

# Redesigning Climate Risk Heatmap for Improved User Experience

By: Gbemisayo Adelaja

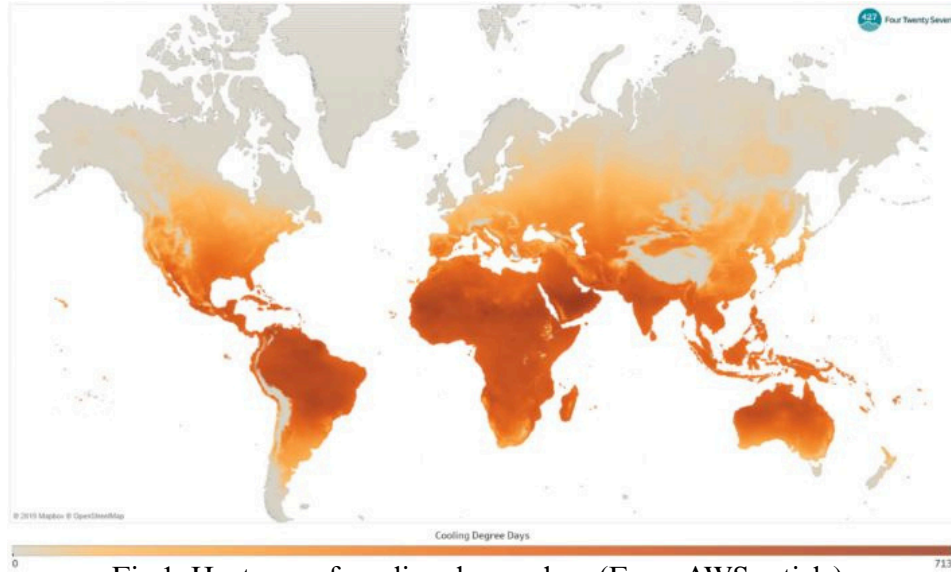


Fig 1. Heatmap of cooling degree days (From AWS article)

## Critique of the Original Visualization

The original AWS heatmap showed CDD across regions. It lacked **color contrast**, **geographic markers** and **metadata**. It had no interactivity or legend which **reduced accessibility**. The original dataset was not found which violated **FAIR principles** (transparency, reusability, interpretability).

## Theory: Visualization Principles and FAIR Framework



Heatmaps: Show spatial/scalar patterns (Munzner, 2014, p. 145).  
Snake race bar charts: Highlight temporal trends (p. 125).  
Radial bar charts: Emphasize cyclical data (p. 130).  
All support FAIR goals: **clarity**, **metadata**, and **accessibility** (Wilkinson et al., 2016).

## Research: Role of LLMs in Visualization Accessibility



LLMs help **non-experts** interpret data visuals (Choe et al., 2024).  
**Tooltips** reduce cognitive load and improve understanding (Ware, 2012).  
Supports **inclusivity** and informed **decision-making**.

## Tools Used



Used Python libraries: pandas, numpy, plotly.  
**Simulated data** due to lack of original dataset.  
Chose Python over QuickSight for better **flexibility** and **customization**.

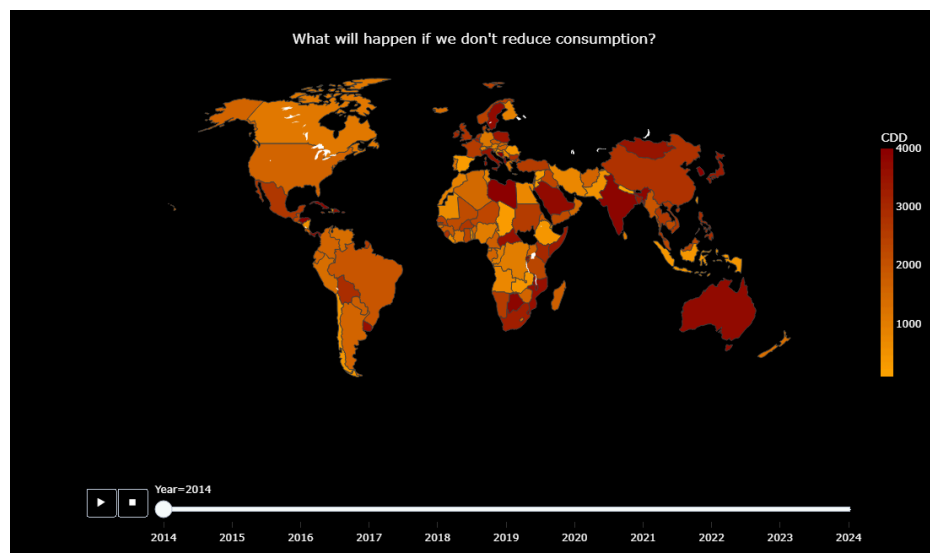


Fig 2. Heatmap redesigned (created using python code)

## Final Redesign Explanation

The redesigned Heatmap improved the **contrast** between the colors. There is an **interactive hover** for data values. It has an **animation control** which allows the viewers to play the video and see changes over the years. They have **LLM-guided tooltips** that off real-time explanations. This enhances **user engagement**, **accessibility** and **climate data insight**.

## Additional Visualizations

Based on the type of data (**Quantitative and Categorical**), here are other ways to visualize the data that can also help improve interpretability of the data. The **snake race bar chart** shows animated CDD rankings by year while the **radial bar chart** shows seasonal changes. They also have similar interactive feature with the Heatmap.

The target audience for the redesign is the general public

Who is leading in destroying our planet?

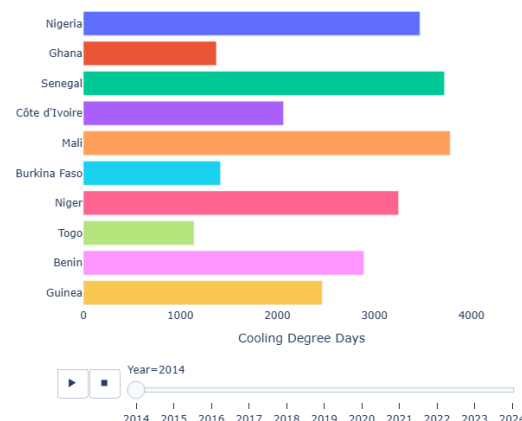


Fig 3. Snake race bar chart (python code)

Which countries should be held more accountable?

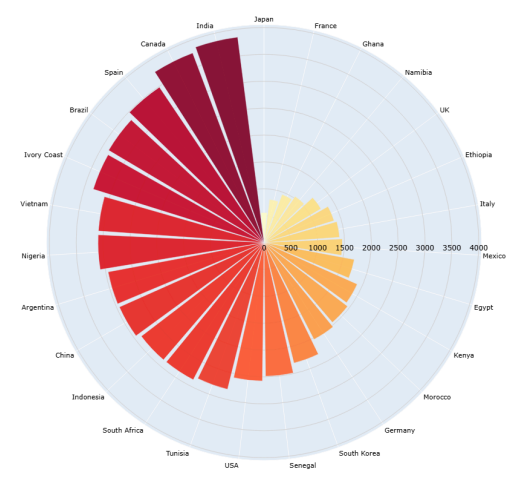


Fig 4. Radial chart (python code)

Disclaimer: Course project for INFOSCI 301–Data Visualization and Information Aesthetics, instructed by Prof. Luyao Zhang at Duke Kunshan University, Spring 2025. **GitHub link**: <https://github.com/Gbemisayo1/Infovis-Re-design/tree/main>

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