Karl Hu Josefsson
Dr. Alark Joshi
Data Visualization

Data Visualization Final Project Proposal

Basic Information

- **Project Title:** COVID-19 Global Impact Explorer: Interactive Analysis of Pandemic Effects
- **Name:** Karl Josefsson
- **Email:** kfhujosefsson@dons.usfca.edu
- **GitHub Repository:** https://github.com/karldif01/DataViz-FinalProject
- **Project Website:** https://karldif01.github.io/DataViz-FinalProject/

Background and Motivation

The COVID-19 pandemic represents arguably the most significant global disruptions in modern history, affecting almost every aspect of human life across the planet. By visualizing pandemic data alongside economic and social, I want to create an interactive tool that reveals patterns in how countries responded to and were affected by the crisis. This project will help users understand the complex relations between public health measures, economic impacts, and social responses during a global emergency. My true personal motivation is my personal anger regarding how Sweden handled COVID-19 horribly, and I'd like to see how the rest of the world was affected through different aspects.

Project Objectives

1. **Compare pandemic magnitudes:** Enable users to explore how different countries were affected by COVID-19 in terms of mortality and case rates.
2. **Visualize economic impacts:** Demonstrate the pandemic's effect on key economic indicators (GDP, unemployment, stock markets) across regions and over time.
3. **Analyze mobility patterns:** Show how human movement changed during lockdowns and restrictions, and how these changes correlated with infection rates.
4. **Explore recovery trajectories:** Allow users to compare how different countries and regions have recovered from pandemic impacts across multiple dimensions (health, economic, social).

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Data

- Our World in Data COVID-19 Dataset - global dataset on COVID-19 cases, deaths, testing, vaccinations, and policy responses
- Google COVID-19 Community Mobility Reports - data showing movement trends across different places
- World Bank Open Data - economics dataset
- Oxford COVID-19 Government Response Tracker - governments policy responses
- Johns Hopkins University COVID-19 Data Repository - time series data on cases and deaths globally

Data Processing

When it comes to the cleaning part, one big thing would be to match country names across the different datasets. Another would be dealing with missing values for some countries with limited data. Lastly would be grouping time series data into daily, weekly, monthly and yearly categories. My plan right now is to use Python to clean it, as well as its in build date and time feature to normalize it.

From the data, I would like to create a single value that represents how severely a country was impacted by combining data such as case and mortality rates. This makes comparing different countries more straightforward rather than trying to look at multiple separate metrics at the same time. I would like to create the same thing for an economical impact. Probably some interesting metric regarding how people travelled during that time period, in regards to different government rules.

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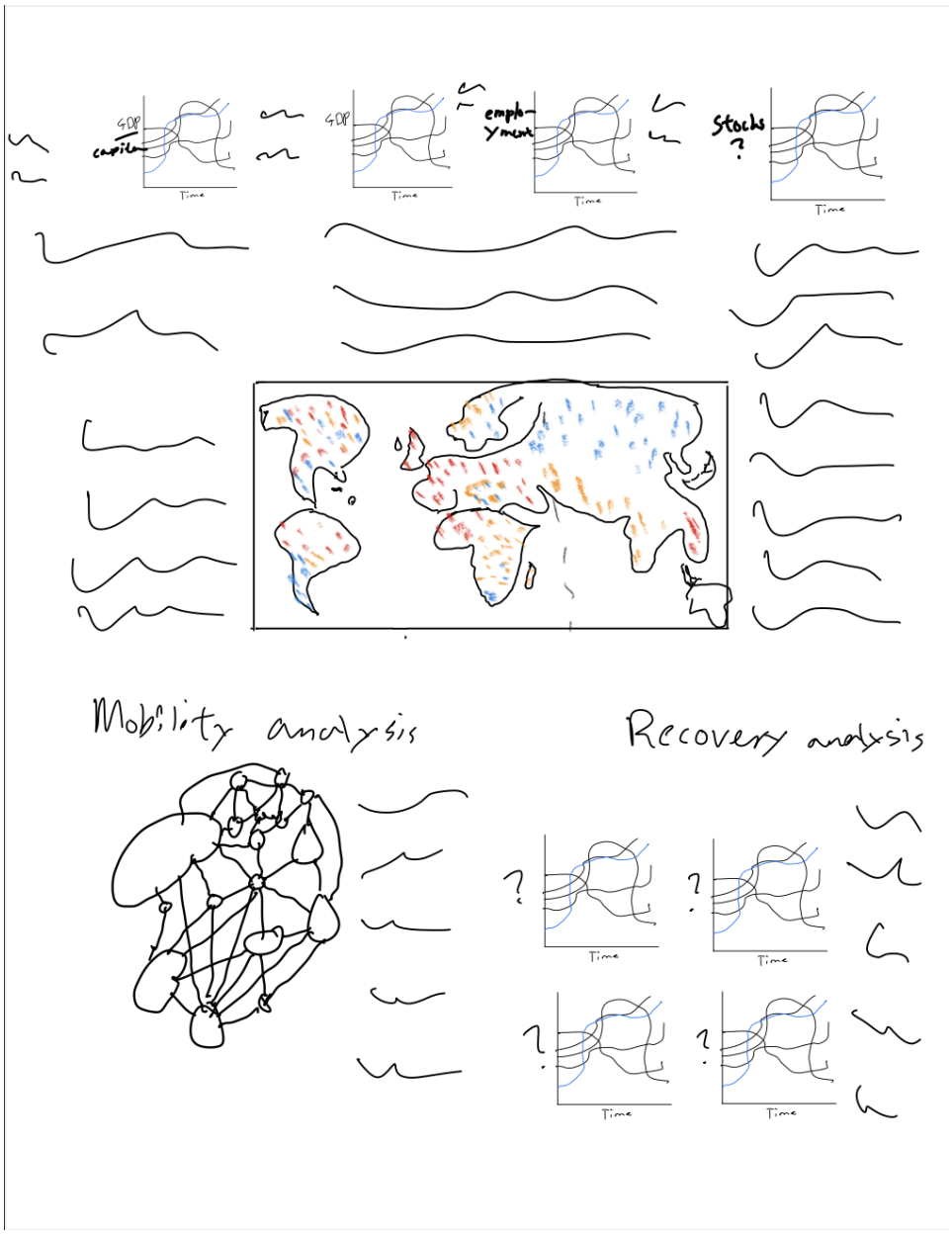
Visualization Design

Sketch 1:



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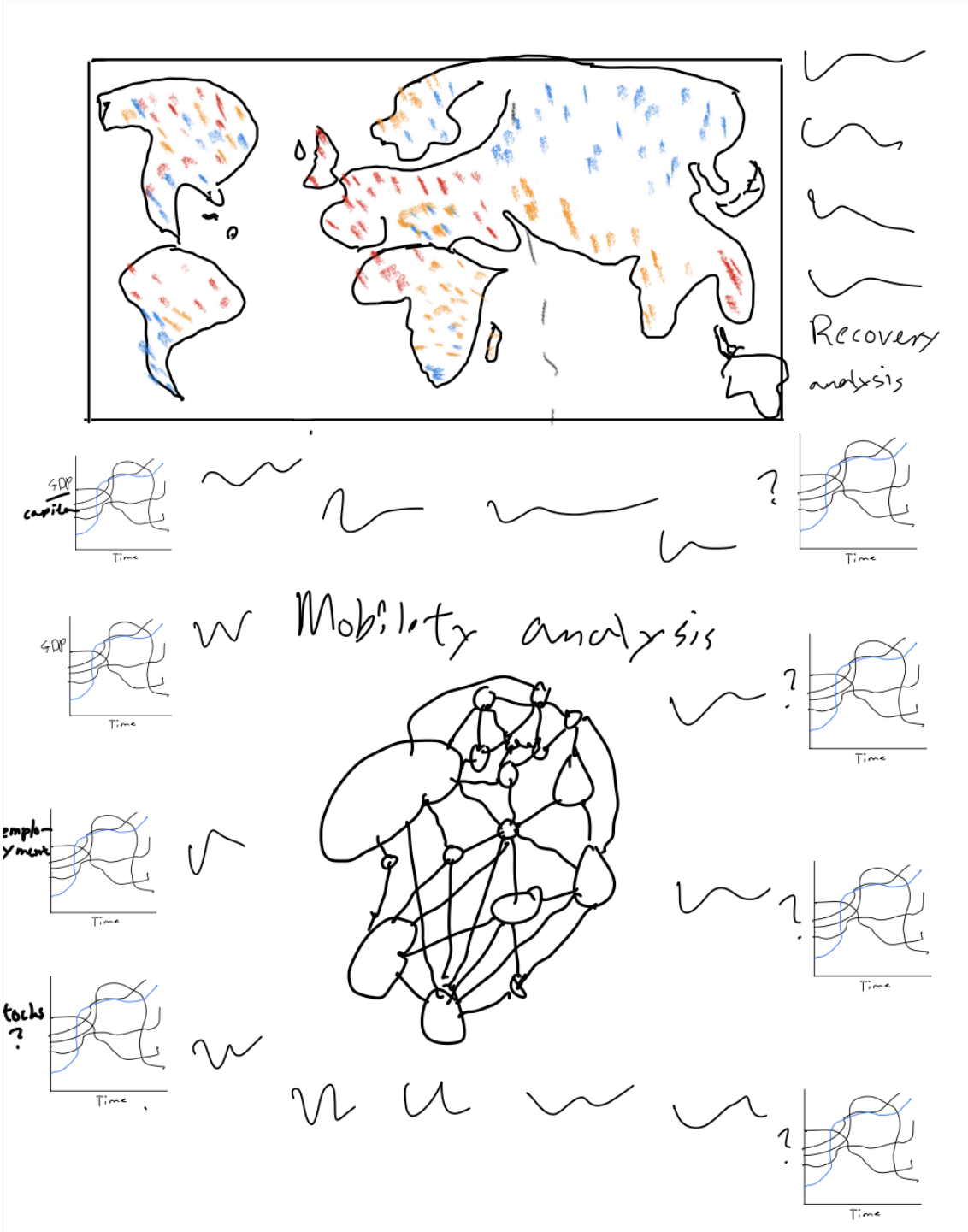
Sketch 2:



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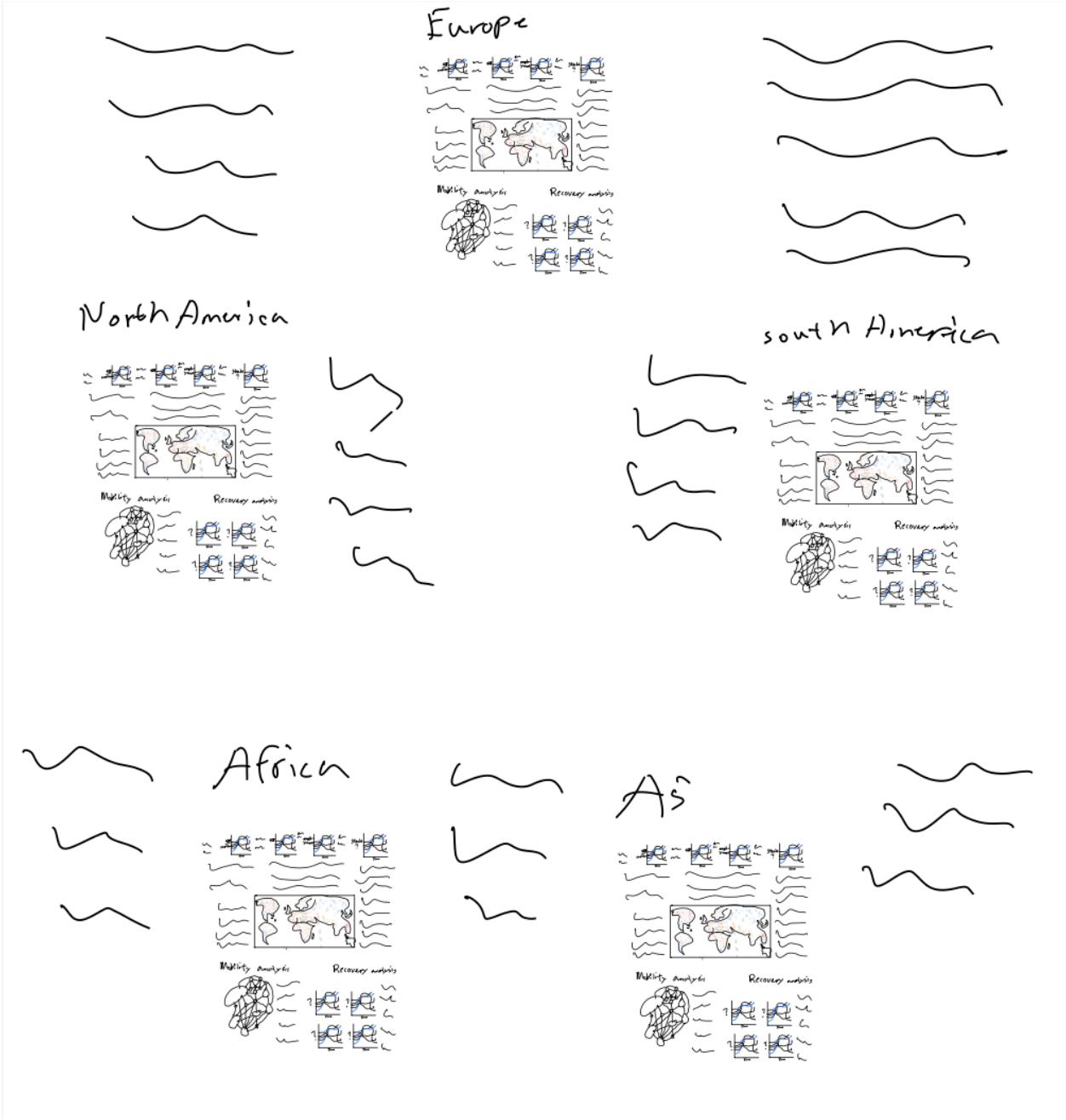
Sketch 3:



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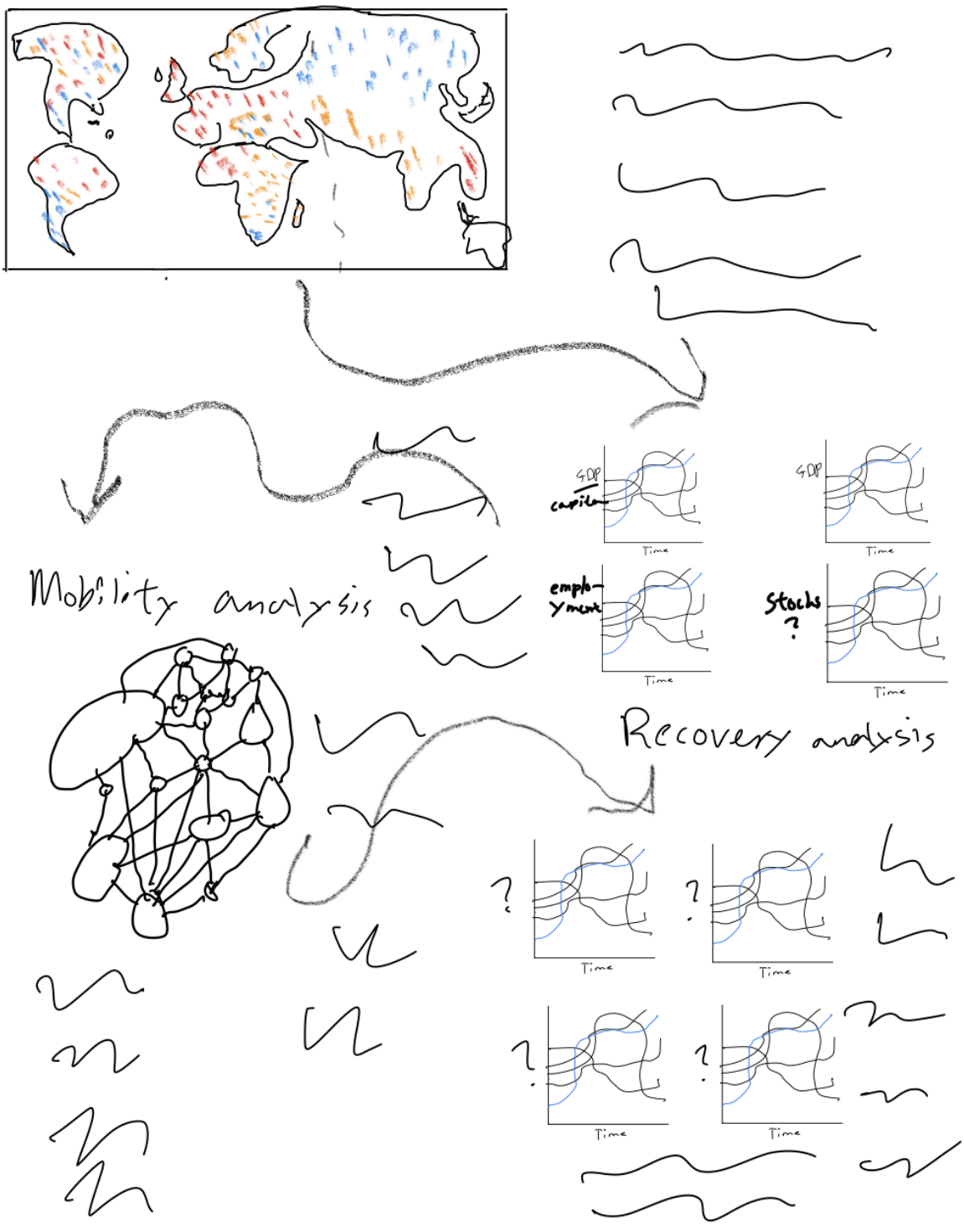
Final sketch: (not final(thinking about using sketch 3))



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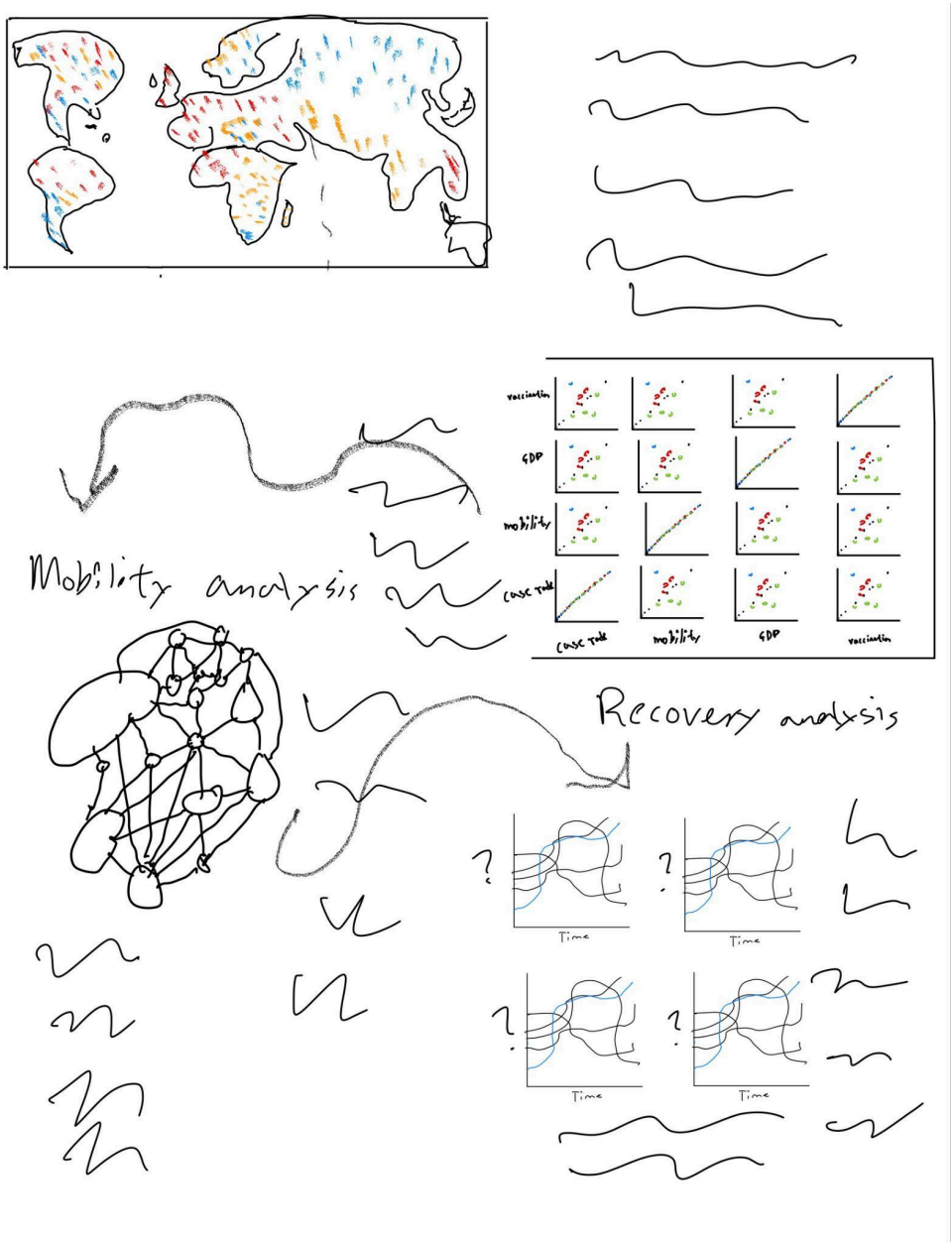
Revised Final Design with added Scatterplot Matrix



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Must-Have Features

A force directed node link diagram to see mobilities between each country, adding in size to see magnitude, and of course some tooltips (yet to figure this out yet).

Interactive heatmap over the world for the magnitude comparison.

Sort of like an economic impact dashboard with different graphs regarding employment and GDP for the countries where you would be able to select one country and see all of its connected metrics.

Time series visual to see when or predict a country's recovery time to pre pandemic levels.

Optional Features

Demographic analysis seeing how the population changed over time.

Display of vaccination and how it affected the country over time in terms of recovery pace.

Custom grouping for the countries, showing each continent individually for less clutterness.

Related Work

- https://ourworldindata.org/coronavirus

The resource above is useful and inspiration gained with how they used interaction with the first world map plot. Also seeing how they compared variables to show insights.

- https://pmc.ncbi.nlm.nih.gov/articles/PMC9923118/

The WHO's comprehensive analysis of COVID-19's impact on livelihoods and food systems gives context for my economic impact visualizations, but also gives me a subtopic.

- https://www.who.int/news/item/13-10-2020-impact-of-covid-19-on-people's-livelihoods-their-health-and-our-food-systems

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- https://www.nature.com/articles/s41598-023-31709-2

The Nature study on country-specific COVID-19 mortality trends offers insights for comparing pandemic outcomes across different regions, which will inform my approach to creating fair cross-country visualizations.

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- https://www.pewresearch.org/politics/2025/02/12/5-years-later-america-looks-back-at-the-impact-of-covid-19/

This resource demonstrates how to effectively present recovery trajectories and lasting effects that will give me ideas of framing of my data.

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Project Schedule

Week 1 (March 28 - April 3)

- **Get and finalize data sets to use for the project**
- **Create a webpage for the project**
- **Start writing Python code to read and start cleaning the data files**

Week 2 (April 4 - April 10)

- **Have the data cleaned**
- **Have all the static visualizations done for Alpha Release**
- **Deadline: Prepare for Alpha Release due on April 11**

Week 3 (April 11 - April 17)

- **ALPHA RELEASE DUE: APRIL 11**
- **Start implementing interactions for the visuals to make them dynamic**
- **Finalize layout and project design to prepare for Beta Release**

Week 4 (April 18 - April 24)

- **BETA RELEASE Week**
- **Address any issues or feedback from Beta Release**
- **Plan out Beta Release**
- **Complete and finalize all visualizations for Beta Release**
- **Complete and finalize the structure, layout and ordering for Beta Release**
- **BETA RELEASE DUE: APRIL 24**

Week 5 (April 25 - May 1)

- **Start preparing and writing Project Report**
- **Address any issues or feedback from Beta Release**

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- **Create slides for presentation**
- **Prepare talking points and presentation structure**
- **Start practicing for the presentation**

Week 6 (May 2 - May 8)

- **Continue preparing and writing Project Report**
- **Start preparing DEMO for final submission**
- **Start cleaning and preparing all code and data used for final submission**
- **Start User Manual**
- **Fix any remaining bugs or issues**
- **Make final improvements based on feedback**
- **Make sure everything works on different browsers**
- **Finalize all presentation content**
- **Finalize talking points for the presentation**
- **Practice presentation**
- **PROJECT PRESENTATION: MAY 5**

Week 7 (May 9 - May 14)

- **Finish Project Report Draft**
- **PROJECT REPORT DRAFT: MAY 10**
- **Finalize Demo for final submission**
- **Finalize User Manual**
- **Finalize all cleaned code and data for final submission**
- **Address any issues or feedback from FINAL REPORT DRAFT**
- **PROJECT FINAL SUBMISSION: MAY 14**