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# Alcohol Consumption

Process Book

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COS30045 DATA VISULISATION

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Website Link:
https://mercury.swin.edu.au/cos30045/s103824847/index.html

# 1. Introduction

## 1.1 Overview

This project aims to provide a visual representation of the past few years' global patterns in alcohol consumption. The goal is to offer insights into consumption patterns and changes that have happened since COVID-19 by using data visualisation techniques. With the aid of the visualisation, patterns and connections may be found, providing a thorough understanding of the regional variations in alcohol consumption.

## 1.2 Background and Motivation

Worldwide, alcohol consumption is a major public health concern, estimating that alcohol abuse causes millions of deaths and fatalities annually. In addition, alcohol consumption contributes to many other illnesses and damage types. In many societies, drinking alcohol is still a deeply embedded social activity, notwithstanding these facts. Comprehending alcohol consumption patterns can be useful to medical professionals, officials, researchers, non-governmental organizations and of course the general public.

## 1.3 Visualization Purpose

The purpose of the visualization:

- Which countries have the highest alcohol consumption rates?
- What are the trends in alcohol consumption over the past decade?
- What was the United States alcohol consumption rate like during the year 2019?

# 2. Data

## 2.1 Data Source

For this project, the OECD statistics for alcohol consumption was used. Focusing on the following countries: Australia, United Kingdom, United States, Brazil and South Africa, the data consist of annual alcohol consumption from 2010to 2021.

## 2.2 Data Processing

Data processing is a critical step in any data visualization project as it ensures the data is clean, consistent, and suitable for analysis. For this project, the following steps were taken to process the alcohol consumption data:

Loading the Data:

- The dataset used in this project is named data3. It contains information about annual alcohol consumption measured in Liters per capita for various countries from 2010 to 2021.
- The data was initially provided in a excel format which was then converted into a CSV and JSON format for easier handling and processing.

Inspecting the Data:

- The dataset was inspected for missing values, inconsistencies, and potential errors. This involved checking for any null values, duplicate records, or incorrect data entries.
- The dataset included columns such as Country, Year, and Value (which represents the alcohol consumption in liters per capita).

Cleaning the Data:

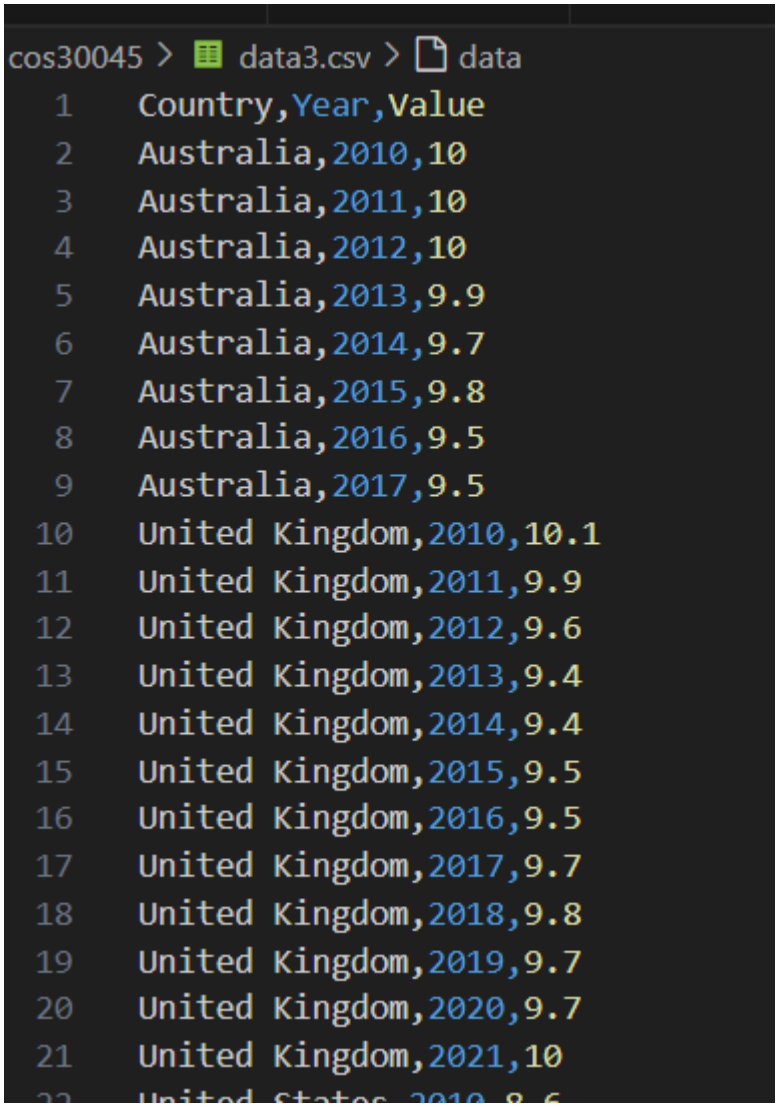
- Unnecessary Columns: The dataset contained columns that were not necessary for this analysis. Columns like Measure were removed since all entries had the same value (Litres per capita (15+)), and it did not contribute additional information.
- Handling Missing Values: Any missing values in the Value column were carefully examined.
- Standardizing Data: The country names and year formats were standardized to ensure consistency.

Transforming the Data:

- The data was transformed to a tidy format suitable for visualization. This involved ensuring that each row represented a single observation with the columns Country, Year, and Value.
- The data was also sorted chronologically within each country to facilitate easier time series analysis.

Preparing for Visualization:

- The cleaned dataset was saved as data3.csv and structured in a way that is ready for use in visualization libraries such as D3.js. The CSV format was chosen for its simplicity and compatibility with most data visualization tools.
- The processed data was then loaded into the D3.js framework within the script.js file, where it was used to create both the choropleth map and bar chart visualizations.
- The data loading process in D3.js involved reading the CSV file, parsing the data, and binding it to the graphical elements of the visualizations.



| Column4 | Column2 | Column6 | Column7 | Column9 | Column1 |
|---|---|---|---|---|---|
| Measure | | Country | YEA | Value | |
| Litres per capita (15+) | | Australia | 2010 | 10 | |
| Litres per capita (15+) | | Australia | 2011 | 10 | |
| Litres per capita (15+) | | Australia | 2012 | 10 | |
| Litres per capita (15+) | | Australia | 2013 | 9.9 | |
| Litres per capita (15+) | | Australia | 2014 | 9.7 | |
| Litres per capita (15+) | | Australia | 2015 | 9.8 | |
| Litres per capita (15+) | | Australia | 2016 | 9.5 | |
| Litres per capita (15+) | | Australia | 2017 | 9.5 | |
| Litres per capita (15+) | | United Kingd | 2010 | 10.1 | |
| Litres per capita (15+) | | United Kingd | 2011 | 9.9 | |
| Litres per capita (15+) | | United Kingd | 2012 | 9.6 | |
| Litres per capita (15+) | | United Kingd | 2013 | 9.4 | |
| Litres per capita (15+) | | United Kingd | 2014 | 9.4 | |
| Litres per capita (15+) | | United Kingd | 2015 | 9.5 | |
| Litres per capita (15+) | | United Kingd | 2016 | 9.5 | |
| Litres per capita (15+) | | United Kingd | 2017 | 9.7 | |
| Litres per capita (15+) | | United Kingd | 2018 | 9.8 | |
| Litres per capita (15+) | | United Kingd | 2019 | 9.7 | |
| Litres per capita (15+) | | United Kingd | 2020 | 9.7 | |
| Litres per capita (15+) | | United Kingd | 2021 | 10 | |
| Litres per capita (15+) | | United State: | 2010 | 8.6 | |
| Litres per capita (15+) | | United State: | 2011 | 8.7 | |
| Litres per capita (15+) | | United State: | 2012 | 8.9 | |
| Litres per capita (15+) | | United State: | 2013 | 8.8 | |


## 3. Requirements

The essential components needed for a successful data visualisation project on worldwide alcohol consumption patterns are described in this section.

*Essential Elements*

- Interactive Visualisation: The project will feature interactive visualisations with zoom and filter functions, with a focus on user involvement. This enables users to customise the view based on their interests and conduct in-depth data exploration.

- Several Visualisations: A bar chart and a choropleth map will be the two primary visual aids used in the project. Each graphic will respond to a certain query regarding patterns of alcohol usage.
- User-friendly Design: Ensuring user-friendliness is key. The visualizations will adopt a clear, easy-to-read design to make the data accessible and understandable for a wide audience.
- Accurate and Updated Data: Guaranteeing the validity of insights is crucial. The project will use accurate and up-to-date data to present a reliable representation of alcohol consumption trends.
- Interactive Tools: To enhance user interaction with the visualized data, the project will incorporate interactive tools such as tooltips, legends, and selection controls. These features will provide additional context and details to users.
- Enhanced Axes: Axes for bordering are contemplated to enhance the visual clarity of the graphs. Well-labelled and formatted axes will help users understand the scale and context of the data.

## 4. Visualization

### *4.1 Design 1: Choropleth Map*

Purpose: The choropleth map provides a geographical representation of alcohol consumption across different countries. This visualization helps users understand regional variations and identify countries with the highest and lowest consumption rates.

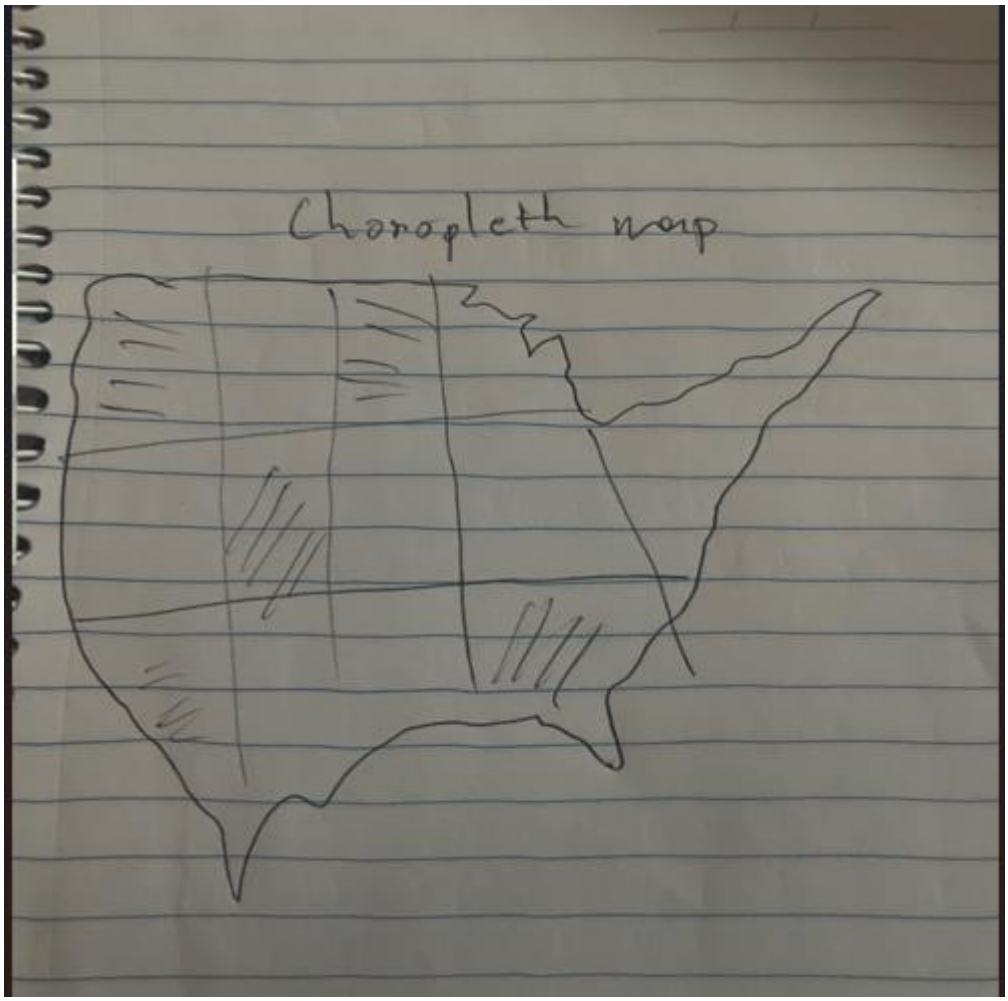
Design Features:

- Colour Coding: Countries are color-coded based on their alcohol consumption rates. A gradient color scheme, ranging from light to dark, indicates lower to higher consumption levels, respectively.
- Interactive Elements: Users can hover over a country to see a tooltip displaying detailed information about that country's alcohol consumption, including specific values and trends.
- Legends: An interactive legend helps users understand the color-coding scheme and provides a quick reference to consumption levels.
- Zoom and Pan: The map includes zoom and pan functionalities, allowing users to focus on specific regions for a closer look.

Implementation:

The choropleth map is implemented using D3.js, which allows for creating scalable vector graphics and handling complex data interactions. The JSON dataset is loaded

and processed to map each country's consumption data to the corresponding geographical location on the map.




```
const svg = d3.select("#choropleth")
    .attr("width", width)
    .attr("height", height);

const projection = d3.geoMercator()
    .scale(130)
    .translate([width / 2, height / 1.5]);

const path = d3.geoPath().projection(projection);

const color = d3.scaleSequential(d3.interpolateBlues)
    .domain([0, d3.max(data, d => d.consumption)]);
```

### *4.2 Design 2: Bar Chart*

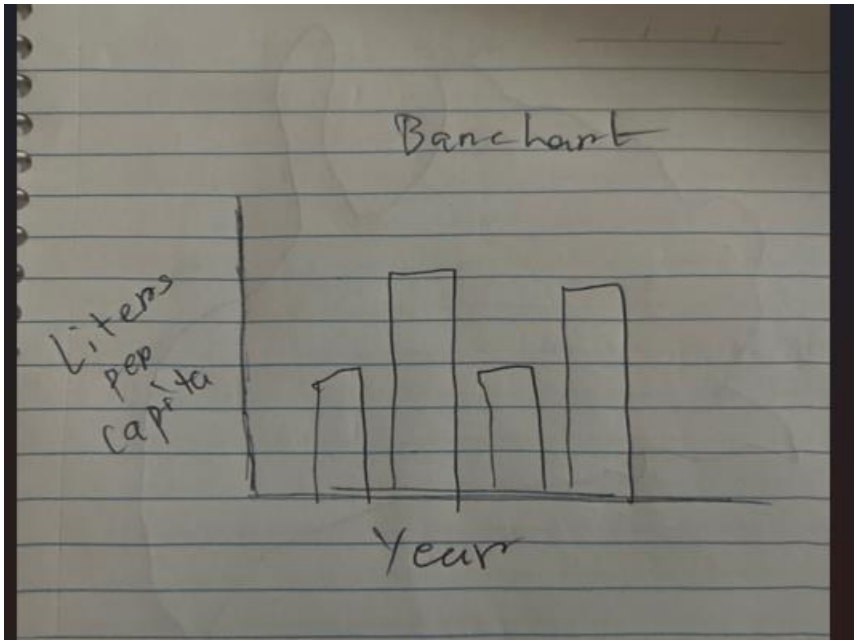
Purpose: The bar chart presents a comparative view of alcohol consumption over time for selected countries. This visualization helps users analyze trends and changes in consumption rates over the years.

Design Features:

- Bars: Each bar represents the alcohol consumption rate for a specific year. Different colours are used for each country to distinguish them easily.
- Axis Labels: Clearly labelled axes provide context. The x-axis represents years, while the y-axis represents alcohol consumption in litres per capita (15+).
- Interactive Elements: Users can hover over individual bars to see a tooltip with detailed information, such as the exact consumption value and the corresponding year.
- Filters: Dropdown menus or checkboxes allow users to filter the data by country or year, enabling a customized view of the data.

Implementation:

The bar chart is also created using D3.js. The cleaned CSV data is imported and parsed to extract the necessary information for each country and year. The chart dynamically updates based on user interactions, such as filtering or hovering.



```
const y = d3.scaleLinear()
    .domain([0, d3.max(data, d => d.consumption)]).nice()
    .range([height - margin.bottom, margin.top]);

svg.append("g")
    .attr("fill", "steelblue")
    .selectAll("rect")
    .data(data)
    .enter().append("rect")
    .attr("x", d => x(d.country))
    .attr("y", d => y(d.consumption))
    .attr("height", d => y(0) - y(d.consumption))
    .attr("width", x.bandwidth());
```

### 5. Validation: the Data

After cleaning and transforming the data, validation checks were performed to ensure accuracy. This included:

Consistency Checks: Ensuring that there were no duplicate rows, and that the data followed the expected patterns (e.g., no negative values for consumption).

### 6. Conclusion

The project visualizes alcohol consumption patterns over the past decade. The interactive and dynamic visualizations provide a deeper understanding of how consumption rates vary across different regions and time periods. These insights can inform policy decisions and public health strategies aimed at mitigating the adverse effects of alcohol consumption.

## References

*COS30045 Data Visualization*. (n.d.). Retrieved from Swinburne.Instructure.com: https://swinburne.instructure.com/courses/56073/assignments/580922

Murray, S. (2017). *Interactive Data Visualization for the Web : An Introduction to Designing with D3.* O'Reilly Media, Incorporated.

*OECD.Stat*. (n.d.). Retrieved from OECD.Statistics: https://stats.oecd.org/Index.aspx?DatasetCode=HEALTH_STAT#