Isabelle Tingzon

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WORK EXPERIENCE

The World Bank | Global Facility for Disaster Reduction and Recovery (GFDRR) — **Washington DC, USA**
Geospatial Data Scientist | Junior Professional Associate (JPA) — Starting Jan 2025
Disaster and Climate Risk Data Fellow — Feb 2023 - Dec 2023

- Developed nationwide housing stock classification maps for Saint Lucia, Dominica, and Grenada using computer vision models (CNNs) trained on drone images, aerial orthophotos, LiDAR data, and street view images. These maps supported government-led climate adaptation initiatives and were featured in the UNFCCC Technology Executive Committee Information Note on "AI for Climate Action in Developing Countries: Opportunities, Challenges, and Risks" at COP29.
- Designed and led knowledge exchange sessions, creating training materials and tutorials on AI-assisted building delineation and roof classification for government staff, community mappers, and disaster responders, as part of capacity-building initiatives under the Digital Earth Project for Resilient Housing and Infrastructure in the Caribbean.
- Presented research and applications at prominent conferences and workshops, including Applied Machine Learning Days (AMLD) 2024, Climate Informatics 2024, ICCV'23 AI for Humanitarian Assistance and Disaster Response Workshop, and the American Geographical Society Fall Symposium 2023.
- Supervisors: Pierre Chrzanowski, Prof. Caroline Gevaert, Dr. Nuala Margaret Cowan, Dr. Andrea Garcia Tapia

United Nations Children's Fund (UNICEF) — **Barcelona, ESP**
Data Science Consultant — Oct 2023 - Dec 2024

- Led our AI-enabled global school mapping initiative, leveraging computer vision and Earth Observation to support Giga, a UNICEF-ITU program aimed at connecting every school to the internet and advancing universal school connectivity.
- Developed an end-to-end pipeline to generate large-scale school location prediction maps using high-resolution Maxar satellite imagery, weakly supervised computer vision models (ViTs, CNNs), and explainable AI (XAI) techniques. This work, executed on Dell's high-performance computing (HPC) infrastructure, produced nationwide school prediction maps across 7 Giga partner countries in Africa and Asia.
- Co-developed an interactive web mapping tool to enable human-in-the-loop validation, helping government partners discover non-geolocated schools and improve the quality and completeness of official school location datasets.
- Facilitated knowledge transfer by presenting technical concepts to UNICEF country offices, government agencies, and ministries of education through comprehensive reports, training sessions, and presentations.
- Awarded 1st Place for Best Innovative Technology Application at the IEEE Connecting the Unconnected Summit 2024 and accepted for publication at AAAI-25 Special Track on AI for Social Impact (AISI).
- Supervisors: Dr. Do-Hyung Kim and Dr. Ivan Dotu

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 under the Generalizability & Transferability Working Group at the Chair of Data Science in Earth Observation at TUM.
- Supervisor: Prof. Xiaoxiang Zhu

Thinking Machines Data Science, Inc. — **Taguig City, PHL**
GeoAI Team Lead | Machine Learning Researcher — Mar 2018 - Jul 2022

- Led a team of 7 ML researchers and engineers in developing our GeoAI product, leveraging ML and computer vision 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 across the Philippines using the Demographic and Health Survey (DHS), computer vision, satellite imagery, social sensing data, and volunteered geographic information. These maps supported 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 from Google Earth Engine during the Venezuelan mass migration crisis. Model predictions were ground-validated by local contributors in Colombia using mobile apps developed by Premise Data. The results were shared with local NGOs and international development agencies, enabling more efficient, targeted humanitarian aid and response operations. Collaborators: iMMAP Colombia and Premise Data.
- Conducted field visits in Bogota and La Guajira to support data collection for assessing the living conditions of Venezuelan migrants in informal settlements in Colombia. This mission resulted in two USAID-funded AI for humanitarian action projects. Collaborators: UNICEF Colombia and iMMAP.

- Co-authored peer-reviewed papers on AI for humanitarian action; developed grant proposals under the Sustainability Team, resulting in two AI for climate action projects funded by the CCAI Innovation Fund and the Lacuna Fund.

TECHNICAL SKILLS

- Python, SQL, BigQuery, Jupyter, Pandas, NumPy, SciPy, NetworkX, Scikit-learn, Pytorch, Weights & Biases, QGIS, GDAL, GeoPandas, Rasterio, Google Earth Engine, Google Cloud Platform (GCP), Git, Asana, Docker, AzureML, Linux, LaTeX
- **Languages**: Filipino (native), English (fluent)

EDUCATION

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

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

AWARDS

IEEE Connecting the Unconnected Challenge 2024: 1st Place Innovative Technology Applications	Oct 2024
Women in AI (WAI) Asia and the Pacific (APAC) 2024: AI for Social Good Award	Jun 2024
Best Poster Runner-up, International Future Lab AI4EO Symposium 2022	Oct 2022
Best Paper at 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 Co-lead | Climate Change AI - 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.

Reviewer/Meta-reviewer **2021 - Present**
- Frontiers in Climate, Frontiers in Big Data - Data Analytics for Social Impact, Philippine Journal of Science (PJS), IEEE Latin America Transactions Special Issue on AI and Sustainability, Climate Informatics 2024, Tackling Climate Change with Machine Learning Workshop at ICLR'23, NeurIPS'22, & NeurIPS'21

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/panelists, with a focus on career development and special topics.

PUBLICATIONS

- **Tingzon, I.,** Ozturk, U., Dotu, I. (2024) "Large-scale School Mapping using Weakly Supervised Deep Learning for Universal School Connectivity." Accepted for publication at the AAAI 2025 Special Track on AI for Social Impact (AISI).
- **Tingzon, I.**, Cowan, N.M., & Chrzanowski, P. (2024) "Mapping housing stock characteristics from drone images for climate resilience in the Caribbean." To appear in *Environmental Data Science*.
- **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) (pp. 3742-3749). IEEE.
- **Tingzon, I.**, Miraflor, J.M., Zhu, X.X., & Kochupillai, M. (2023) "Towards impactful applications of AI4EO in the Global South." In 2023 Joint Urban Remote Sensing Event (JURSE), pp. 1-4. IEEE.
- 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.
- 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." Accepted at the Machine Learning for the Developing World (ML4D) Workshop at NeurIPS'20. **Best Paper**.
- **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 2020 IEEE/ITU International Conference on Artificial Intelligence for Good (AI4G) (pp. 198-203). IEEE. Accepted at the Fragile Earth Workshop at KDD'20. **Best Paper. Best Presenter**.

- **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.

TALKS & PRESENTATIONS

- **Large-scale School Mapping using AI and Satellite Images for Universal School Connectivity.** Erasmus Mundus - UNICEF Giga Meet. 28 November 2024. Campus Poblenou, Universitat Pompeu Fabra (UPF), Barcelona, Spain.
- **Ethics and Biases in UNICEF Giga's AI-enabled School Mapping Work.** AI4Development Conference. 28 October 2024. Norrsken Social Hub, Barcelona, Spain.
- **Advancing Universal School Connectivity through AI-enabled School Mapping.** IEEE Connecting the Unconnected Summit 2024 | IEEE Future Networks Works Forum. 14-15 October 2024. Dubai, UAE. Virtual.
- **Mapping Housing Stock Characteristics from Drone Images for Climate Resilience in the Caribbean.** Climate Informatics 2024. 22 April 2024. Alan Turing Institute, BMA House, London, UK. Virtual.
- **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 March 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 - Spring 2024. 20 March 2024. Columbia University, New York City, USA. Virtual.
- **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 November 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 November 2023. The World Bank Headquarters at Washington DC, USA.
- **Tackling Climate Change with AI: From Energy to Agriculture to Disaster Response.** Co-presented with Priya Donti. 6th Indonesia's SDGs Annual Conference (SAC) 2023. 7 November 2023. Virtual.
- **Climate Change and Machine Learning: Opportunities, Challenges, and Considerations.** 9th Annual Public Policy Conference (APPC). 19 September 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. Virtual.
- **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 August 2022. Virtual.
- **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. Virtual.
- **Detecting Informal Settlements using Machine Learning, Satellite Images, and Mobile Apps**. Lightning Talk at the Geo for Good Summit 2020. 20-22 October 2020. Virtual.
- **Methodologies for Poverty Prediction**. Workshop on The Use of 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 February 2019. iAcademy, Makati, Philippines.
- **Shedding Light on Philippine Poverty**. AI for Social Good Workshop. 17-18 February 2019. Qatar Computing Research Institute, Hamad Bin Khalifa University. Ar-Rayyan, Qatar.