geo for Good Summit 2020. 20-22 Oct 2020.
- **Methodologies for Poverty Prediction.** Workshop on Big Data in Official Statistics for Measuring Digital Economy and Sustainable Development. 9 May 2019. National Administrative Department of Statistics, Bogota, Colombia.
- **Using Machine Learning and Satellite Images to Zero in on the Philippines' Most Vulnerable Communities.** Python Conference Asia Pacific (PyCon APAC) 2019. 24 Feb 2019. iAcademy, Makati, Philippines.
- **Shedding Light on Philippine Poverty. AI for Social Good Workshop.** 17-18 Feb 2019. Qatar Computing Research Institute, Hamad Bin Khalifa University. Ar-Rayyan, Qatar.