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CASE STUDY: INTEGRATING AI WITH GEOSPATIAL DATA TO UNDERSTAND CLIMATE
PATTERNS AND PREDICT CLIMATE-INDUCED DISASTERS

Abstract

CosmoX tackles a four-dimensional problem. On one dimension, the world is battling climate change and climate-induced disasters and epidemic outbreaks, migrations, species extinctions, and conflicts. On another dimension, with the dawn of the NewSpace era and the sharp and steady rise in the number of space actors and space-enabled services, the data that helps us understand the climate and respond to its threats is increasing at an exponential rate. Terabytes of daily raw data need levels of processing/analysis. On the third dimension, the people and organizations at the forefront of this battle need to derive valuable and actionable insights from different types of datasets that would otherwise require an immense amount of time, effort, money, and may require resources they may not have access to. On the fourth dimension, some applications or use cases may require higher temporal resolution or real-time data and insights.

This paper presents a case study in an endeavor to uncover valuable and actionable insights about the climate and to effectively predict, and respond to, its threats. In this case study we work with environmentalists, climate experts, disaster managers, developers, and citizen scientists to develop a solution. We implement a data science approach to tackle the biggest challenges and ask the right questions. We then explore, scrap, wrangle, and exploit data from diverse data sources/types, derive valuable and actionable insights, uncover patterns and make better and more informed decisions through both Artificial Neural Networks (ANN) and human-in-the-loop approaches. The outcome of the paper will be a compelling and an intriguing story answering the questions: Are there concealed patterns between climate change and some phenomena, anomalies, disasters, or events? What can we discover now that we didn't know? Why couldn't we discover this before? How to predict those phenomena, anomalies, disasters, or events? What can we do about them? What actions or policies are recommended to deal with those threats? And How to respond, warn, and inform decision/policy makers and the public about it?