

Visualizing CO₂ Emissions

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Dr. Geoffrey Roest



Mentor: Scooter Nowak

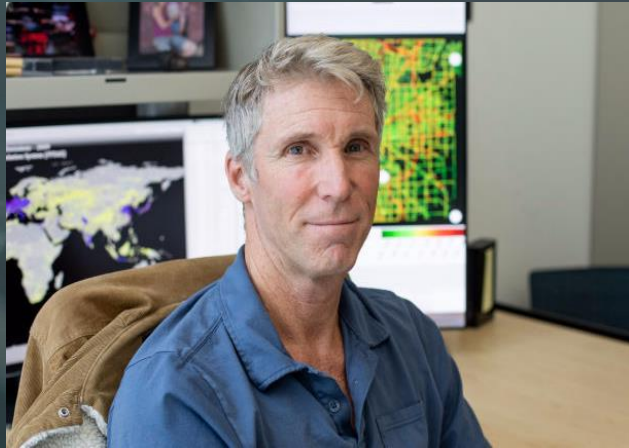
Kiley Jacobs - Team Leader, Back-End Coder

Tung Nguyen - Recorder, Architect

Yisheng Wang - Front-End Coder

Zihang Shen - Front-End Coder

Our Clients



Professor Kevin Gurney

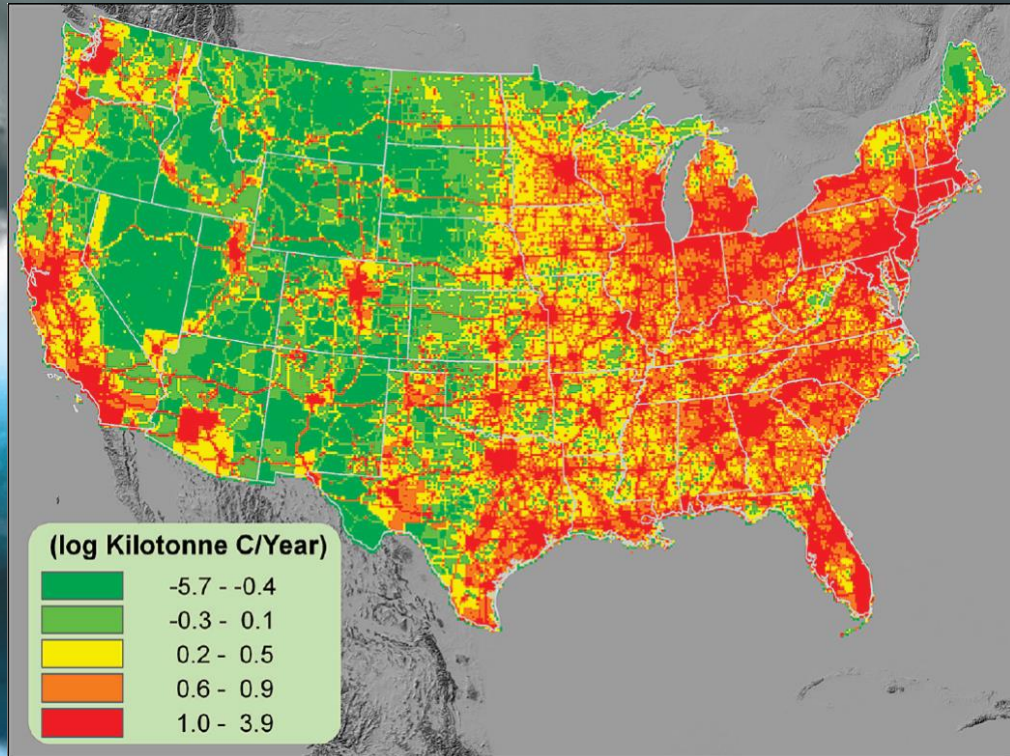
- Specializes in atmospheric science, ecology and public policy
- 25 years with UNCCFC



Doctor Geoffrey Roest

- Postdoctoral Researcher

Our Clients' Work



- The project has been going on over a decade
- Develop a system that quantifies and visualizes greenhouse gases
- 20-30 TB of data related to CO₂ emissions
- Primary sponsor: NASA

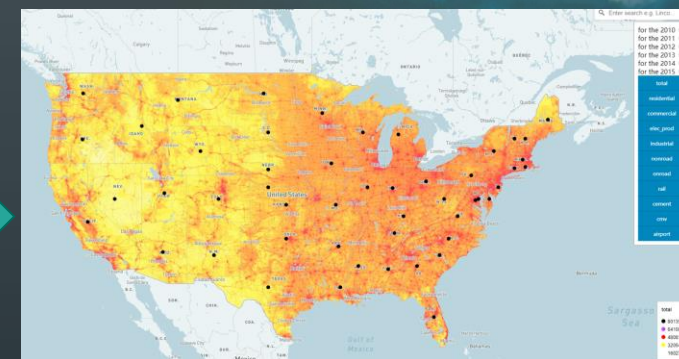
Problem Statement

- Data are only available in technical formats
 - Required specific software
- No user interaction
 - Only pictures and videos of CO2 emission map
- Information is hard to interpret and analyze
 - No tools to compare these data

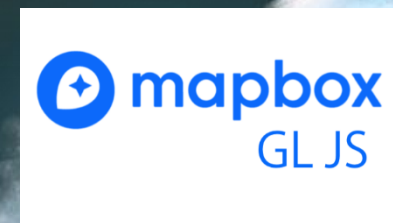
Solution Overview

- Convert and colour the raster layer
 - Conversion from static 32 bit float data to unsigned 8 bit
 - Use GDal to colour the layer
- A Web map application for CO2 emission in U.S.
 - Several different ways for users to interact
 - Switch the map and layer
 - Search location
 - Show the info for each states, etc.
- Pages for emission ranking and download

Solution Overview



Raster Data



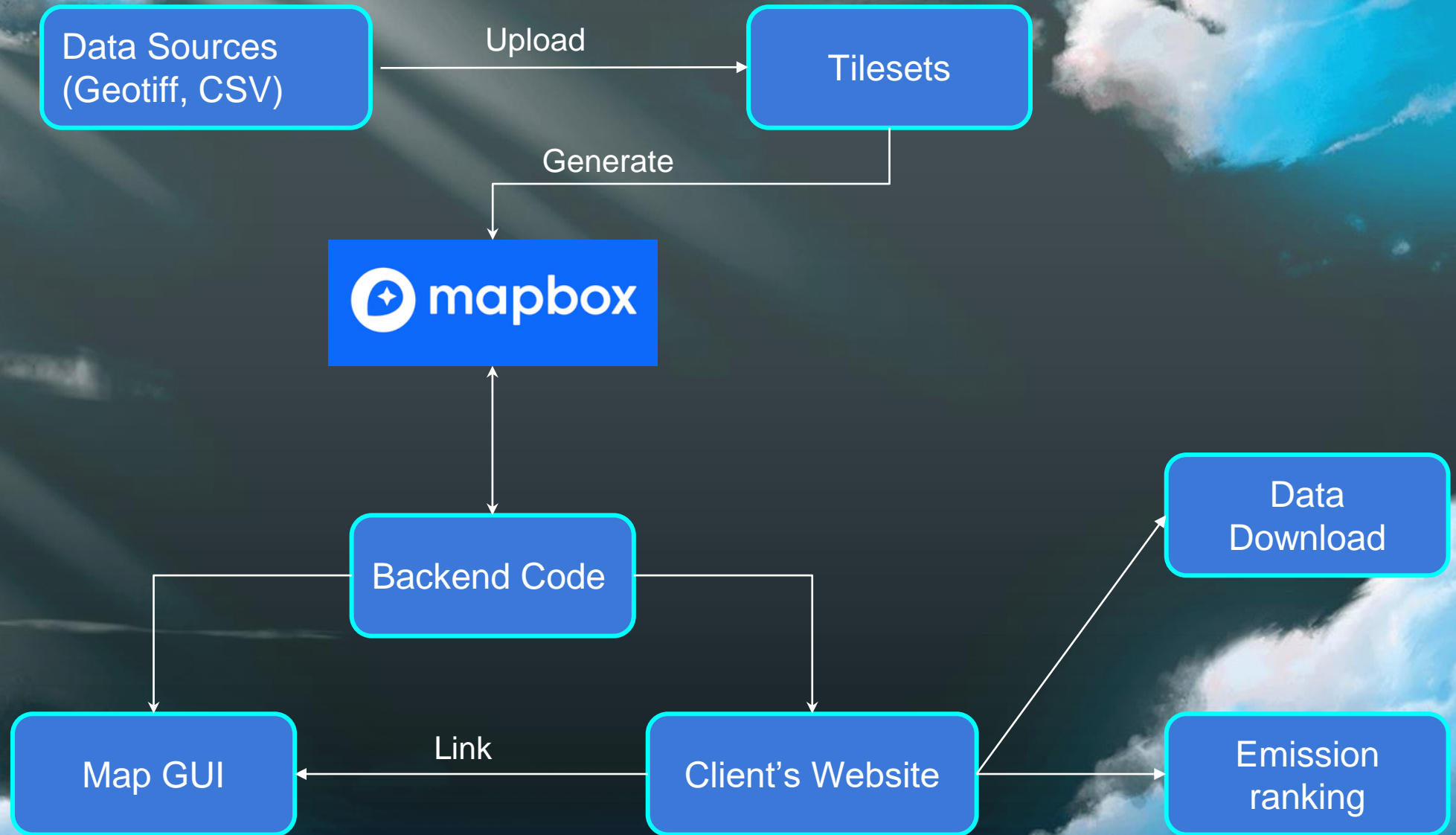
Key requirements

- Colour the raster layer basic on the calculate of Max_Value
- Display CO2 Emissions data in the form of raster data
- Provide some user interaction
- Display data ranking and download data

Implementation Tools



Architecture Overview





Live Demo

Challenges

- Change source buttons' color after click
- Take a few seconds to load layer
- Original file format can't upload in Mapbox

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resolution

- use a circular algorithm to change.
- maybe we can improve it.
- Conversion 32 bit to 8 bit
Use GDal to colour layer



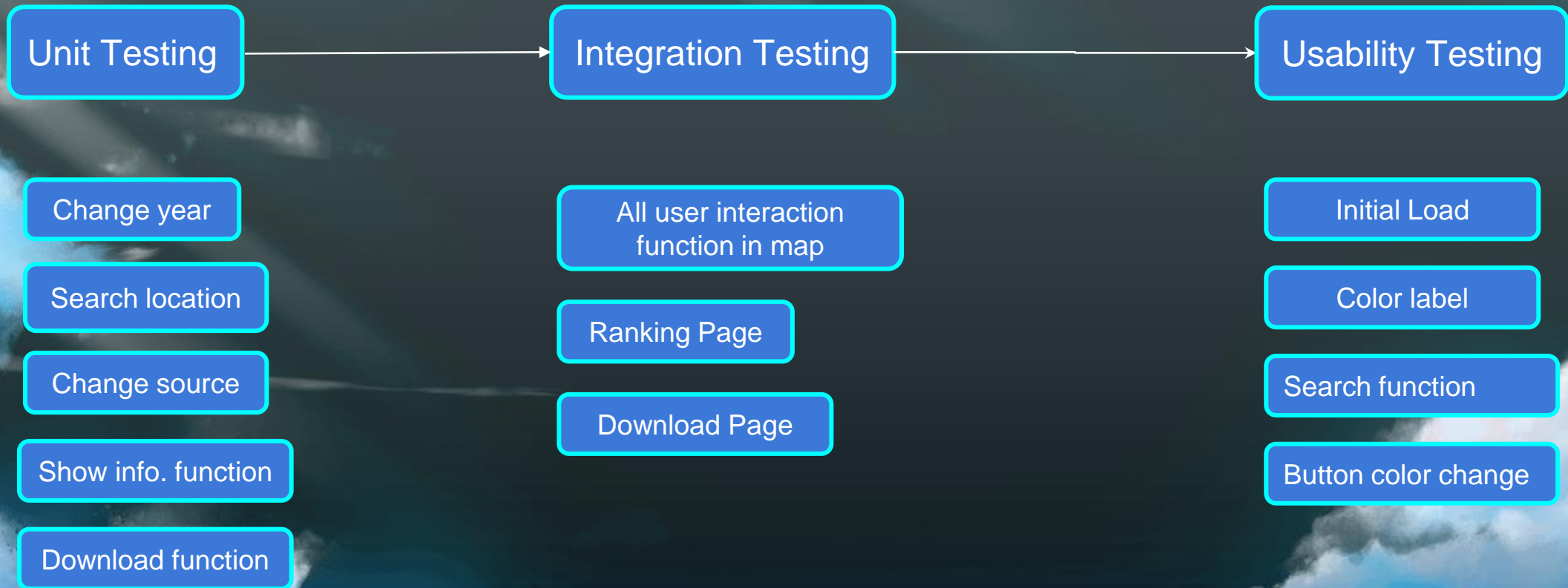
Challenges solved

- Give layer color
- Combine function
- Color label

Schedule

		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17	
Team website		Green		Green															
Map GUI	Change layer	Green	Green	Green	Green	Green	Green	Green	Green										
	Map switch by different year	Green	Green	Green															
	Switch layer by different source	Green	Green	Green															
	Associate CO2 emission with color	Green	Green	Green	Green	Green	Green	Green	Green										
	Show info. under mouse pointer	Green	Green	Green	Green	Green	Green	Green	Green										
	Location search	Green	Green	Green	Green														
Website	Emission ranking											Green							
	Data download											Green							
	Combine												Green						
Function testing	Unit Testing													Green					
	Integration Testing													Green					
	Usability Testing													Green					
Final Build																		Red	
																			Blue
		<p>Green: things already completed Red: things in process Blue: things in the future</p>																	

Testing Plan



Future works

- Maps SDK for IOS
- Maps SDK for Android
- Show emission change more detail

Conclusion

Problem: Our clients have lots of technical data they wish for people to see, but is not easily accessible

Solution: Create an interactive map that is easy for users to use, interpret, and provide analysis

Plan: To optimize the prototype and begin testing

Questions?



(Website)