Isabelle Tingzon

issa-tingzon.github.io | linkedin.com/in/issatingzon

RESEARCH & WORK EXPERIENCE

Disaster and Climate Risk Data Fellow
The World Bank, Global Facility for Disaster Reduction and Recovery (GFDRR)

Feb 2023 - Present
Washington DC, USA (Remote)

- Investigating the applications of ML/CV and Earth Observation data (e.g. RGB orthophotos, drone imagery, and LiDAR data) for building classification using LiDAR data and very high-resolution aerial imagery in the Caribbean under the Digital Earth for Resilient Infrastructure and Housing Project, with the goal of enhancing the resilience of vulnerable communities to climate change and natural hazards.
- Supervisors: Pierre Chrzanowski and Dr. Nuala Margaret Cowan

Beyond Fellow | AI4EO Beyond Fellows Program
AI4EO Future Lab, Technical University of Munich

Aug 2022 - Jan 2023
Munich, DEU

- Focus: Geospatial ML and CV for building attribute recognition; investigated the cross-country generalizability of ML and CV models trained on urban form features and multispectral satellite images (Sentinel-2)
- Member of the Generalizability & Transferability Working Group and the AI4EO Ethics Working Group at the Chair of Data Science in Earth Observation at TUM; co-authored papers and tutorials on the topics of building type classification and ethics in AI4EO, accepted at the Joint Urban Remote Sensing Event (JURSE) and the International Geoscience and Remote Sensing Symposium (IGARSS).
- Supervisor: Prof. Xiaoxiang Zhu

GeoAI Team Lead and Machine Learning Researcher
Thinking Machines Data Science, Inc.

Mar 2018 - Jul 2022
Taguig City, PHL

- Led a team of 7 ML researchers and engineers in the development of the GeoAI product, which leverages ML and CV algorithms for automated building footprint delineation and classification, land use and land cover (LULC) classification, and socioeconomic classification using multimodal geospatial datasets (e.g. satellite images, social sensing data, volunteered geographic information) to support network demand planning for major telecommunications companies across Southeast Asia. Clients: Globe Telecom
- Generated high-resolution nationwide maps of socioeconomic indicators (e.g. asset-based wealth index, education) across the Philippines using ML and CV techniques, ground truth demographic and health survey data, satellite imagery, social media data, volunteered geographic information, and other geospatial data sources in support of targeted humanitarian interventions led by UNDP Philippines and the Zero Extreme Poverty 2030 Movement. Collaborators: UNICEF Innovation and the Qatar Computing Research Institute.
- Accelerated the discovery of 300+ informal migrant settlements that emerged in Colombia during the Venezuelan mass migration crisis using random forests and historical Sentinel-2 satellite images, 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.
- Co-authored 5 peer-reviewed publications on ML and CV for socioeconomic development, humanitarian response, and health applications; conducted extensive literature review on ML/DL for climate change mitigation and adaptation to support grant proposal development under the Sustainability Team.

Research Fellow II
Philippine-California Advanced Research Institutes (CHED-PCARI)

Aug 2015 - Feb 2018
Quezon City, PHL

- 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 (CSG); coordinated with a major water utility company in Metro Manila for the research and development of resilient cyber-physical infrastructure; developed a framework for finding an optimal and resilient placement of hydraulic pressure sensors in water distribution networks using genetic algorithms (e.g. NSGA-II).
- Recipient of the PCARI Scholarship awarded to graduate student researchers under CHED-PCARI Projects.

Web Development Intern
Kalibrr

Jun - Aug 2014
Makati City, PHL

- Contributed to the development of a video recording widget for Kalibrr's online job-matching platform using CoffeeScript, Jade, and codec libraries; performed Python web scraping to populate a database for project demos.

Game Development Intern
Icannhas, Inc.

Apr - May 2014
Makati City, PHL

- Trained in mobile game development using Lua and Corona SDK and PC game development using Unity3D and C#.

EDUCATION

Master of Science in Computer Science
University of the Philippines Diliman
Grade: 1.15 (1.00 highest; 5.00 lowest)

Aug 2015 - Jan 2018

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

Jun 2011 - Jun 2015

TECHNICAL SKILLS

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

COMMUNITY OUTREACH & VOLUNTEER EXPERIENCE

Tutorials Lead | Climate Change AI - Core Team
2020 - Present
- Manage the CCAI Tutorial Series; responsibilities include developing tutorial notebook templates and guidelines, coordinating review efforts for tutorial proposals and notebooks, and providing feedback to tutorial authors to ensure technical correctness and broad accessibility.
- Member of the Workshop Steering Committee; co-organized the Tutorials Track at the Tackling Climate Change with Machine Learning Workshop at ICLR'23, NeurIPS'22, & NeurIPS'21.

Tech Lead of AI/ML | Women Who Code Manila
2017 - Present
- Facilitated monthly study group sessions where members can learn about the latest trends and best practices in data science and machine learning, with the goal of empowering more women to become leaders in tech.
- Co-organized the event 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 with the goal of designing methodologies for small area estimation of poverty and water and sanitation needs in territories lacking information using AI and Earth Observation.

Academic Services: Reviewer/Meta-reviewer
- **Journals**: Frontiers in Big Data - Data Analytics for Social Impact, Philippine Journal of Science (PJS), IEEE Latin America Transactions Special Issue on AI and Sustainability
- **Workshops**: Tackling Climate Change with Machine Learning Workshop at ICLR'23, NeurIPS'22, & NeurIPS'21
- **Grants**: CCAI Innovation Grants 2023

PUBLICATIONS & PROCEEDINGS

1. **Tingzon, Isabelle,** Nuala Margaret Cowan, Pierre Chrzanowksi. "Data Fusion of Post-disaster VHR Aerial Imagery and LiDAR Data for Roof Classification using Convolutional Neural Network." *Artificial Intelligence for Humanitarian Assistance and Disaster Response Workshop at ICCV 2023, submitted.*

2. **Tingzon, Isabelle**, James Matthew Miraflor, Xiao Xiang Zhu, Mrinalini Kochupillai. "Towards impactful applications of AI4EO in the Global South." *Joint Urban Remote Sensing Event (JURSE) (2023), International Future Lab AI4EO Symposium (2022).* **Runner-up Best Poster**. Poster.

3. Maksabedian Hernandez, Ervant, **Isabelle Tingzon**, Lorenzo Ampil, and Jessica Tiu. "Identifying chronic disease patients using predictive algorithms in pharmacy administrative claims: An application in rheumatoid arthritis." *Journal of Medical Economics* (2021).

4. Dejito, Niccolo, Ren Avell Flores, Rodolfo De Guzman, **Isabelle Tingzon**, Liliana Carvajal, Alberto Aroca, and Carlos Delgado. "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 (AI+HADR) Workshop NeurIPS Workshop* (2021).

5. Fatehkia, Masoomali, **Isabelle Tingzon**, Ardie Orden, Stephanie Sy, Vedran Sekara, Manuel Garcia-Herranz, and Ingmar Weber. "Mapping socioeconomic indicators using social media advertising data." *EPJ Data Science* (2020).

6. Ledesma, Chiara, Oshean Lee Garonita, Lorenzo Jaime Flores, **Isabelle Tingzon**, and Danielle Dalisay. "Interpretable poverty mapping using social media data, satellite images, and geospatial information." *Machine Learning for the Developing World NeurIPS Workshop* (2020). **Best Paper**.

7. **Tingzon, Isabelle**, Niccolo Dejito, Ren Avell Flores, Rodolfo De Guzman, Liliana Carvajal, Katerine Zapata Erazo, Ivan Enrique Contreras Cala, Jeffrey Villaveces, Daniela Rubio, and Rayid Ghani. "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 Fragile Earth Workshop* (2020). **Best Paper, Best Student Presenter**. Presentation.

8. **Tingzon, Isabelle**, Ardie Orden, Stephanie Sy, Vedran Sekara, Ingmar Weber, Masoomali Fatehkia, Manuel Garcia Herranz, and Dohyung Kim. "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* (2019), *AI for Social Good ICML Workshop* (2019).

INVITED TALKS & PRESENTATIONS

- **Harnessing Digital Innovation for Inclusive and Sustainable Risk Management.** Invited Panel Speaker at the GFDRR Partnership Days 2023. 22-23 May 2023. The World Bank Headquarters at Washington DC, USA.
- **Towards Responsible and Impactful Applications of AI and Earth Observation in the Global South.** 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. Presentation | Colab Notebooks: Part 1 and Part 2
- **Research and Challenges of ML/AI against COVID-19 and Climate Change in the Context of Developing Countries**. Invited Panel Speaker at the Practical Machine Learning for Developing Countries (PML4DC) Workshop ICLR 2021. 8 May 2021. Virtual.
- **Detecting Informal Settlements using Machine Learning, Satellite Images, and Mobile Apps**. Geo for Good Summit 2020. 20-22 October 2020. Virtual. Poster | Presentation
- **Data Science for Social Good**. Code Filipina 2019. 26 October 2019. Asia Pacific College, Makati, Philippines.
- **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, 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. Presentation
- **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. Presentation