Summer School 1: GeoPython Conference
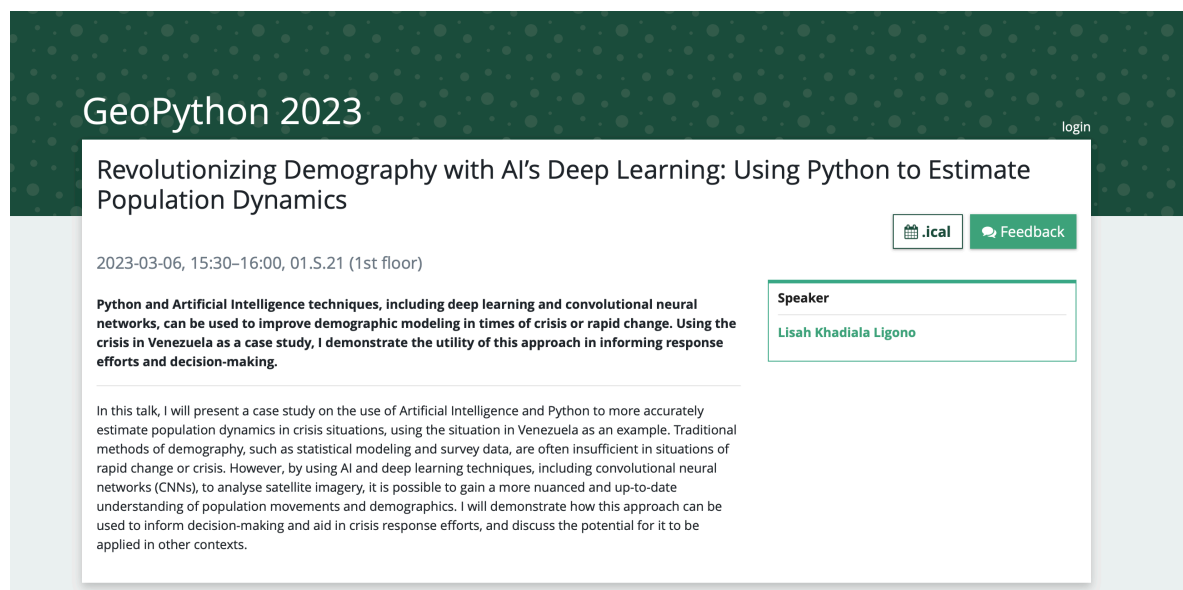# March 6-8, 2023
Basel, Switzerland

Introduction

I am Lisah Khadiala Ligono, an Erasmus Mundus scholar currently studying the Copernicus Master in Digital Earth at Paris Lodron Universität Salzburg and Université Bretagne Sud. I am passionate about using artificial intelligence and data to understand and address complex problems.

I was selected to participate in this year's 2023 GeoPython Conference in Basel, Switzerland (https://2023.geopython.net). The conference started in 2016, focusing on Python and Geo, its toolkits and applications. Key subjects for the conference series are the combination of the Python programming language and Geo.

Venue: The University of Applied Sciences and Arts North-western Switzerland (FHNW) is one of Switzerland's most innovative and highly-ranked universities of applied sciences. FHNW has modern campuses located in north-western Switzerland, near the borders of Germany and France. They are in close proximity to the cities of Basel and Zurich, as well as to national and international companies.

Background of my presentation

Summary of my presentation on the conference website

The use of Python and Artificial Intelligence techniques such as convolutional neural networks, has the potential to improve demographic modelling in times of crisis or rapid change. In this talk, I presented a case study on the use of these techniques to more accurately estimate population dynamics in crisis situations, using the situation in Venezuela as an example. My research aimed to demonstrate the utility of this approach in informing response efforts and decision-making.

Gap explored: Traditional methods of demographic modelling, such as statistical methods and survey data, may not be sufficient in times of crisis or rapid change. This is particularly true in the case of the crisis in Venezuela, where significant population movements have occurred due to political and economic instability. The use of satellite imagery and AI techniques may provide a more nuanced and up-to-date understanding of population dynamics and movements.

Why Venezuela?

One of the most under-studied humanitarian crisis despite being categorised to be in the same scale as Syria by the UNHCR. Furthermore, the crisis in Venezuela has had regional and international implications, with a large number of people fleeing the country in search of safety and assistance.

Humanitarian crises in 2023 ©IRC

Here is a link to the story map to view the methodology and results:
Click link here

Conclusion

The use of AI and Python in demographic modelling has significant potential in crisis situations, where traditional methods may not be sufficient. By using satellite imagery and deep learning techniques, we can gain a more comprehensive understanding of population movements and demographics. However, challenges remain, such as data availability and quality, and the need for specialized skills and expertise. This study demonstrated the potential of AI and Python in improving demographic modelling in times of crisis or rapid change. We believe that this approach has significant potential to aid in crisis response efforts and decision-making, not just in Venezuela but in other contexts as well. Further research and development are needed to refine the models and improve their accuracy.

Acknowledgement

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References

1. Encovi. (2019). Encuesta de Condiciones de Vida en Venezuela 2019. Retrieved from https://www.encovi.ucv.ve/
2. World Bank. (2019). World Development Indicators. Retrieved from https://databank.worldbank.org/source/world-development-indicators
3. Lang, Stefan, Dirk Tiede, Daniel Hölbling, Petra Füreder, and Peter Zeil. 2010. "Earth Observation (EO)-Based Ex Post Assessment of Internally Displaced Person (IDP) Camp Evolution and Population Dynamics in Zam Zam, Darfur." International Journal of Remote Sensing 31 (21): 5709–31. https://doi.org/10.1080/01431161.2010.496803.
4. Gella, Getachew Workineh, Lorenz Wendt, Stefan Lang, Dirk Tiede, Barbara Hofer, Yunya Gao, and Andreas Braun. 2022. "Mapping of Dwellings in IDP/Refugee Settlements from Very High-Resolution Satellite Imagery Using a Mask Region-Based Convolutional Neural Network." Remote Sensing 14 (3). https://doi.org/10.3390/rs14030689