ZIXUAN LI | INFOSCI 301

Redesigning Climate Risk Heatmap for Improved User Experience

Github link: https://github.com/PadparadschaNero/InfoSci301_Individual_Project

Disclaimer: *Course project for INFOSCI 301 – Data Visualization and Information Aesthetics, instructed by Prof. Luyao Zhang, Spring 2025.*

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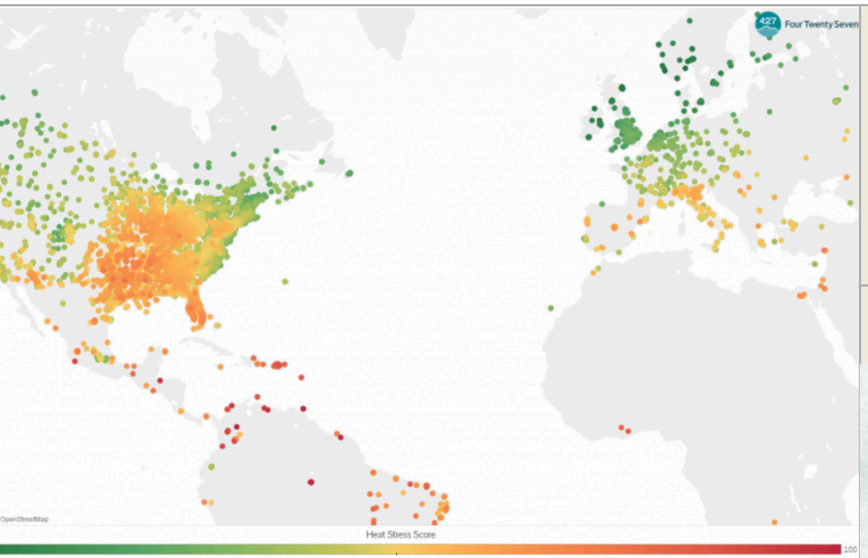

Figure 1. Heat stress exposure for corporate facilities (Gannon 2019)

01. Introduction - Critical Engagement with Visualization Methodologies

- Critiqued the AWS heat stress risk map for limited color differentiation, poor accessibility, and regional clarity issues.
- Applied FAIR data principles and affective design theory to suggest improvements, including better color schemes, clearer geographic labels, and reducing visual clutter through hexbin maps.
- Proposed using tools like Python and Amazon QuickSight to enhance data transparency and visual clarity.

02. Literature Review

- Reviewed affective visualization theory, emphasizing how emotional design improves user engagement, memory, and understanding.
- Summarized challenges in defining and applying affective visualization.

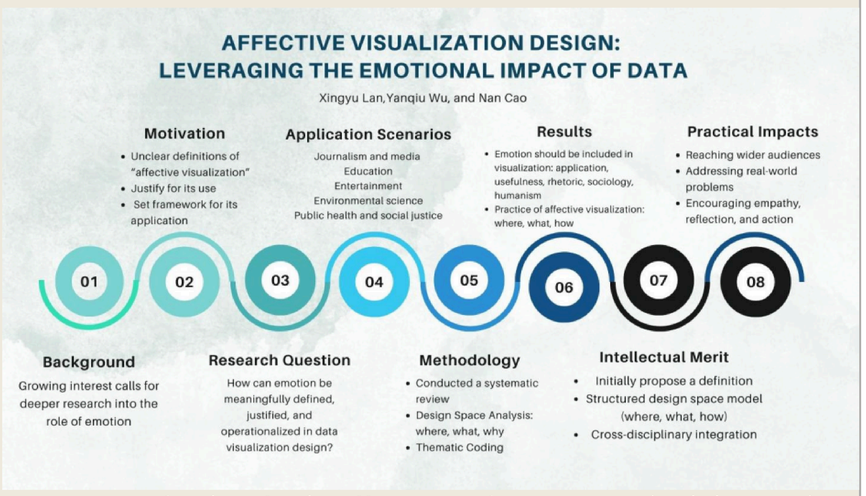

Figure 2. Flowchart for the Affective Visualization Design (made by Canva)

03. Practice - Tool-Driven Redesign Preparation

- Conducted experiments using Amazon QuickSight on a sample dataset.
- Visualized trends through line charts, KPI indicators, donut charts, and stacked bars to analyze regional sales and profit patterns.
- Identified strengths (ease of use) and limitations (steep learning curve for advanced functions) of QuickSight for beginners.

04. Methodology - Tool-Driven Redesign Preparation

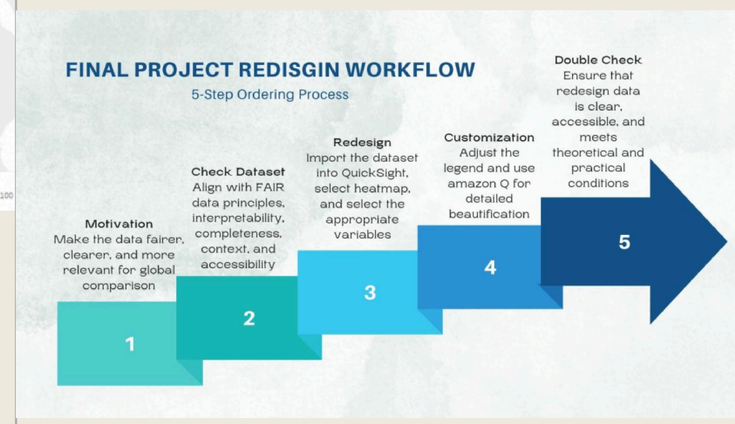

Figure 3. Redesign with Amazon QuickSight: Total number deaths (made by Canva)

05. Innovation – Final Redesign and Integration

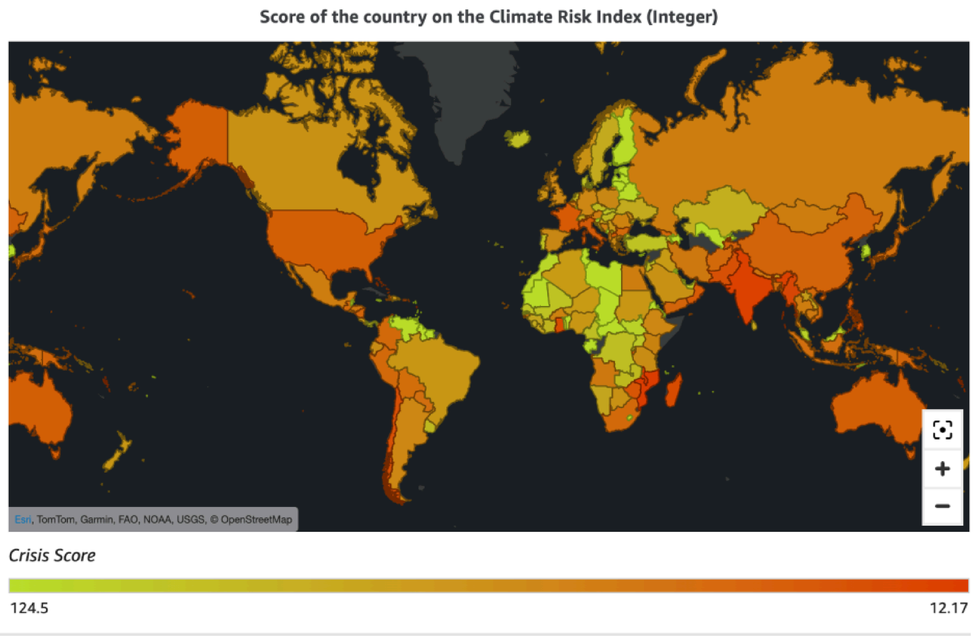

Figure 4. Redesign with Amazon QuickSight: crisis score

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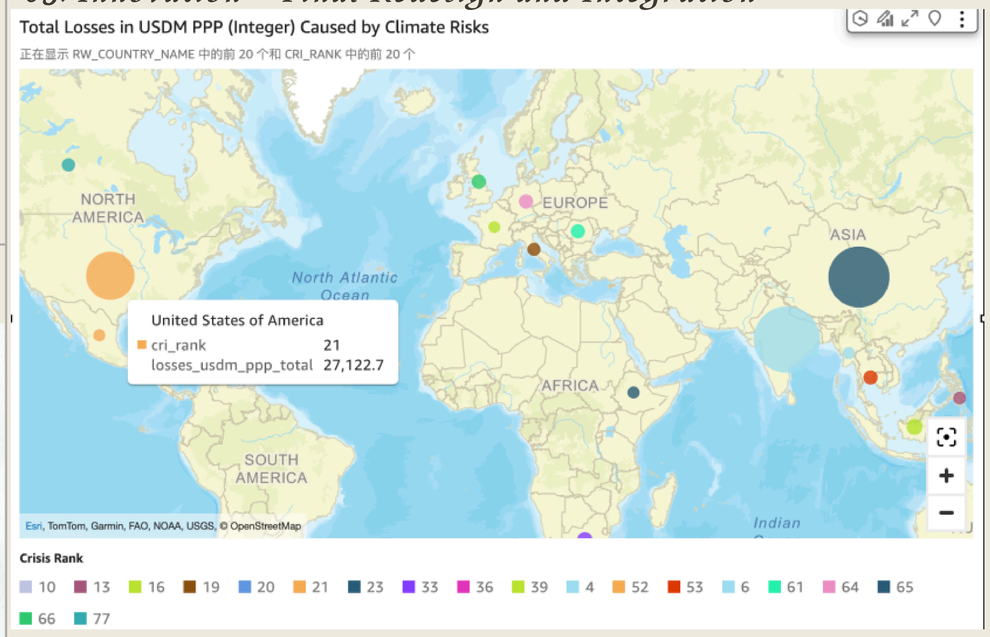

Figure 5. Redesign with Amazon QuickSight: Total number deaths

- Used Kaggle's global climate risk index dataset to redesign climate risk visualizations.
- Created a multi-dimensional filled map showing risk scores and a bubble chart visualizing climate-related economic losses.
- Enhanced interpretability, emotional resonance, and policy relevance by using clearer metrics, interactive features, and simplified design.

06. Statement of Contribution to SDGs

Figure 6. SDGs' icons

- Aligned the project with SDG 13 (Climate Action) and SDG 11 (Sustainable Cities and Communities): **Promoted** data transparency, equitable information access, and public environmental education and **supported** evidence-based planning for climate mitigation and sustainable development.

07. Future Research Direction on Digital Humanities

- Inspired by exhibits at the Zhouzhuang Mystery of Life Museum, emphasized integrating emotional storytelling into scientific visualization.