Project 1: Landslide Inventory

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landslide inventory

CONTEXT

Landslide Inventories

In many parts of the world today, landslide inventories are being, and have been produced. Recently, there is a lot of interest in the use of machine learning approaches to execute this task—see the recent review [ESR] and references therein. However, once the susceptibility maps have been computed, there is the fundamental question: how should they be used?

In this project, we will:

- select and compare different ML methods for generating susceptibility maps from existing landslide inventories provided by PHIVOLCS;
- on the basis of these maps, produce decision-making tools (in the form of dashboards) that facilitate the interpretation of the hazard maps and quantify the consequences of risk-based decisions (VaR).

Value at Risk

Value at Risk (VaR) is a statistical technique that originated in financial risk management but has been increasingly applied to socio-economic and environmental contexts. An interactive dashboard for landslide susceptibility mapping based on Value at Risk (VaR) principles will enable decision-makers to analyze risk-cost relationships. It will extract data from the landslide inventory susceptibility maps and present them in a way that bridges the gap between technical risk assessment and practical decision-making by expressing complex landslide risks in terms of their socio-economic impacts.

Project Steps

1. Bibliographic research.

2. Data collection and preparation.

3. Application of ML approaches and their comparative evaluation based on carefully chosen metrics [APM].

4. VaR dashboards for selected regions.

References

References

[ESR] M. Alvioli, M. Loche, L. Jacobs, C. H. Grohmann, M. T. Abraham, K. Gupta, N. Satyam, G. Scaringi, T. Bornaetxea, M. Rossi, I. Marchesini, L. Lombardo, M. Moreno, S. Steger, C.A.S. Camera, G. Bajni, G. Samodra, E. E. Wahyudi, N. Susyanto, M. Sinčić, S. B. Gazibara, F. Sirbu, J. Torizin, N. Schüßler, B. B. Mirus, J. B. Woodard, H. Aguilera, J. Rivera-Rivera. A benchmark dataset and workflow for landslide susceptibility zonation. *Earth-Science Reviews*, Volume **258**, 2024, 104927. DOI or Science Direct

[APM] M. Kuhn, K. Johnson. *Applied Predictive Modeling*. Springer. 2013.