FEELING THE HEAT: AN INTERACTIVE REDESIGN OF GLOBAL CLIMATE VISUALIZATION

INFOSCI 301 | Yiqing Wang | Prof. Luyao Zhang

Project Overview

Goal:

Redesign a static CDD map into an interactive, emotionally engaging visualization that supports deeper analytical insight, using open climate data and storytelling-based design.

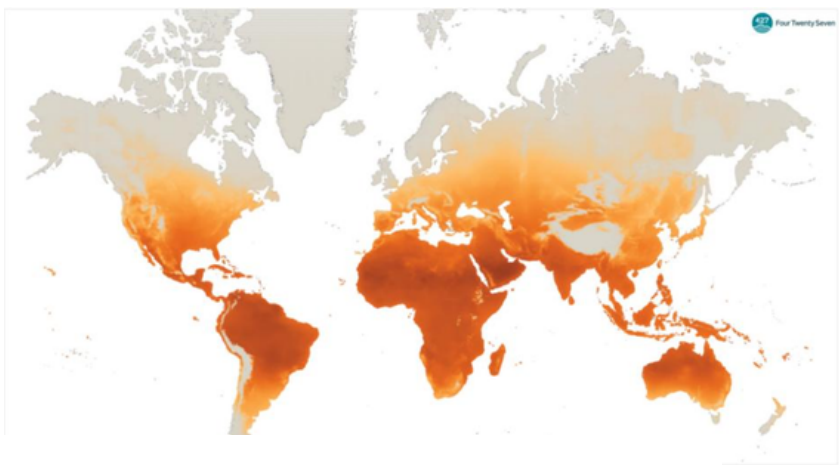


Figure1: Static choropleth map visualizing the projected increase in Cooling Degree Days (CDD) across the globe

Approach:

Blend visualization theory (textbook) and research (literatures), and interactive prototyping in Google Colab.

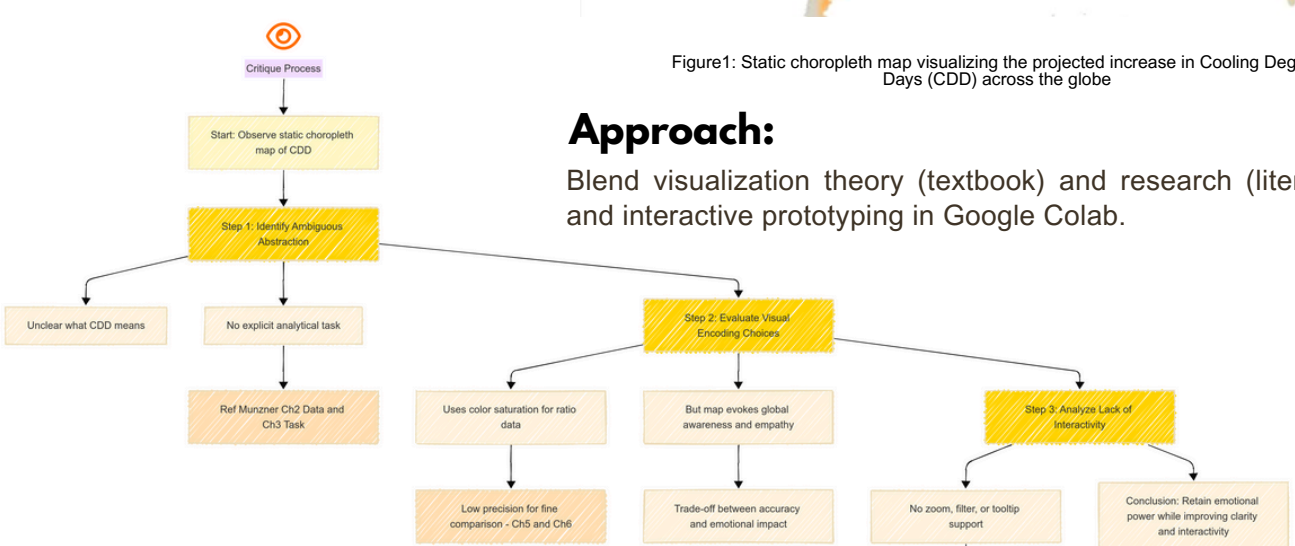


Figure2. Flowchart of Critique Process (Created by Mermaid Live Editor)

Theoretical + Research

- Task abstraction & perceptual channels – Munzner (2014)
- Affective visualization framework – Lan et al. (2023)
- Climate visualization principles – Mahyar (2024)
- Color Psychology – Elliot et al. (2015)

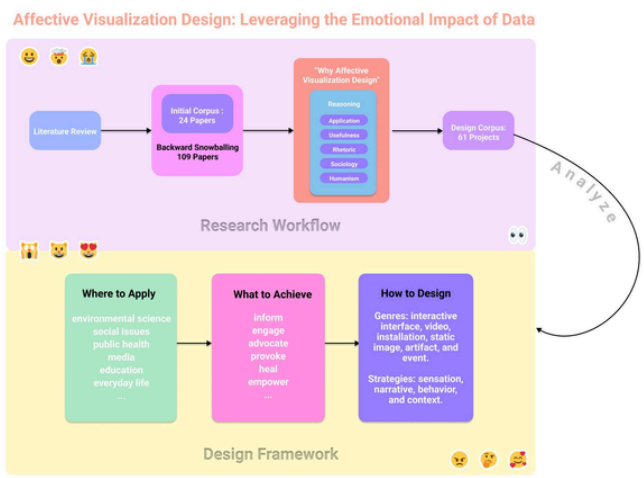
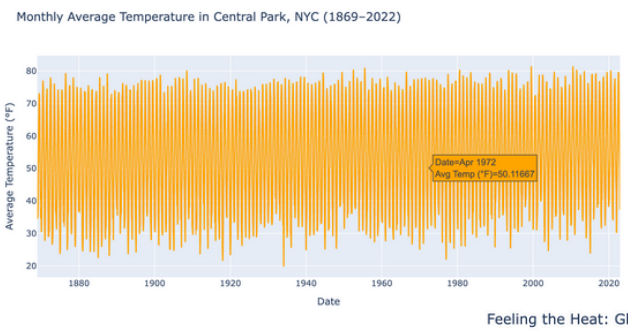
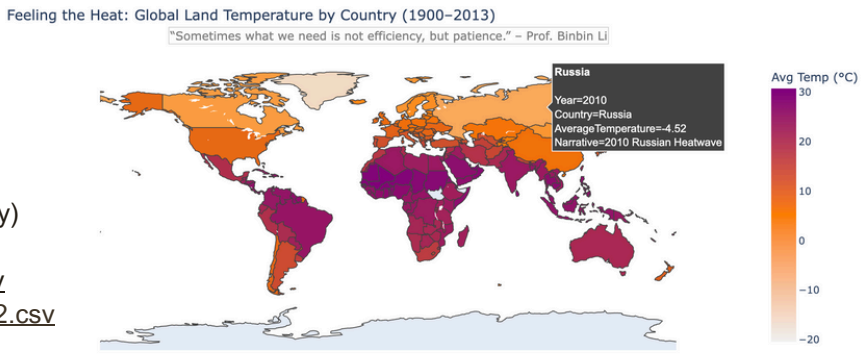


Figure3: Research pipeline of the paper by Lan et al. (Created by figma)





Implementation

Toolchain:

• Google Colab + Python (Pandas, Plotly)
• Dataset:
GlobalLandTemperaturesByCountry.csv
NYC_Central_Park_weather_1869-2022.csv

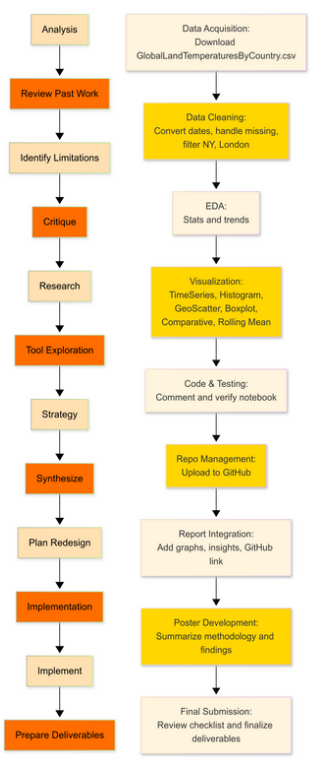


Figure6(left).The overall redesign workflow
Figure7(right).The final project implementation process
(Created by Mermaid Live Editor)

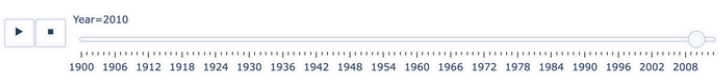


Figure4&5: Redesign Choropleth Map of Global Climate Visualization

Features:

1. Dynamic choropleth map
2. Custom bone👉orange👉purple color scale
3. Hoverable numeric tooltips
4. Embedded narrative cues
5. Timeline slider (1900–2013)
6. City-specific historical view for empathy
7. Reflective storytelling design

Workflow & Process

🔗Github link： https://github.com/Yiqing-Wang-05/design_graph

Acknowledgements

Thanks to Prof. Zhang for instructional support, and to all peers whose feedback helped shape this project. And also thanks guest speakers David Schaaf and Dongping Liu for their inspiring insights on immersive education and real-world visualization applications. And special thanks to Prof. Binbin Li (Environmental Science, DKU) for her insights on the emotional power of local context and the importance of patience and open-ended reflection in climate communication.

Contribution to Sustainable Development Goals (SDGs):

Figure8-10. Logos for SDG 13 (“Climate Action”), SDG 4 (“Quality Education”), and SDG 11 (“Sustainable Cities and Communities”), retrieved from https://sdgs.un.org/goals/goal13

Future Research Direction on Digital Humanities:

Figure 11. Two plastinated human specimens displayed in a joyful posture at the Mystery of Life Museum, Zhouzhuang. This exhibit inspired a shift in thinking about affective climate communication—toward hope, empathy, and positive motivation. Image captured by the author during the DKU field trip on April 25, 2025.

References:

Amazon Web Services. Amazon QuickSight. Retrieved April 13, 2025, from https://quicksight.aws.amazon.com/
Ackerman, E. (2022, November 10). Color psychology for kids: How color affects behavior and learning. The Spruce. https://www.thespruce.com/color-psychology-for-kids-2504750
Braswell, D. (n.d.). New York City weather 1869–2022. Kaggle. Retrieved April 18, 2025, from https://www.kaggle.com/datasets/danbraswell/new-york-city-weather-18692022
Elliot, A. J., & Maier, M. A. (2015). Color psychology: Effects of perceiving color on psychological functioning in humans. Frontiers in Psychology, 6, 368. https://doi.org/10.3389/fpsyg.2015.00368
Google. Google Colaboratory. Retrieved April 13, 2025, from https://colab.research.google.com/
Kaggle. Climate Change: Earth Surface Temperature Data. Retrieved April 13, 2025, fraom https://www.kaggle.com/datasets/berkeleyearth/climate-change-earth-surface-temperature-data
Lan, X., Wu, Y., & Cao, N. (2023). Affective visualization design: Leveraging the emotional impact of data. IEEE Transactions on Visualization and Computer Graphics, 29(1), 1–10. https://doi.org/10.1109/TVCG.2022.3209372
Mahyar, N. (2024). Harnessing visualization for climate action and sustainable future. Proceedings of the IEEE VIS Conference. https://doi.org/10.48550/arXiv.2410.17411
Munzner, T. (2014). Visualization analysis and design. CRC Press.
Knsv, & Mermaid Community. (2024). Mermaid Live Editor. Retrieved April 13, 2025, from https://mermaid.live/