Assignment 1: Part A

**Research Question**: Does gentrification displace low-income people?

**Problem Description or Background**:

Gentrification is a concept rooted back in 1964 by Ruth Glass where he defined the transformation of low-income neighbourhoods undergo process of middle- and high-income earners purchasing and upgrading properties in such areas (Lin et al. 2021, p. 3). In the context of Adelaide city, one of the indicators to measure gentrification is surging of rental housing price. Adelaide's rents are among the affordable in the country but have risen faster than other capital cities in the past year where the median advertised rental price for an Adelaide property jumped 11.8 per cent in 2022 to a record $450 a week (realestate, 2023). The situation in Adelaide was not solely about the neighbourhood’s complete alteration but rather the high demand and limited properties across Adelaide’s rental market were continuing to push prices up that continue to facilitate the gentrification process (realestate, 2023).

**Follow-up question** – Which next suburbs are likely would get affected by gentrification from this increasing rental housing price?

**Data Description:**

While rising rental housing prices are often associated with gentrification, sources data from Australian Bureau Statistic (ABS) has more than 100 indicators but need to be selective that helps to answer on which components of the census contributes to gentrification. Among the reliable indicators are, social infrastructure index comprises of index in education and health and services which could give insights into the quality of life and overall well-being. Gentrification often attracts high-income households that prioritize quality education for their children, hence likely will displace people that could not afford due to rising cost. Next, housing low-income rental stress index provide insights into the level of rental stress experienced by low-income households in Australia. The ABS calculates the Housing Low Income Rental Stress Indicator by examining the proportion of low-income households that spend 30% or more of their gross household income on rent. Besides, the ABS also provides median mortgage repay monthly and median rent weekly where both provide the number of dwellers must pay for their houses. Finally, total household income both for below $650 and above $3000 provide insights on how much the dwellers earn. These census data components allow to investigate the changes in the suburbs that could potentially undergo gentrification.

**Initial Data processing:**

With these data, it allows to visualize the distributions index across the suburbs and compare of how they are related to one another in addressing gentrification. The data from ABS has been processed in term of index and some features such as rental and housing mortgage are in the whole number ie Australian Dollar (AUD). Each of the suburbs has the index ID called Statistical Area Level varies from level 1 to 4. Statistical Areas Level are geographical areas built to indicate area within the Mesh Blocks. Using these data sources could generate gentrification maps at coarse spatial resolution (often at SA1 level). Using ABS data, it helps to identify changes in the suburb’s demographics over time. By comparing census data from different years, we can analyse the changes in demographics characteristics such as income level, rental and housing mortgage price and education level. An increased concentration of high-income households, higher levels of education, or a rise in certain occupations may imply the presence of gentrification.

However, measuring for this survey data for gentrification research takes time and effort. Other indicators that could contribute to gentrification but could not be captured by census data are, presence of local high-end stores, park facilities and distance to public transportation. Local high-end stores choose to be selective, only in wealthy suburbs. The message this gives off essentially is that wealthy people deserve the best quality stores. As for distance to public transportation, the column data is presence but is not filled. This suggests that ABS data planning to record but not get measured. Public transportation provides the connectivity and accessibility within a neighbourhoods or city. Properties closer to public transportation could increase the housing demand which can lead to rising property value and might be displacing existing residents. Next is park facilities could give a different effect on gentrification in terms of size, overall quality, whether they are new and proximity to downtown. Parks located closer to downtown could also correlate to gentrification.

**Refined problem and Plan:**

To investigate gentrification in the neighbourhoods, process of Exploratory Data Analysis (EDA) should be performed by checking the relationship between indicators by performing univariate and multivariate analysis to see if any corelation occurred. Next, visualize the distributions index across the suburbs and compare on how they are related to one another by mapping out the demographic distribution indexes. Besides, data cleaning process should be performed in term of checking null values, presence of outlier’s data and imputation if necessary. Model will be built to predict if the neighbourhoods are gentrified or vice versa based on the reliable predictors in the ABS such as

income level, education level other inputs. By using these indicators as proximity to gentrification, classification modelling may be ideal to predict if the suburbs or neighbourhoods is gentrified or not gentrified. The model will be validated by checking it through cross-validation techniques and compare the performance. Software implementations for this project will utilise from the scikit-learn Python library to conduct the prediction analysis. For the mapping visualisation of the neighbourhood, Geopandas library will be used to project the changes of indicators indexes.

**Reference:**

[Adelaide | Region summary | Data by region | Australian Bureau of Statistics (abs.gov.au)](https://dbr.abs.gov.au/region.html?lyr=sa2&rgn=401011001).

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