REDESIGN: ENHANACADEMIC POSTER: INNOVATIONS IN DATA VISUALIZATION FOR CLIMATE RISK, HUMAN TRAFFICKING DETECTION, AND SEISMIC ACTIVITYCING GLOBAL DATA VISUALIZATION

INFO 301
Prof Luyao Zhang
Chenshuhao Qin

Critical Analysis of Climate Risk Visualizations

The analysis of climate risk maps in “Leveraging the Cloud for Rapid Climate Risk Assessments” reveals effective use of color gradients for risk categorization and asset-level decision-making. However, limitations such as ambiguous geographic coverage, undefined risk score methodologies, and missing temporal context hinder their full potential. Proposed enhancements include hexagonal binning to resolve cluster overlaps in dense regions, dynamic layers for mitigation infrastructure, and interactive sliders to project risk across different warming scenarios. These improvements align with FAIR data principles, ensuring interoperability and reusability. By integrating socioeconomic indicators and temporal projections, these visualizations could empower policymakers and corporations to prioritize climate adaptation strategies with greater precision.

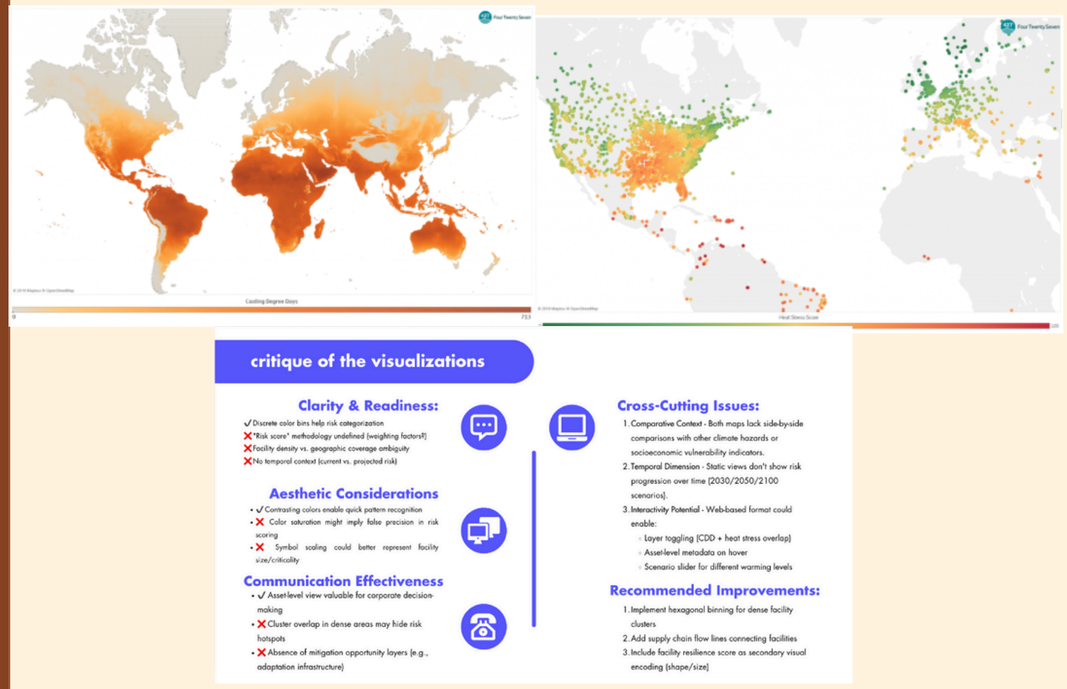

Figure 1. Original Maps and Flowchart of LLM’s Critique (created by Canva)

TRAFFICVIS: A COLLABORATIVE TOOL AGAINST HUMAN TRAFFICKING

Addressing the pervasive issue of human trafficking, TRAFFICVIS bridges algorithmic detection and human expertise through an interactive dashboard. Built using participatory design with domain experts, the system connects text-based micro-clusters (via InfoShield algorithms) into meta-clusters using metadata like phone numbers and geographic spread. The interface features panels for temporal analysis, geographic mapping, and ad-text inspection, enabling experts to label meta-clusters in 2–4 minutes —a tenfold efficiency gain over manual methods. Law enforcement agencies benefit from its ability to distinguish trafficking operations from legitimate activities, while its open-source framework promotes broader adoption. Future work includes integrating spatial trajectory analysis and refining the UI to support downstream tasks, underscoring the tool’s potential to combat organized crime globally.

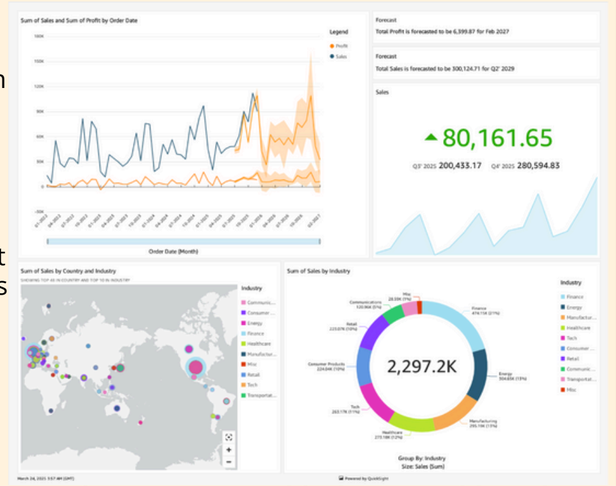

Figure 2. Geographical Map Dashboard Example (Created by QuickSight)

Earthquake Visualization: Open Data for Public Awareness

A Python-based interactive map, powered by real-time USGS data, demonstrates the value of open geospatial tools for disaster preparedness. Using Folium and Pandas, the project plots global seismic activity with magnitude-scaled markers and dynamic popups. While the current version highlights spatial clusters and risk zones, future iterations aim to incorporate time-based animations, historical comparisons, and contextual layers like tectonic plate boundaries. Such enhancements could transform the tool into a platform for emergency response planning and public education, fostering resilience in vulnerable regions.

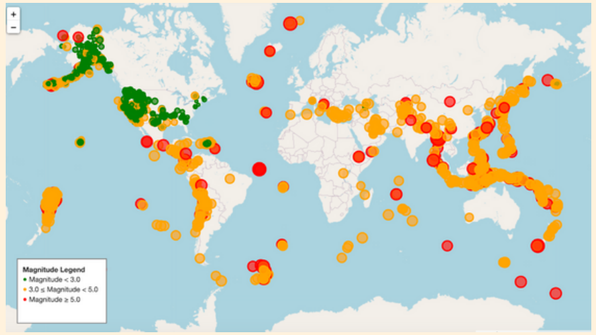

Figure 3. EarthQuake Visualization Redesign colored with Level Index Ranges

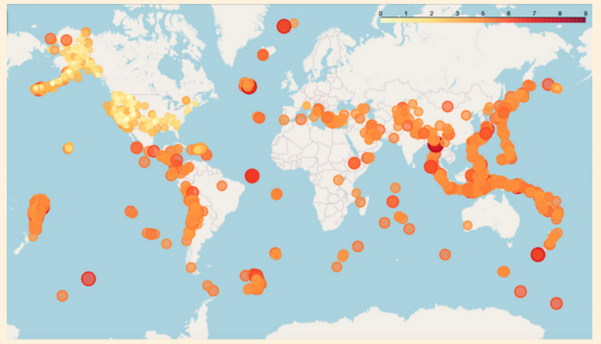

Figure 4. EarthQuake Visualization Redesign colored with Gradual Level Index

Figure 5. EarthQuake Visualization Details Example when touching the Signal