



COS30045 Data Visualisation

Data Visualisation Project Process Book

Introduction

The Project Process Book is where you document the development of your data and design process. The Project Process Book is the major piece of assessment that should demonstrate that you have achieved the unit learning outcomes. The following is a template to help you structure your Process Book. Assessment Criteria are detailed on Canvas page. Please read them carefully.

A 50% penalty applied to this item if visualisation does not address this semester's Project Topic. Please check with your tutor if you are unsure if your visualisation addresses the Project Topic before doing any major work.

Visualisation Process Book

Title Page

Project Title: Visualising Road Safety Enforcement Trends in Australia (2008 – 2024)

Team Name: DataVision

Members: Krisvyin Selvaraja, Kugendran Mageshwaran, Ivan Jeremy Joseph

Unit: COS30045 – Data Visualisation

Lecturer: Mohamad Faizal Alias

Tutorial: [1/11/2025]

Year/Semester: 2025 – Semester 1

1. Introduction

1.1 Background and Motivation

Road safety enforcement plays a vital role in reducing accidents and saving lives. The Bureau of Infrastructure and Transport Research Economics (BITRE) collects national road-safety enforcement data across Australia, covering fines, drug testing, and other police actions.

Since 2023, BITRE has introduced more detailed enforcement data — including demographics, locations, and offence categories — that are not fully visualised in their existing dashboard.

Our project aims to use this dataset to create an interactive, web-based dashboard that helps policymakers, enforcement agencies, and the public understand how enforcement activities have changed over time and across regions.

1.2 Visualisation Purpose

The goal of this visualisation is to allow users to:

- Track trends in road-safety enforcement (e.g., speeding fines, mobile phone offences).
- Compare enforcement levels across Australian states and territories.
- Identify hotspots or categories with the highest enforcement activity.

Example user questions:

- How have total fines and drug tests changed from 2008 to 2024?
- Which states issue the most speeding fines?
- Are there seasonal or demographic differences in enforcement actions?

1.3 Project Schedule

Week	Task	Status
9	Create GitHub repo, choose topic, draft introduction	<input checked="" type="checkbox"/>
10	Collect BITRE dataset, start KNIME workflow	<input type="checkbox"/>
11	Perform exploratory analysis, generate summary stats	<input type="checkbox"/>
12	Design and build D3.js visualisations	<input type="checkbox"/>
13	Test, refine, complete final submission	<input type="checkbox"/>

2 Data

2.1 Data Source

- **Dataset:** Road Safety Enforcement Data (2008–2024)
- **Source:** Bureau of Infrastructure and Transport Research Economics (BITRE)
<https://www.bitre.gov.au/statistics/safety>
- **Format:** CSV
- **Attributes:** Year, State/Territory, Offence Type, Count, Age Group, Testing/Arrests
- **Governance:** Publicly available; collected by BITRE from state police agencies under Australian privacy and open data police. This dataset provides quantitative records suitable for trend and geographic analysis.

2.2 Data Processing

Planned steps in KNIME:

1. Import CSV using *File Reader* node.
2. Clean missing or invalid data (e.g., blank states or counts).
3. Standardise attribute names.
4. Aggregate total offences/fines by year and state.
5. Calculate summary statistics (e.g., average fines per year).
6. Export cleaned dataset using *CSV Writer* so data is saved with the workflow

At this stage, we have identified the required transformations and begun drafting the workflow.

3 Requirements

We will implement **3 core visualisation components** in D3.js:

Visualisation	Description	Interaction
Line Chart	Total enforcement actions per year	Hover for year values
Bar Chart	Offences by state or type	Filter by category
Map (Choropleth)	Enforcement density by state	Hover tooltips, zoom

The dashboard will use consistent colour scales, readable fonts, and responsive design to ensure accessibility across devices.

4. Blockers and Challenges

- Locating and merging BITRE's yearly enforcement CSVs
- Interpreting variable definitions (e.g., difference between offence vs enforcement action)
- Building map interactivity with D3 GeoJSON for Australia
- Limited time for testing on Mercury server

5. Next Steps

- Finalise data cleaning and transformation in KNIME
- Generate basic charts for exploratory data analysis
- Develop D3.js visualisation layout and filters
- Expand Process Book with design sketches and validation

6. AI Declaration

Artificial intelligence tools were used only to improve writing clarity and structure. Specifically, OpenAI's ChatGPT (GPT-5) was used to reformat the Process Book and presentation outline. All design decisions, data processing, and final implementation will be completed and verified by the DataVision team.

7. Project Progress

Process Book – Krisvyin

Powerpoint Slides – Krisvyin

Knime Workflow - Kugendran

