Monash University: Assessment Cover Sheet

Student name	Irfan	Ahmed Bin	
School/Campus		**Student's I.D. number**	30933374
Unit name	FIT3179 Data visualisation - S2 2021		
Lecturer's name		**Tutor's name**	Joe Liu
Assignment name	Data Visualisation II Report	**Group Assignment: No** **Note, each student must attach a coversheet**	

Lab/Tute Class:	**Lab/Tute Time:**	**Word Count:** 880
Due date: 18-10-2021	**Submit Date:** 18-10-2021	**Extension granted** ☐

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Extension granted until (date): ...../...../..... Signature of lecturer/tutor: .....

Late submissions policy	**Days late**	**Penalty applied**
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- I have taken proper care to safeguard this work and made all reasonable efforts to ensure it could not be copied.
- No part of this assignment has been previously submitted as part of another unit/course.
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Name: Ahmed Bin Irfan
SID: 30933374
Assignment 2
FIT3179
Word Count: 880

URL

https://airf0002.github.io/FIT3179_assignment2/

[*Start Word Count]

Domain, Why and Who

The domain of this visualisation is to portray different types of pollution which have contributed to global warming. The purpose of this visualisation is to raise an awareness against pollution in which people are directly or indirectly involved. It is aimed at the general people yet it is simple enough for the typical Australian or Malaysian to understand.

What: A brief description of the data

Data used in this visualisation was populated in excel spreadsheets and to graph out different idioms, several spreadsheets were used. The source of all the dataset is through OurWorldInData, [3]. Ritchie, H is the author/compiler of most of the datasets. This data is strictly for non-commercial/study-related use.

The general dataset is consisted of following data types:

- Categorical Attributes (Country, Continent)
- Ordinal Attributes (Year)
- Quantitative Attributes (CO2 emissions, GDP per capita, Regional temperature anomaly etc)

The categorical and ordinal attributes in each dataset were the same, but the quantitative attributes were different.

Why and How

Line Chart

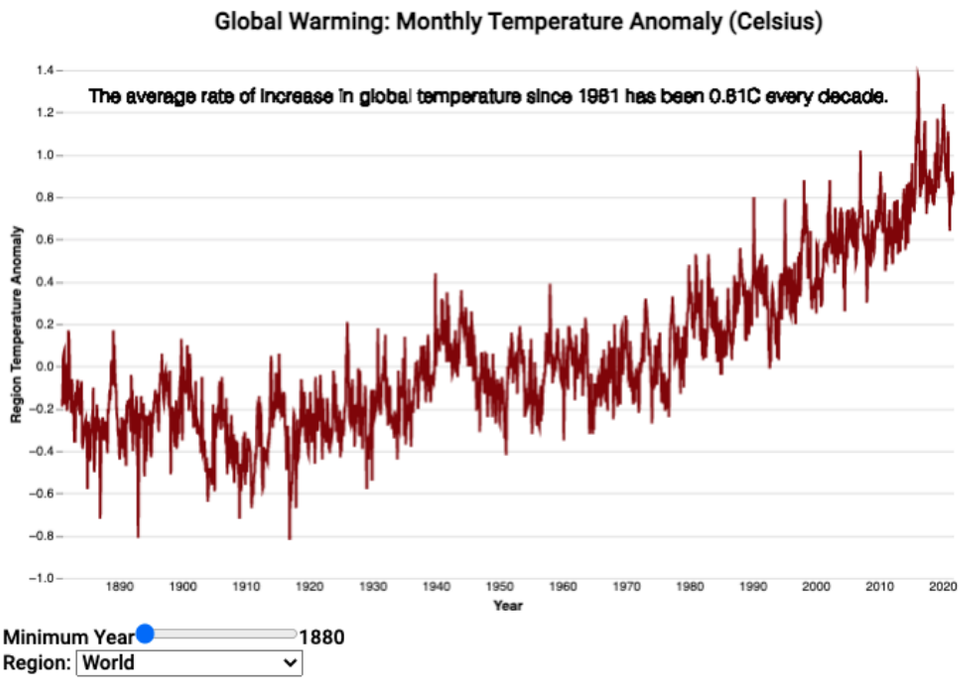

Fig 1: Line Chart 1

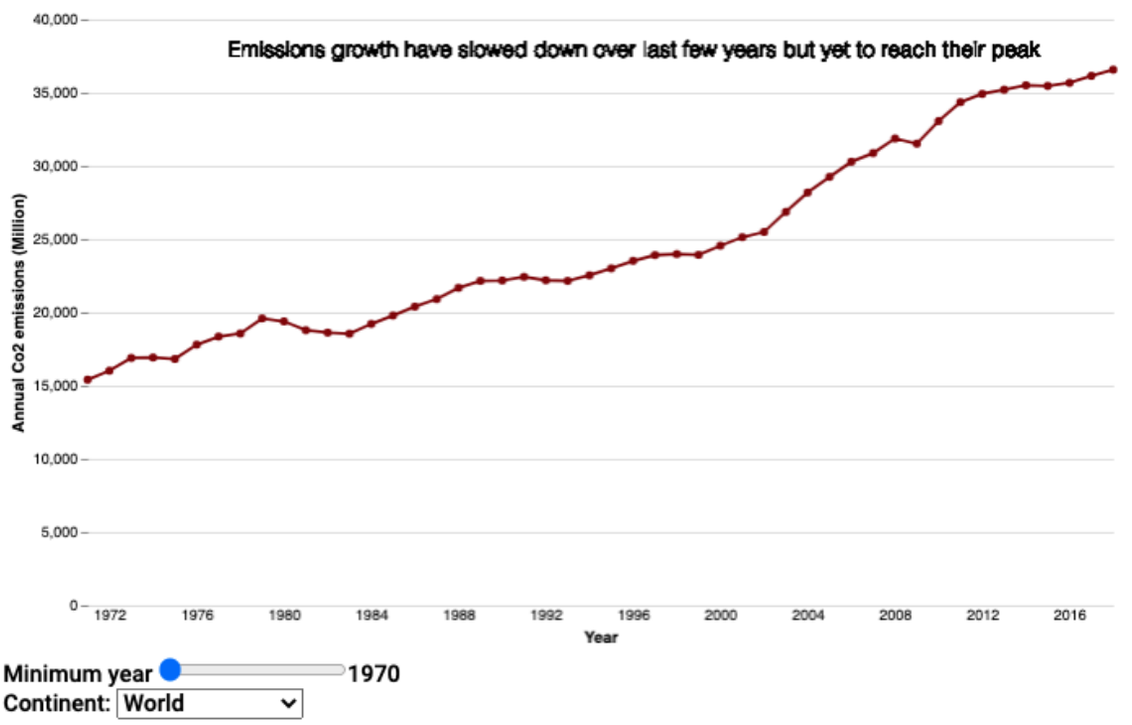

Fig 2: Line Chart 2

Line charts were used to compare to visualise the overall trends (CO2 emission globally and temperature anomaly) over time (see figure 1 and figure 2). The marks used are point and line connections. The channels used are vertical positions to depict the quantitative values (CO2 emission and Temperature Anomaly).Overall, the line chart is a good choice, as it guides the reader through the flow of the narrative showing the changing temperature and rise in CO2 emission..

Choropleth Map

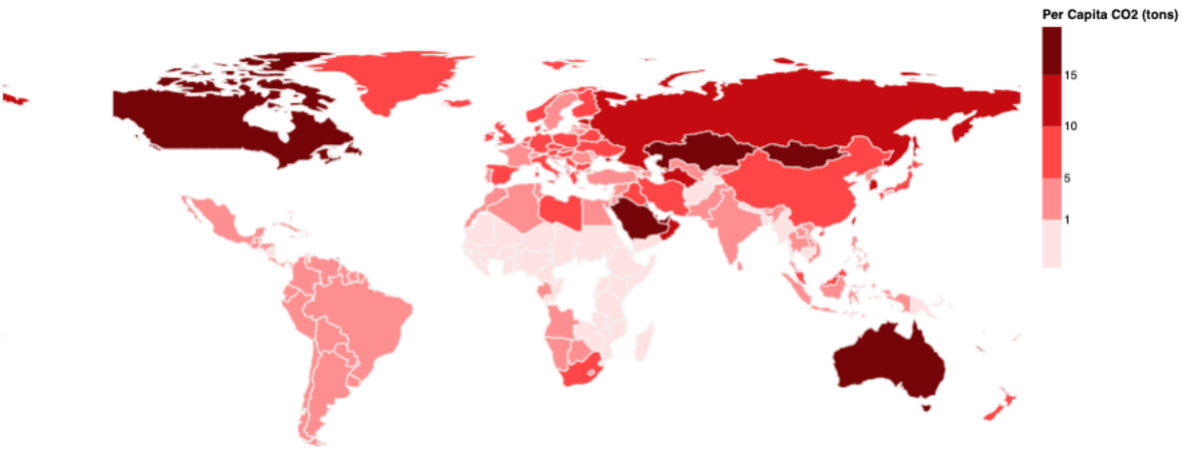

Fig 3: Choropleth Map

Choropleth maps are helpful for illustrating simple data patterns, highlighting outliers, and determining relationships. To make an impact on the user, it has been used as one of the starting idioms so readers will have an idea which parts of the world have more CO2 emissions than others. Choropleth map was a sensible choice to portray a dataset with countries, and quantitative attributes (CO2 emission per capita). The marks used are geographic regions, and the channel used is luminance.

Area Chart

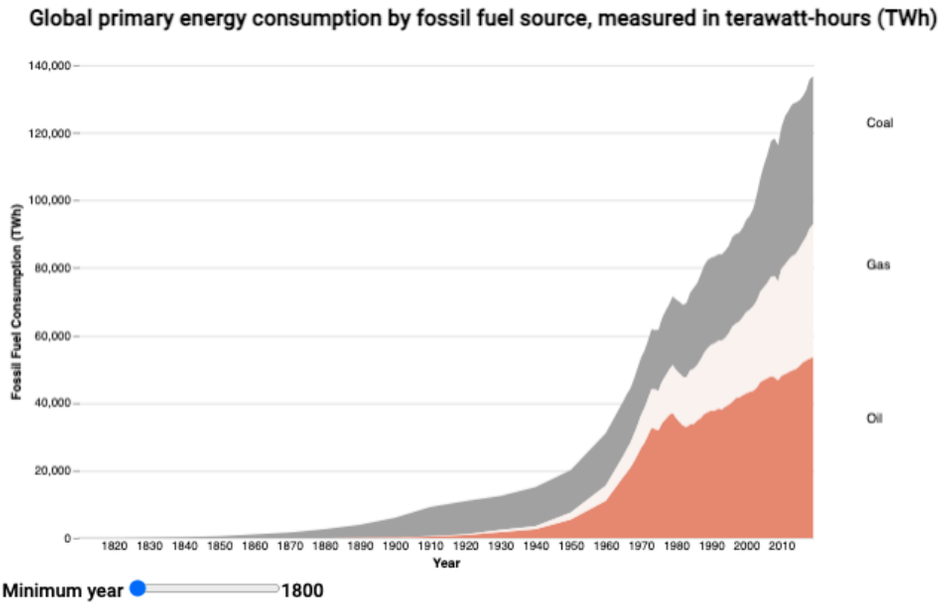

Fig 4: Area Chart

An area chart is a reasonable choice to visualise the sky rocketing consumption of fossil fuel for energy production. Area chart shows the comparison between the fossil fuels (see fig 4) and the total accumulated fossil fuel consumption over the years. The marks used here are the area (polygons), and the channel used are height of the areas to express the quantitative attribute of fossil fuel consumption, and color hue.

Bar Chart

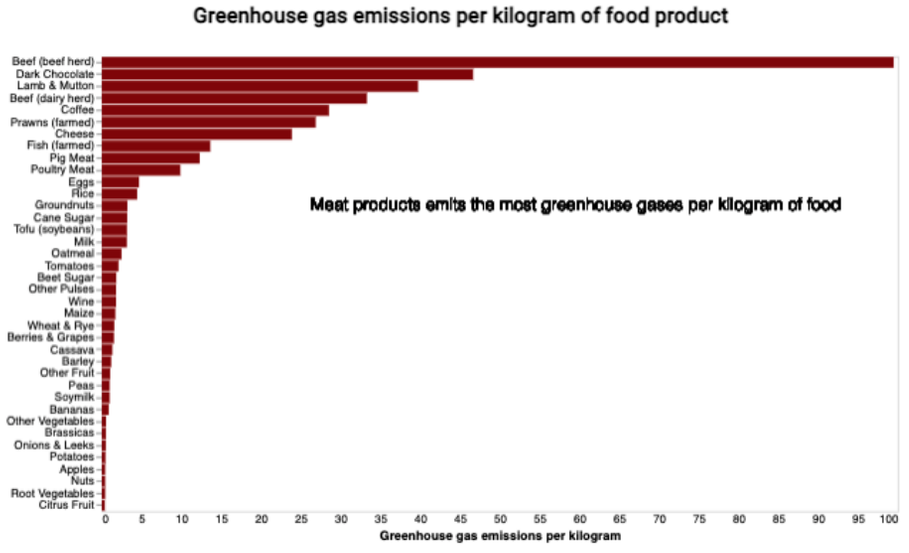

Fig 5: Bar Chart

A common position scale is the most efficient means of encoding a quantitative attribute. To show the same efficiency and effectiveness in the visualisation bar chart is used to depict Greenhouse gas emissions per kilogram of food production (see fig 5). Bar chart is a sensible choice to compare quantitative attributes. The marks used are lines and to compare the difference the length of bars are used as channels.

Bubble Chart

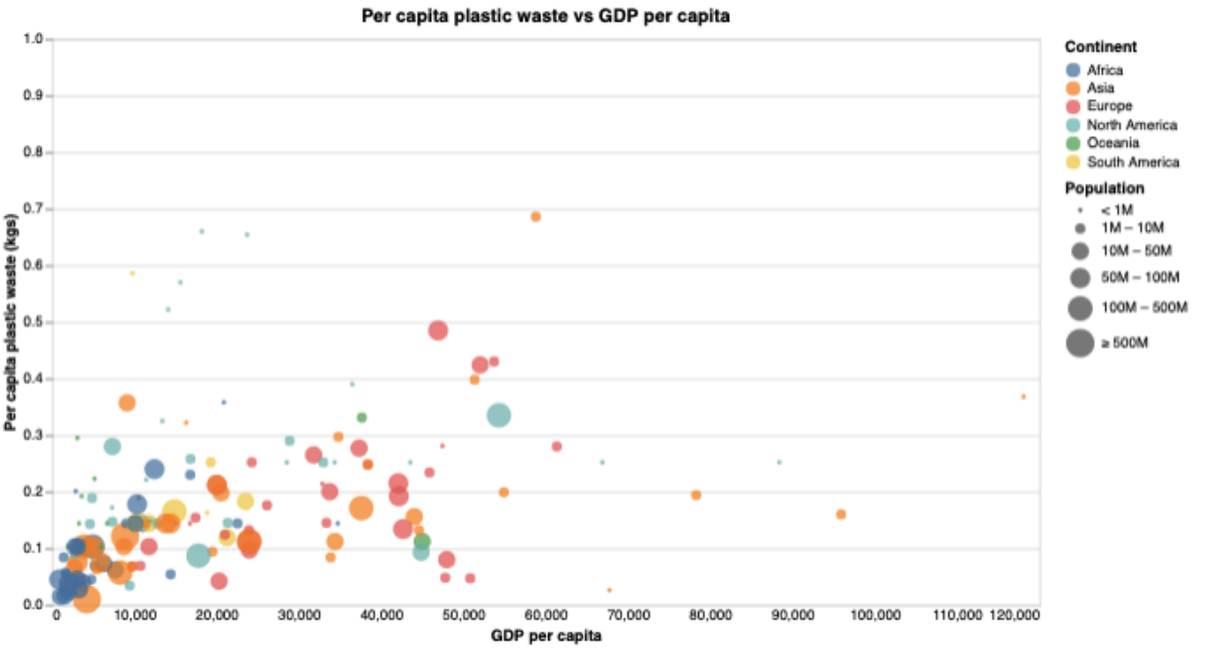

Fig 6: Bubble Chart

Bubble charts are used to show the magnitunal variation between categorical data. In the visualisation it is used to depict how per capita plastic waste is generated by a country. The quantitative data is the GDP per capita of a country and country population. The marks used are points and to distinguish different points the size of points was used as a channel. Colour hue was used to depict the continent of an individual country.

Design

Layout

The text was located to the left column to create sight lines. So now the left-hand text and the right-hand idioms are separated by a vertical sight line. Horizontal sight lines are created to easily distinguish between idioms and text related to it.

Furthermore, the sight line aligns the page's beginning from both the left and the top, making it more visually appealing.The proximity of the text (with limited white space) reflects the Gestalt principle, indicating that the texts are closely related.

Color

Throughout the visualisation background color for headings are changed to the same color as title which provides the entire picture a uniform colour scheme, making it more appealing and easy to read.

Figure-Ground

Visual hierarchy is created using different sizes and colours. Most of the text is in black however, important or summarized information for the idioms are mentioned in red with bigger font size to catch readers attention.

Typography

The title is large and dark, indicating its significance. The text in the paragraphs is black and in a regular font (not bold or italic) but text with important information has black color and 1 size up with bold to create a hierarchy. For most important information or quick summary of an idiom is in red and bigger font.

The aforementioned typography enables a clear hierarchy of text elements. Due to the obvious large and bold text, the reader will read the title first. The reader will then go on to the paragraphs' black text with most important information from the idioms.

Storytelling

The visualisation starts with important quotes which catches readers attention and interest. The first idiom is about global warming which gives the reader an idea how important and concerning the topic is. After that all other idioms in different ways depict how various types of pollutants contribute to global warming.

[*End Word Count]

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1. Munzner, T. (2014). *Visualization Analysis and Design (AK Peters Visualization Series)* (1st ed.). A K Peters/CRC Press.
2. T. (2021, September 10). *Pollution Quotes*. TRVST. https://www.trvst.world/environment/pollution-quotes/
3. *Our World in Data*. (n.d.). Our World in Data. Retrieved October 18, 2021, from https://ourworldindata.org/
4.

Global Warming

1. NCEI.Monitoring.Info@noaa.gov. (n.d.). *Global Climate Report - Annual 2020 | National Centers for Environmental Information (NCEI)*. National Centers for Environmental Information. https://www.ncdc.noaa.gov/sotc/global/202013

CO2 Emission per Capita / around the globe

1. Ritchie, H. (2020a, May 11). *COâ, , and Greenhouse Gas Emissions*. Our World in Data. https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions

Global Fossil Fuel Consumption

1. Ritchie, H. (2020, November 28). *Fossil Fuels*. Our World in Data. https://ourworldindata.org/fossil-fuels

Greenhouse Gas Emissions

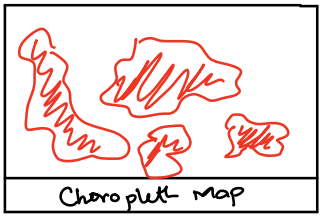
1. Ritchie, H. (2020a, January 15). *Environmental impacts of food production*. Our World in Data. https://ourworldindata.org/environmental-impacts-of-food#you-want-to-reduce-the-carbon-footprint-of-your-food-focus-on-what-you-eat-not-whether-your-food-is-local
2. Dunne, D. T. P. A. J. G. (n.d.). *Interactive: What is the climate impact of eating meat and dairy?* Carbon Brief. https://interactive.carbonbrief.org/what-is-the-climate-impact-of-eating-meat-and-dairy/

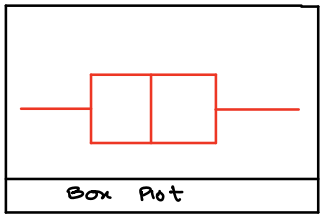
Plastic Waste

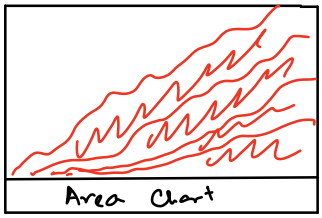
1. Ritchie, H. (2018, September 1). *Plastic Pollution*. Our World in Data. https://ourworldindata.org/plastic-pollution

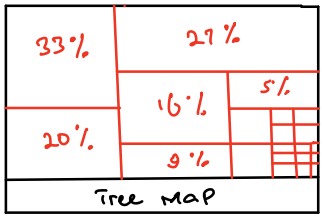
① IDEAS

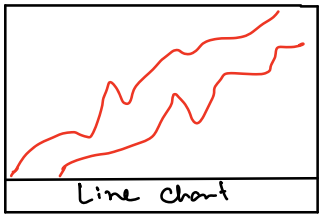
Pollution
- Air pollution
- Land pollution
- Water pollution

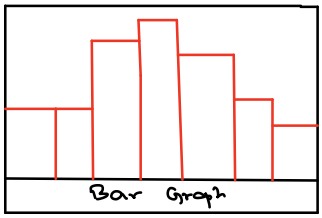


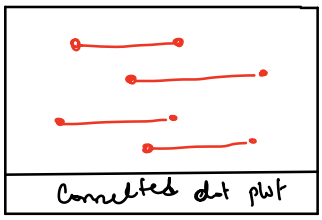


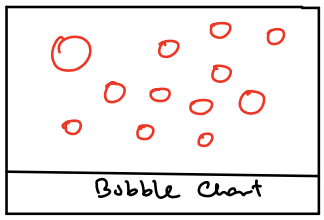




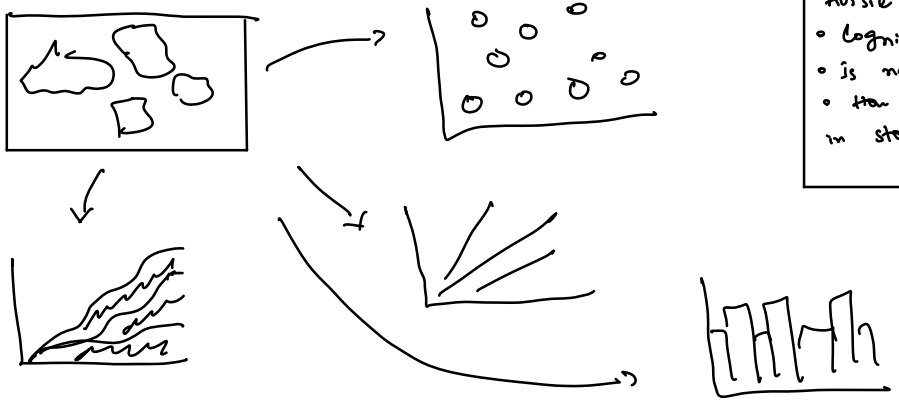








② COMBINE AND REPLACE



③ FILTERS

- Choropleth Map
- Line charts
- Bubble chart
- Area chart
- Bar chart
- Tree Map

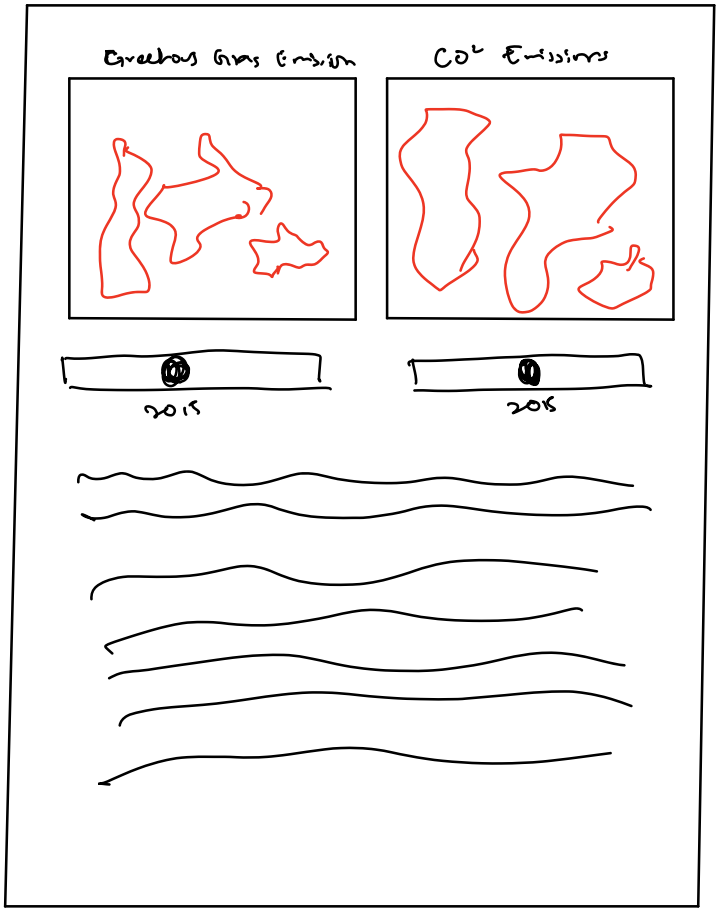
④ CATEGORISE

- Global Warming
- CO^2 Emission per capita
- CO^2 Emission around the Globe
- Global fossil fuel
- Greenhouse gas Emission
- Plastic Waste

⑤ QUESTIONS

- Understand by an average Aussie?
- Cognitive load maintained?
- Is narrative clear enough?
- How to connect all idioms in storytelling?

LAYOUT



TITLE: Classified Choropleth
AUTHOR: Ahmed Bin Irfan
DATE: 20/09/21
SHEET: 02
TASK: Dashboard view remained

OPERATION

① OPACITY: Hovering over buttons dynamically changes the opacity of related centres

② Annotations / tooltip for more information.

③ multiple filter to provide more comparison options for the reader

FOCUS

Main focus is to highlight the change in colour of [redacted] to highlight increased CO^2 / Greenhouse emission.

The dark colour stands out. Helps in narrative being conveyed nicely.

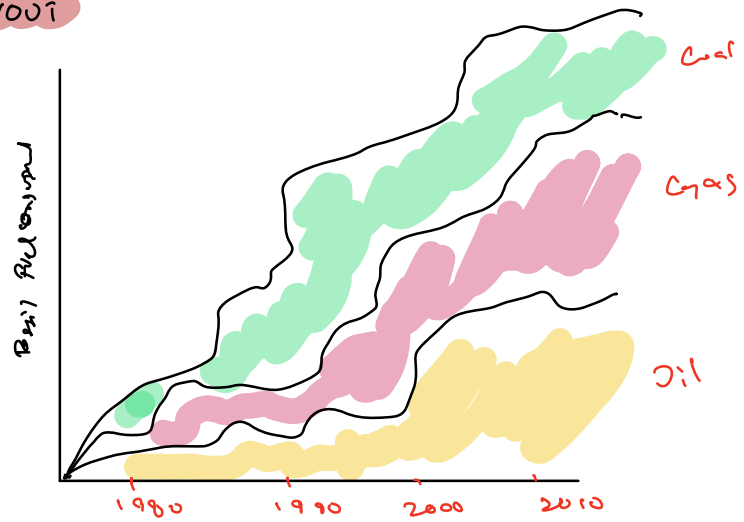
DISCUSSION

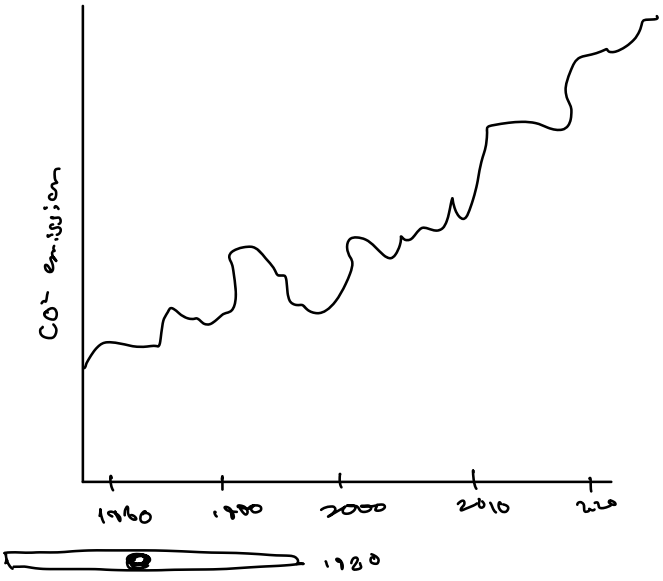
-> Clear distinction between high CO^2 / Greenhouse gas emitting centres.

-> Visually appealing with chosen colour scheme

-> Not too much information to absorb.

LAYOUT





TITLE: Area map & Line Chart
AUTHOR: Ahmed Bin Irfan
DATE: 20/09/21
SHEET: 03
TASK: Comparing fossil fuel consumption.

OPERATION

- interactive tooltip for graphs
- Sliding bar to select minimum year, which provides more detailed information about recent years.
- Filter out continents

FOCUS

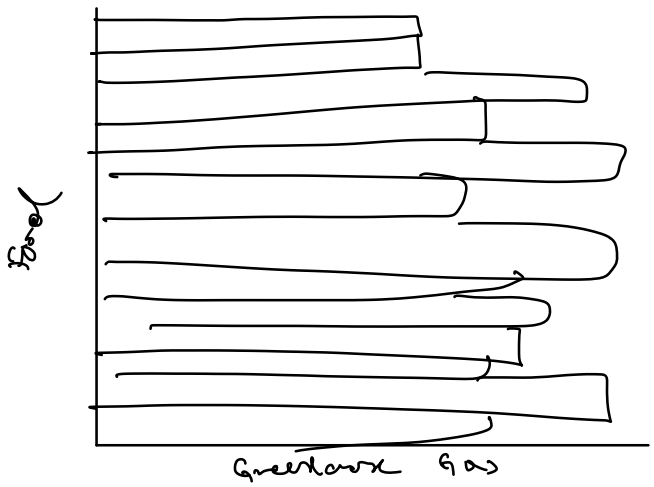
Focus here is to show increasing trend in fossil fuel consumption which leads to high CO^2 emission globally.

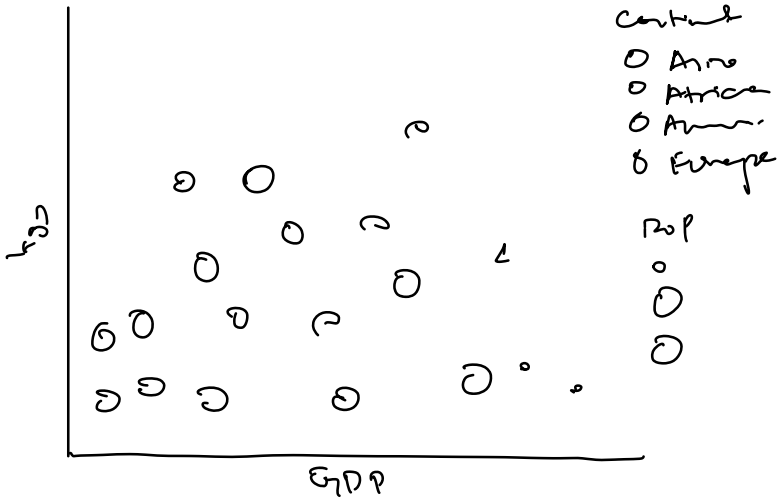
-> Area chart focus on three types of fossil fuels: coal, oil, gas.

DISCUSSION

- Minimal information shown
- Wrath showing all different fuel types;
- Helps in conveying narrative; alerts user into thinking for the future.

LAYOUT





TITLE: Bar & Bubble chart
AUTHOR: Ahmed Bin Irfan
DATE: 20/09/21
SHEET: 04
TASK: focus on more into about other pollutant types.

OPERATION

-> opacity: Upon more hover on legend, only the related data is highlighted.

-> Annotation for additional information.

-> Tool tip to build interaction values.

FOCUS

Main focus on how income level and GDP correlate with the amount of plastic generated per capita.

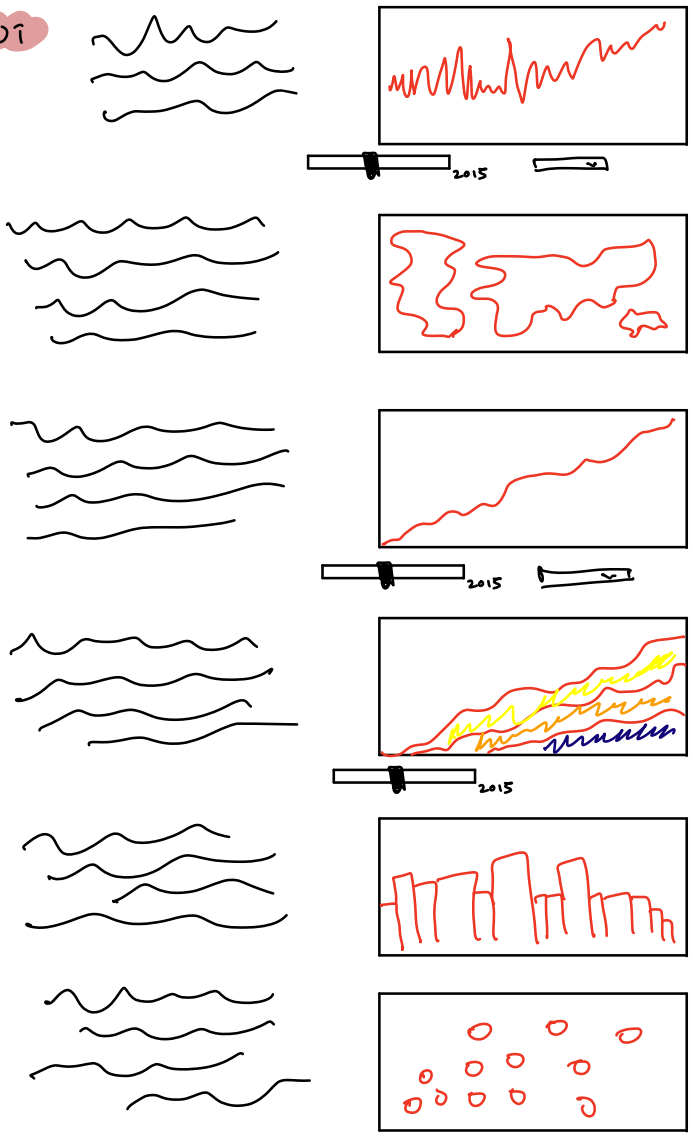
size and color use comparison

same baseline bars: easier for audience.

DISCUSSION

- minimised design for data
- Is opacity operation evident? might need to add a text label.
- Data is seen in different categories, giving a statistical data.

LAYOUT



TITLE: Final Dashboard View
AUTHOR: Ahmed Bin Irfan
DATE: 20/09/21
SHEET: 05
TASK: Organising idioms /Page

OPERATION

- Choosing specific pollution types and countries allows user a custom comparison.
- On hover, annotations and tooltips consistent for all idioms.
- Scrolling the whole page / different idioms
- Timeline will be comparable between graph for filter.

FOCUS

Main focus is to raise an awareness about pollution and things which cause pollution. Provide decent amount of information to a common viewer.

DETAIL:

=> Time to build visualisation is 25-30 hours

=> HTML Page can be viewed on any device (iOS, Android) without affecting scrolling

=> Data to be imported as CSV file, will need to do a bit of data scraping.