

GEO-AI Challenge for Landslide Susceptibility Mapping by ITU

Mohammad Alasawedah

masawdah@gmail.com

Introduction

Mapping landslides is indeed crucial in risk management, as it allows policymakers and stakeholders to assess the potential hazards, vulnerabilities, and exposure to landslide risks. This information is valuable for planning and implementing effective mitigation strategies and disaster preparedness. Machine learning and remote sensing technologies can significantly enhance the accuracy and efficiency of landslide mapping by analyzing various data sources such as satellite imagery, topographic data, and historical records.

DATA

In this study, we utilized data from 2020, including the average and 90th percentile of precipitation, a digital terrain model (DTM), the river network, and a land use/cover dataset. The training dataset consisted of polygon geometries, from which we randomly selected one point for training purposes. In contrast, the test dataset already comprised point geometries.

Next, we extracted the corresponding values for each point from the DTM and precipitation rasters. Additionally, we calculated the nearest distance from each point to each river segment. Finally, we retrieved the land cover category for each point using the land use/land cover geodataframe and encoded the extracted land use/land cover data for use in our modeling process.

Modeling

We employed the CatBoost classifier for landslide mapping and conducted a 5-fold cross-validation to assess the model's performance, resulting in a mean accuracy of 0.904. The model achieved a score of 0.832 on both the public and private leaderboards.

In conclusion, our analysis revealed that land use/land cover information emerged as the most influential feature, significantly enhancing the accuracy of our landslide mapping.