

Natural Disaster Analysis & Response

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humanitaire™

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01 user story

Who are we doing this for?



user story

- As a non-profit, **humanitaire**[™] helps communities afflicted by natural disasters globally.
- We also want Anglosphere donors to understand the **necessity** of their contributions.



“Help others through humanitarian aid.”

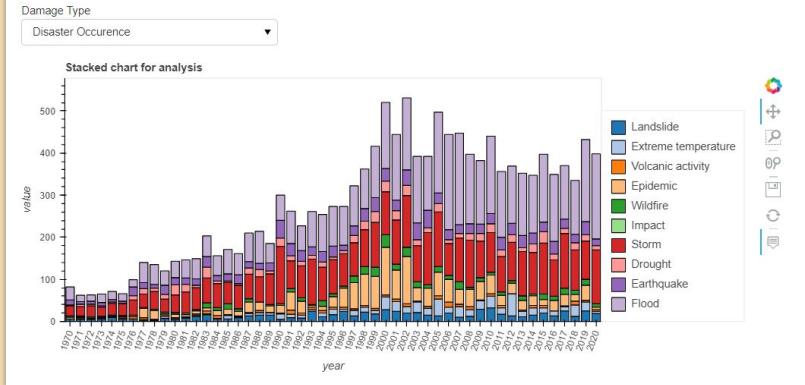


User Story

- Educate end-users about where their money is going and *why*.
- How?
 - Dashboard visualizing historical distribution of disasters.
 - Predict where disasters can occur and which communities will be underserved.

What type of disasters are most common?

We can also take a closer look at how often different types of disasters occur over a certain time period. Knowing the historical distribution of disaster data can help us prepare in the long-term; as the frequency of natural disasters increase year after year, we rely on donors now more than ever to assist us in helping tragedy-stricken communities rebuild after disaster strikes. Try filtering the data by the number of disaster occurrences, deaths, or economic damage incurred. Steadily, the monetary damage to communities increases over time - your donations help rebuild these areas faster.



02

Dataset

Where are we sourcing our data?



Dataset

- **EM-DAT**
 - Catalog of natural disasters from 1950-now with detailed info.
 - Subtypes, geographic info, human and economic losses, etc.
- **USGS Earthquake**
 - Detailed global earthquake history.
- **GDP per Country**
 - GDP/country from 1950-now.



03

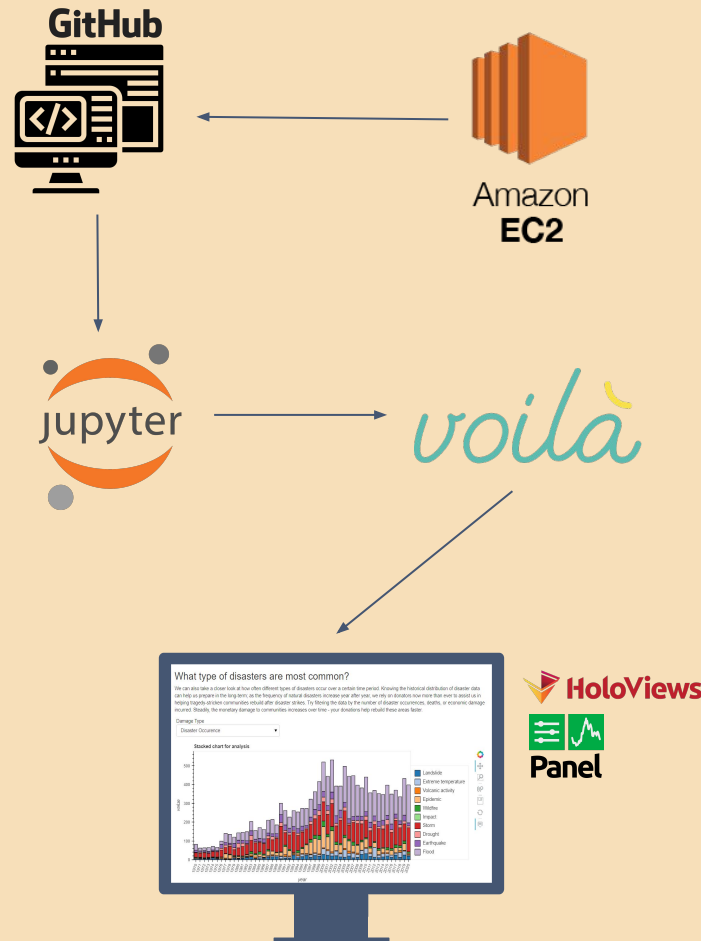
Demo

What do end-users see?



DASHBOARD

Hosted with Voilà, visualizations made
interactive with HoloViews and Panel.



Primer

- **CPI:** Community Preparedness Index
 - Score of how prepared a community is to aid children in a disaster; computed across multiple sectors (hospitals, emergency shelters, child care, etc.).
- Our dashboard provides **visualized statistics** of disaster losses geographically and temporally.
- Predict future **CPI** and **earthquake** occurrence.

waiting...



04

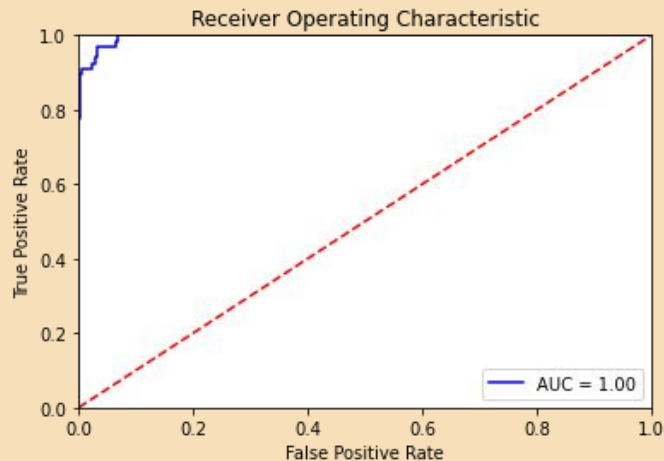
analysis

How and why did we do it
this way?



models

- Our model has some deficiencies:
 - Constrained by limited dataset.
 - ROC plot implies our model performs well, but visualizations say otherwise.
- How to improve robustness?
 - Test with data-insensitive methods (e.g. Bayesian networks).
 - Also neural networks.
 - ... Get more data.



DATASET

- **EM-DAT** is actually limited when cleaned using naive methods (e.g. 'dropna').
 - Works alright for historical analysis and plotting.
 - Inadequate for all predictive modelling!
- **Our solution:** get additional data sets for earthquake prediction.



OKR DEVELOPMENT

- Project broken down into:
 - Visualizations ✓
 - Machine learning model development ✓
 - Deployment to AWS ✓
 - Pytest coverage (> 80% test coverage) ✓
 - Sphinx documentation maintenance ✓
 - Github to host our code repository ✓
- Progress made quickly early on
 - Later tasks were not broken down enough, so progress appeared to stall.



**Any
questions?**

