A Data-Driven Dashboard for Analyzing Cost of Living Trends in Australian Cities

Authors: Johan Carlo Ilagan, Hannah Roberts, Michael Zhang
Conference: IEEE International Conference on Data Science and Visualization (DSV 2025)
DOI: 10.1109/DSV.2025.11234
Publication Date: August 21, 2025

Abstract

This paper presents a cost-of-living dashboard integrating publicly available datasets on rent, groceries, transportation, and energy prices across Australia's capital cities. Developed using Python, Power BI, and REST API data pipelines, the system enables interactive visualization and real-time comparative analysis. Results reveal widening disparities in housing affordability between major cities and regional areas, with Perth and Brisbane showing the steepest growth in rental costs. The dashboard demonstrates how data visualization can translate complex socioeconomic data into actionable insights for policymakers and residents alike.

1. Introduction

Understanding the dynamics of living costs is crucial for addressing socioeconomic inequality and guiding public policy. Traditional statistical reports often lag behind real-time market changes and are not easily interpretable by the public.
This project applies data-science principles to design a transparent and interactive tool that aggregates and visualizes key indicators of living expenses. The system aims to make economic information more accessible to citizens, analysts, and government agencies.

---

2. Methods

2.1 Data Sources

Data were obtained from the Australian Bureau of Statistics (ABS), Numbeo, and open government energy datasets.
All sources were accessed via APIs or CSV exports and normalized to a consistent city-level schema.

2.2 Data Processing

Python scripts cleaned and merged datasets using *pandas* and *NumPy*, applying inflation adjustment via CPI indices from 2015–2025.
An ETL pipeline automated daily updates using *cron* scheduling.

2.3 Visualization

The dashboard was built in Power BI and Streamlit, featuring interactive filters for city, expense category, and time range.
Key metrics were displayed through KPI cards, line charts, and heatmaps.

---

3. Results

Analysis revealed that rent and energy costs increased by 18–25 % in most capital cities between 2020 and 2025.
Perth and Brisbane recorded the highest rent inflation, while Adelaide maintained relatively stable transport and food costs.
The visualization allowed users to explore trends dynamically, revealing correlations between wage growth and regional affordability indices.

---

4. Discussion and Conclusion

The dashboard enhances public understanding of financial trends by transforming complex datasets into intuitive visuals.
Its modular design supports additional data streams—such as fuel prices or education costs—without altering the interface.
Future work will incorporate forecasting models using ARIMA and Prophet to predict future cost trajectories.
This approach highlights the power of open data and visualization in supporting evidence-based policymaking.