Isabelle Tingzon

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PROFESSIONAL EXPERIENCE

United Nations Children's Fund (UNICEF) | Giga — Barcelona, ESP
Data Science Consultant — October 2023 - Present

- Leading our AI-enabled school mapping project, which leverages machine learning (ML), computer vision (CV), and high-resolution Maxar satellite images to advance SDG 4: Quality Education under Giga, a global initiative by UNICEF-ITU to connect every school to the internet by 2030. **Collaborators**: European Space Agency (ESA)
- **Supervisors**: Dr. Do-Hyung Kim, Dr. Ivan Dotu, and Naroa Zurutuza

The World Bank Group | Global Facility for Disaster Reduction and Recovery (GFDRR) — Washington DC, USA
Disaster and Climate Risk Data Fellow — Feb 2023 - Present

- Led the development of deep learning models for the automated generation of critical housing stock information using high-resolution orthophotos, drone images, LiDAR data, and street view photos in support of government-led climate resilience programs in Caribbean small island developing states. **Collaborators**: Development Seed
- Conducted training on AI-assisted building delineation and roof classification for government staff, GIS practitioners, community mappers, and disaster responders as part of local capacity-building initiatives under the Digital Earth for Resilient Housing and Infrastructure Project. **Colab notebooks**: Part 1 and Part 2
- Organized a workshop for World Bank consultants on (1) Intro to Machine Learning, (2) Intro to Deep Learning, (3) Intro to Computer Vision and Remote Sensing, and (4) Hands-on ML using Pytorch and Colab notebooks
- **Supervisors**: Pierre Chrzanowski, Dr. Nuala Margaret Cowan, and Dr. Andrea Garcia Tapia

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

- Investigated the applications of Geospatial ML for building attribute recognition and evaluated the cross-country generalizability of ML and CV 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 and Machine Learning Researcher — Mar 2018 - Jul 2022

- Led a team of 7 ML researchers and engineers in developing our GeoAI product, which leverages ML/CV algorithms for building delineation & classification, land use & 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 poverty maps across the Philippines using ML/CV, demographic and health survey data, satellite imagery, social media data, and volunteered geographic information to support targeted humanitarian interventions led by UNDP Philippines and Zero Extreme Poverty 2030. **Collaborators**: UNICEF and QCRI.
- Accelerated the discovery of 300+ migrant settlements that emerged in Colombia during the Venezuelan mass migration crisis using ML and time-series Sentinel-2 satellite images, thereby improving the efficiency of humanitarian aid and response operations. **Collaborators**: iMMAP Colombia and Premise Data.
- Managed a team of 5 ML researchers - responsibilities included setting and monitoring team goals and having regular 1:1 meetings for coaching and mentoring; organized the GeoAI Bootcamp, an internal training program consisting of lectures, workshops, and hackathon events to accelerate upskilling of junior ML researchers.

Philippine-California Advanced Research Institutes (CHED-PCARI) — Quezon City, PHL
Research Fellow II — Aug 2015 - Feb 2018

- Conducted research under the PCARI Project IIID 2013-054: Resilient Cyber-Physical Societal Scale Systems at the UPD Department of Computer Science, Computer Security Group; coordinated with a major water utility company for R&D of resilient cyber-physical infrastructure; developed a framework for finding optimal and resilient placements of hydraulic pressure sensors in water distribution networks using genetic algorithms (e.g. NSGA-II).

TECHNICAL SKILLS

- **Proficient**: 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
- **With experience**: Docker, Dataflow, Apache Beam, AzureML, MapBox
- **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

VOLUNTEER EXPERIENCE & COMMUNITY LEADERSHIP

Tutorials Co-lead | Climate Change AI - Core Team 2020 - Present

- Managing 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 creation of 25+ tutorials

Tech Lead of AI/ML | Women Who Code Manila 2017 - Present

- Facilitated monthly study group sessions where members can learn about best practices in AI/ML
- Co-organized Filipinas in Tech 2022: Women in Data Science featuring leading Filipina data scientists in the industry and academia as speakers and panelists, focusing on career development and special topics.

Social Impact Mission | Identifying Social Needs in La Guajira, Colombia May 8-12, 2019

- Conducted field visits in Bogota and La Guajira with UNICEF Colombia and iMMAP to assess the living conditions of Venezuelan migrants in informal settlements, leading to two USAID-funded AI for humanitarian action projects.

Reviewer/Meta-reviewer

- 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 (papers and tutorials)

PUBLICATIONS & PROCEEDINGS

- Doerksen, K.[1], **Tingzon, I.**[1], & Kim, D. (2024) "AI-powered school mapping and connectivity status prediction using Earth Observation." ICLR'24 Machine Learning for Remote Sensing Workshop. **Poster**.
- **Tingzon, I.,** Cowan, N.M., & Chrzanowksi, P. (2024) "Mapping housing stock characteristics from drone images for climate resilience in the Caribbean." NeurIPS'23 Workshop on Tackling Climate Change with Machine Learning. **Poster**. 13th International Conference on Climate Informatics. **Oral**.
- **Tingzon, I.**, Cowan, N.M., & Chrzanowksi, 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, pp. 3740-3747. AI for Humanitarian Assistance and Disaster Response ICCV'23 Workshop. **Oral.**
- **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. International Future Lab AI4EO Symposium 2022. **Best Poster Runner-up**.
- 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." NeurIPS'20 Workshop on Machine Learning for the Developing World (ML4D). **Oral. Best Paper**.
- Dejito, N., Flores, R. A., De Guzman, R., **Tingzon, I.**, Carvajal, L., Aroca, A., & Delgado, C. (2021). Mapping access to water and sanitation in Colombia using publicly accessible satellite imagery, crowd-sourced geospatial information, and random forests. AI for Humanitarian Assistance and Disaster Response NeurIPS'20 Workshop. **Poster**.
- **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. "Mapping new informal settlements using machine learning and time-series satellite images: An application in the Venezuelan migration crisis." IEEE/ITU International Conference on Artificial Intelligence for Good (2020), KDD'20 Fragile Earth Workshop. **Oral. 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, ICML'19 Workshop on AI for Social Good (AI4SG). **Poster**.

[1] equal contribution

TALKS & PRESENTATIONS

- **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.
- **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.** Invited Speaker at the Columbia Climate School - Spring 2024. 20 March 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 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
- **Identifying Ethical Issues in Earth Observation Research: Hands-on Tutorial with Case Studies**. Kochupillai, Mrinalini, Michael Schmitt, Simon Schneider, Conrad Albrecht, Matthias Häberle, Isabelle Tingzon. International Geoscience and Remote Sensing Symposium (IGARSS) 2023. Pasadena, California, USA.
- **Tutorial on Land Use and Land Cover (LULC) Classification using Pytorch and Google Earth Engine.** Climate Change AI Summer School 2022. 19 August 2022. Virtual. Colab Notebooks: Part 1 and Part 2
- **Data Science for Social Good**. Code Filipina 2019. 26 October 2019. Asia Pacific College, Makati, Philippines; Youth for Women in Technology Iloilo Chapter WiTalks Webinar. 18 August 2021.
- **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 and Tools 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 (DANE), 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.