1. Ideas

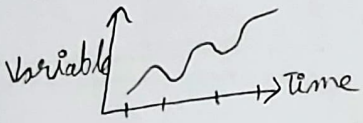
Dataset Domain: Ocean Acidification

Area: 1° grid around Australia. **Time:** 1870–2013 monthly.

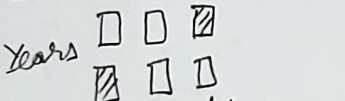
Dataset

- **Temporal Data**
  - For each year and month the mean of all latitude & longitude variables are stored.
  - **Variables**
    - pH
    - Surface Temp
    - Surface Salinity
    - Aragonite Saturation State
    - Calcite Saturation State
- **Geographic Data**
  - Coverage of ocean around Australia
  - For Each Lat / Long, the pH value and pH deviation from global average is calculated for 2013.
  - Also, we can show pH and other variables on the map over some time, possibly as an aggregate

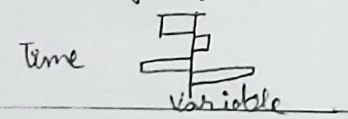
① Time Series: Multiple Charts



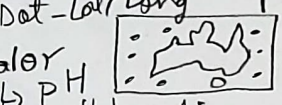
② Calendar Heatmap



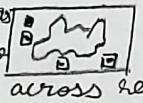
③ Diverging Bar



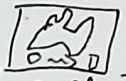
④ Dot Density Map



⑤ Bin Map



⑥ Animated Map



2. Filter

① and ② are just different representations of the same data.

④ and ⑤ are very similar as well, just differ in marks.

We can likely filter these into 1 or show variants.

3. Categorize

Visualisation Type

- **Deviation** → ③
- **Change over Time** → ① and ②
  - Both views are controlled together
- **Spatial** → ⑥ Animation
  - ④ and ⑤ combined to just be a bin map.

4. Combine and Refine

① and ② were combined into a single slot as they show similar data and can be grouped together.

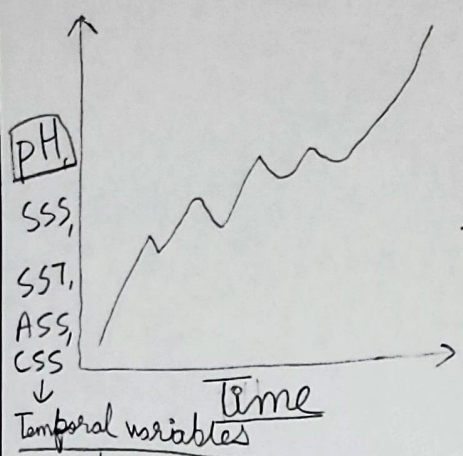
④ and ⑤ were combined into just ⑤ as the bin and dot density maps are very similar in this case (the bin/dot is highly tied to the specific latitude and longitude)

5. Question

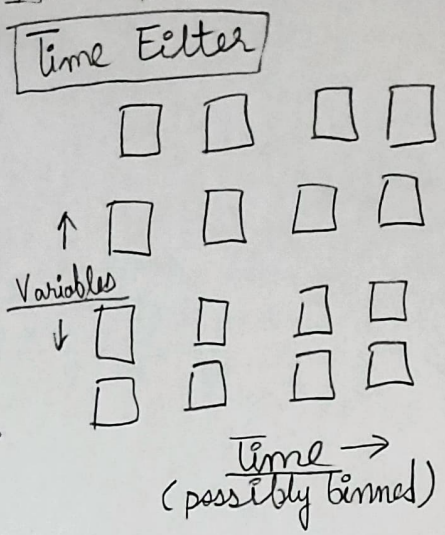
The main objective of this data visualisation is to show the acidification of ocean across time and space, so this solution satisfies the WHY?

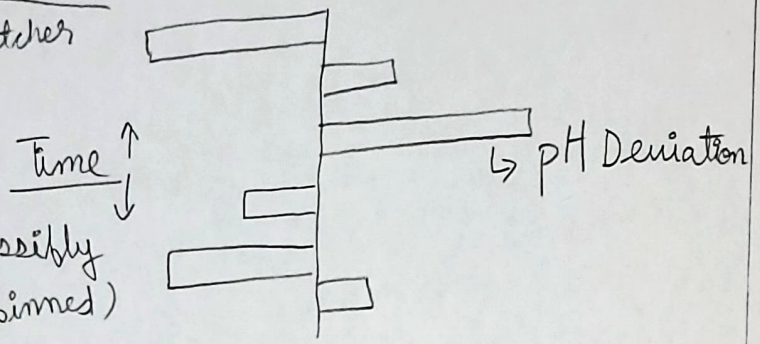
Title: Initial Design 1
Author: Rahul Saxena
Date: 26/09/24
Sheet: 2
Task: Data Vis for Ocean Acidification

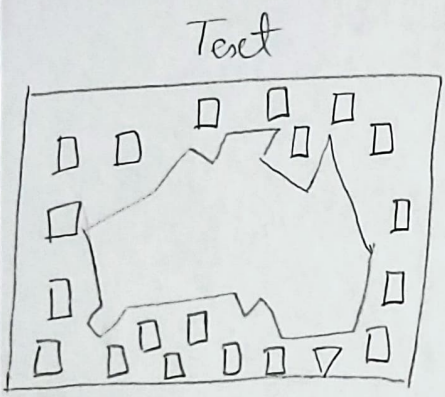
Layout

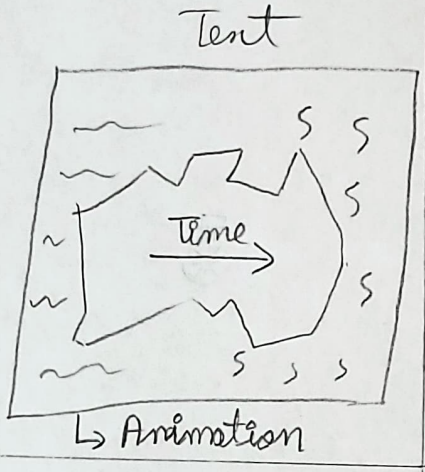


Introduction









Operations

Time Filter will change the years on Time Series. The exact type of filter will depend on binning.

A switcher which display different variables on Time Series.

The user might be able to pause on the animation to get a good look.

Focus

The animation displays pH values over time around Australia. Barring complexity, this should be relatively smooth and load fast.

The dot/bin map should be zoomable.

Discussion

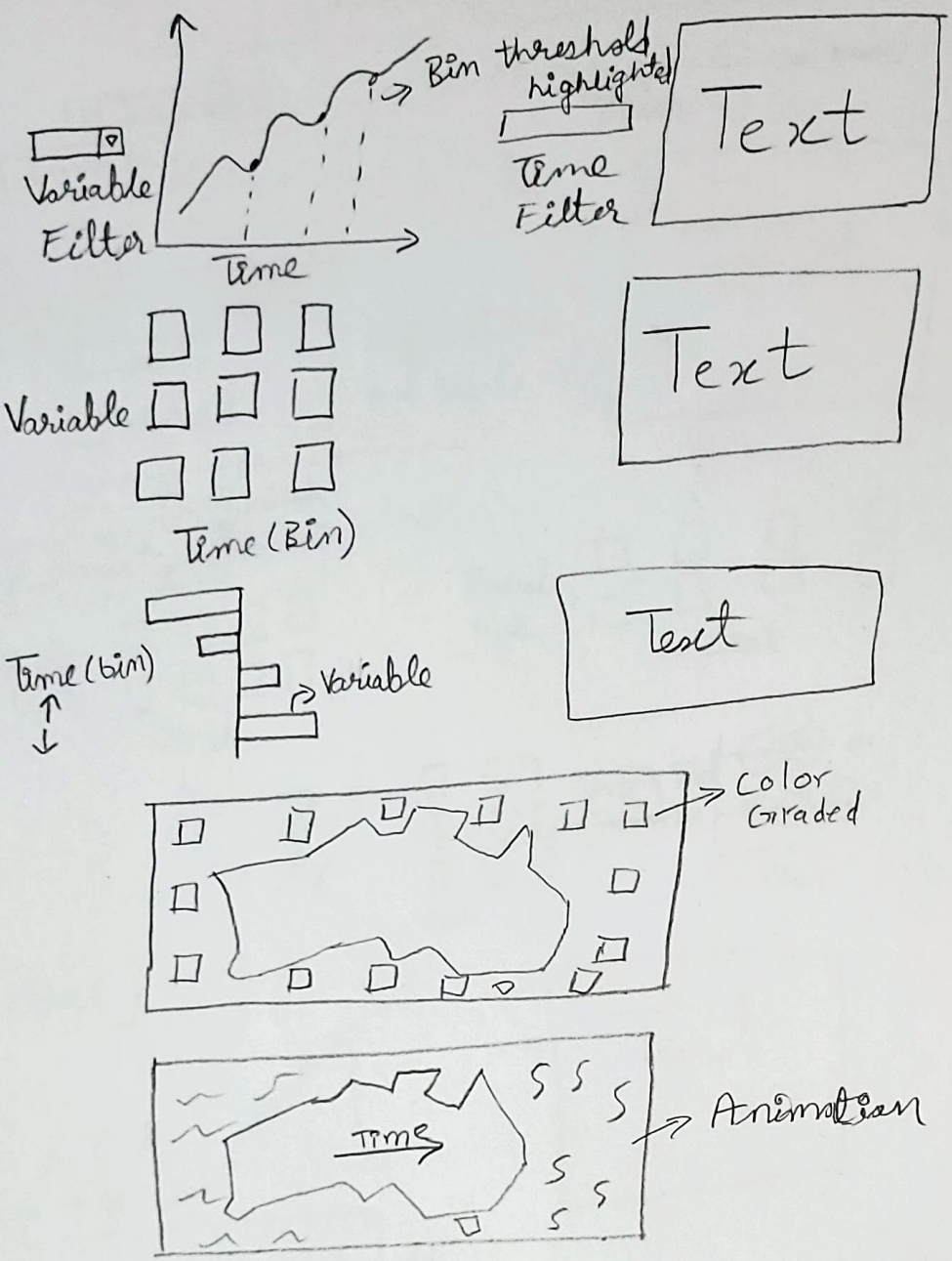
Pro:

- Time related vars are largely grouped together

Con:

- Deviation chart placement is uneven
- Cannot change variable
- 2 maps are not far enough

Layout



Title: Initial Design 2
Author: Rahul Saxena
Date: 26/09/24
Sheet: 3
Task: Data Vis for Ocean Acidification

Operations

The time filter allows the user to change time across time series, heatmap and diverging bar.

The bin map allows zooming into the dataset complexity permitted.

The animation can be paused and started.

Focus

The bin/dot map will be zoomable allowing the use control over what area to focus on.

The animation will display the change of pH over time to provide the user with intuitive change.

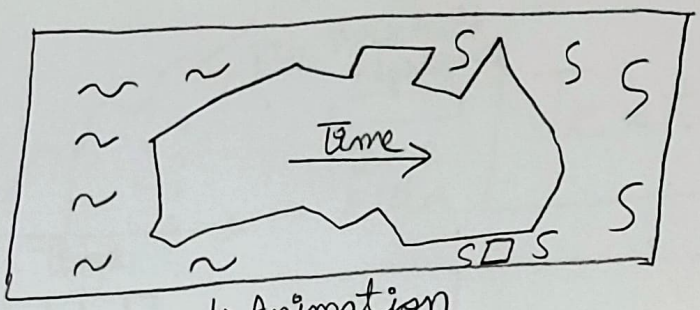
Discussion

- Pro:
  - The layout is well balanced.
  - Variables reflect on charts.
- Con:
  - Cannot compare across variables side by side
  - Animation should be the centerpiece

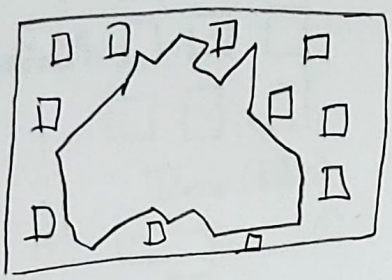
Title: Initial Design 3
Author: Rahul Saxena
Date: 26/09/24
Sheet: 4
Task: Data Vis for Ocean Acidification

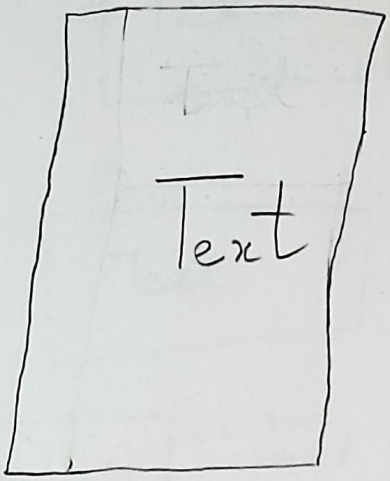
Layout

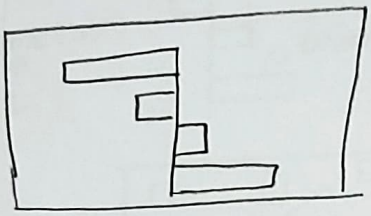
Introduction



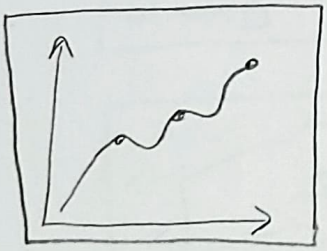
↳ Animation

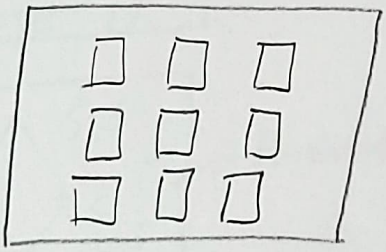






Text





Operations

The bin/dot map will be zoomable which gives the user greater control over the area being used.

The divergent map might have further control over the the map and the divergent bar.

Focus

- Most of the focus should be on the animation as that will be visually appealing for the user.
- The inclusion of divergent scale can be used for 2nd map and divergent bar whereas animation will show pure pH values

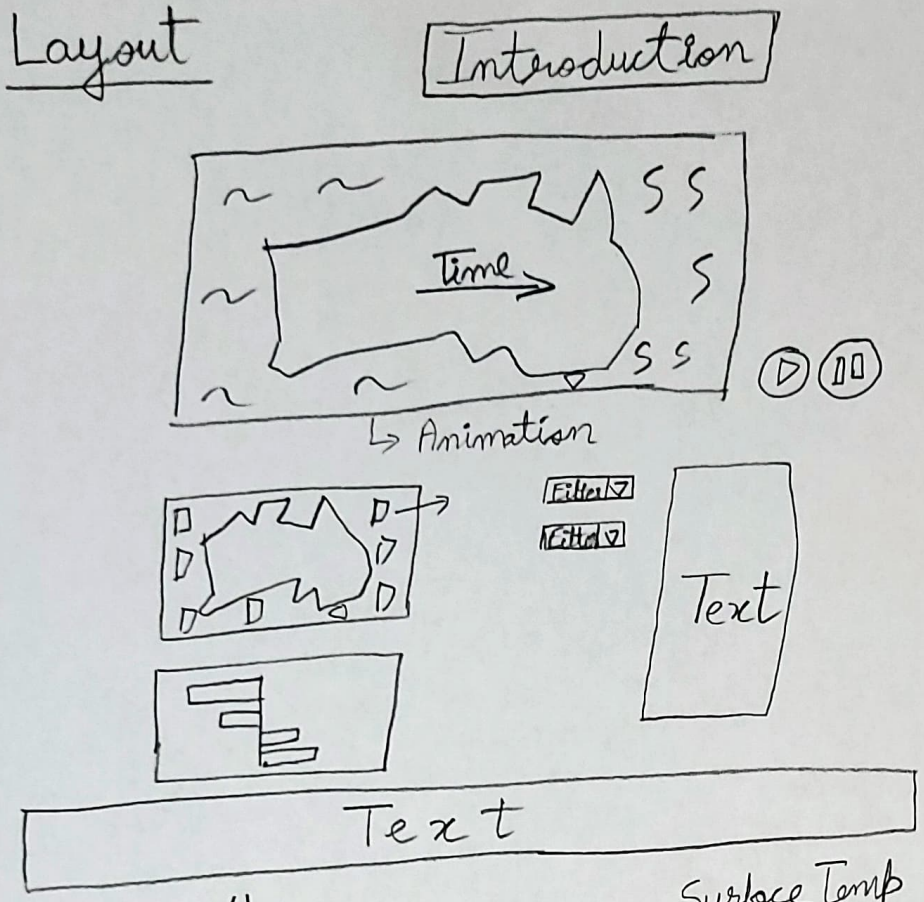
Discussion

Pro:
- Animation is centerpiece
- Well Balanced column layout

Con:
- Cannot compare variables side by side
- Long wall of Vertical Text

Title: Final Design
Author: Rahul Saxena
Date: 26/09/24
Sheet: 5
Task: Data Vis for Ocean Acidification

Layout



Operations

The user can play and pause the animation at any point in time.

The user can zoom into the bin/dot map to explore greater spread of data.

Various filters to facilitate data explorat-ion.

Focus

- The main focus is on the animat-ion since it is the centrepiece.

The user can dive deep into various factors, their changes and effects on the acidification of the ocean.

Details

- Need to mix certain aspects of the temporal and spatial data.
- Estimate → 9 days

Time Series → 1 day
Heatmap → 1 day
Diverging bar → 1 day
Bin Map ↳ 2 days
Animation ↳ 4 days