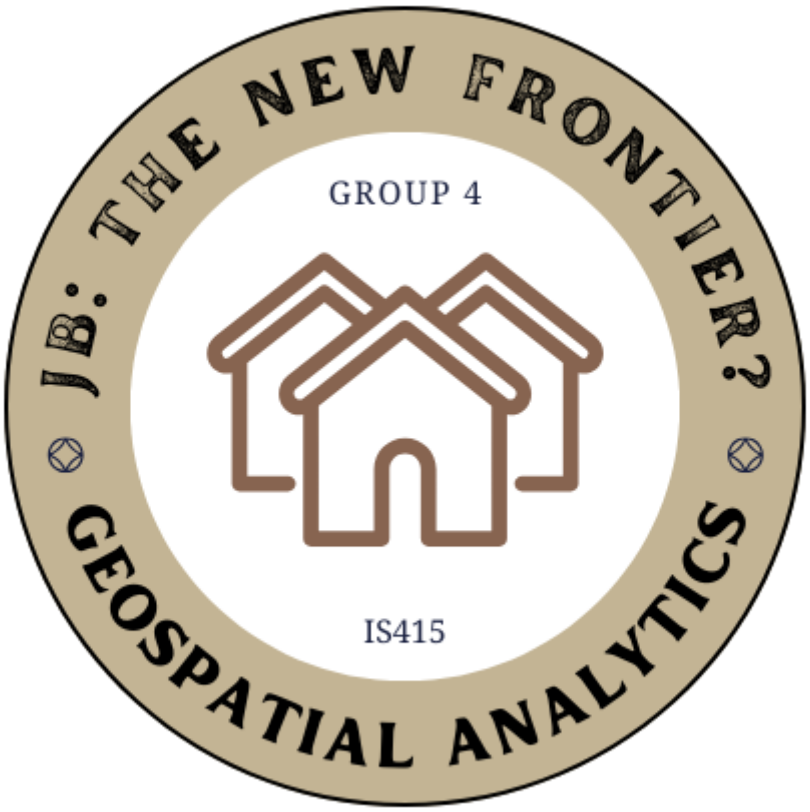

JB: THE NEW FRONTIER?

User Guide

IS415: GEOSPATIAL ANALYTICS AND APPLICATIONS
Group 4: HENG Kuan Xin, SEAH Chi Hao, Kendrick TEO Tze Yu

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Introduction

JB: The New Frontier? is a Shiny web application designed to explain the trajectory of property prices in Johor Bahru, Malaysia (JB).

User can make use of the application to identify Points of Interest (POIs) as well as analyse the prices of the properties in the respective districts (Mukims) within JB. This lets them make a more informed decision when purchasing a property in JB.

Packages Used

The following packages are currently used in this application.

Packages	Link
shiny	https://cran.r-project.org/web/packages/shiny/index.html
bslib	https://cran.r-project.org/web/packages/bslib/index.html
shinydashboard	https://cran.r-project.org/web/packages/shinydashboard/index.html
shinythemes	https://cran.r-project.org/web/packages/shinythemes/index.html
rsconnect	https://cran.r-project.org/web/packages/rsconnect/index.html
olsrr	https://cran.r-project.org/web/packages/olsrr/index.html
ggstatsplot	https://cran.r-project.org/web/packages/ggstatsplot/index.html
sf	https://cran.r-project.org/web//packages/sf/index.html
tmap	https://cran.r-project.org/web/packages/tmap/index.html
tidyverse	https://cran.r-project.org/web/packages/tidyverse/index.html
gtsummary	https://cran.r-project.org/web/packages/gtsummary/index.html
performance	https://cran.r-project.org/web/packages/performance/index.html
see	https://cran.r-project.org/web/packages/see/index.html
sfdep	https://cran.r-project.org/web/packages/sfdep/index.html
spdep	https://cran.r-project.org/web/packages/spdep/index.html
tidygeocoder	https://cran.r-project.org/web/packages/tidygeocoder/index.html
RColorBrewer	https://cran.r-project.org/web/packages/RColorBrewer/index.html

Data

The following datasets were used for the application.

Processed

Data	Description	Raw
amenities.rds	POIs data in Johor Bahru and Kulai, comprising nearby amenities such as schools, parks, shopping malls and CIQ checkpoints	Point of Interest (POI) data
property.rds	Property data in Johor Bahru and Kulai	Property Transaction Data
study_area.rds	Geographical boundary data for Johor Bahru and Kulai	Johor Bahru, Malaysia boundary data

Raw

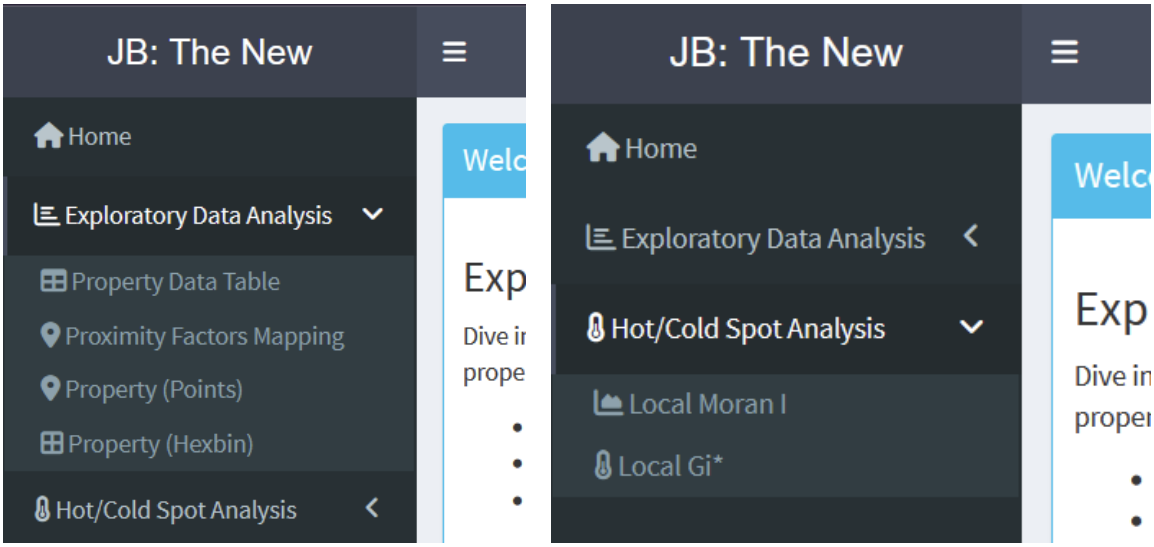
The processed datasets are derived by preprocessing the raw data obtained from the following sources.

Data	Source	Processing method / tool used
Johor Bahru, Malaysia boundary data	United Nations Humanitarian Data Exchange (from geoBoundaries)	Filtered away all districts except Johor Bahru and Kulai
Point of Interest (POI) data	OpenStreetMap	OSM Overpass Turbo API was used to extract POIs within Johor Bahru and Kulai
Property Transaction Data, 2023-2024	Portal Pusat Maklumat Harta Tanah Negara (NAPIC)	Extract relevant data within Johor Bahru and Kulai, drop null values

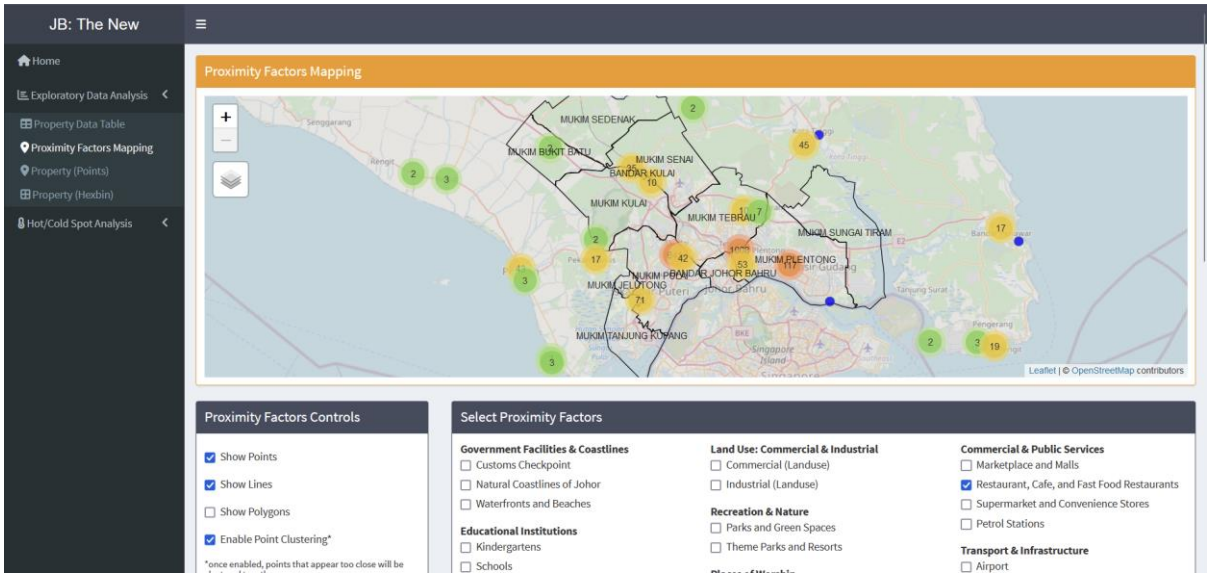
UI and Tabs

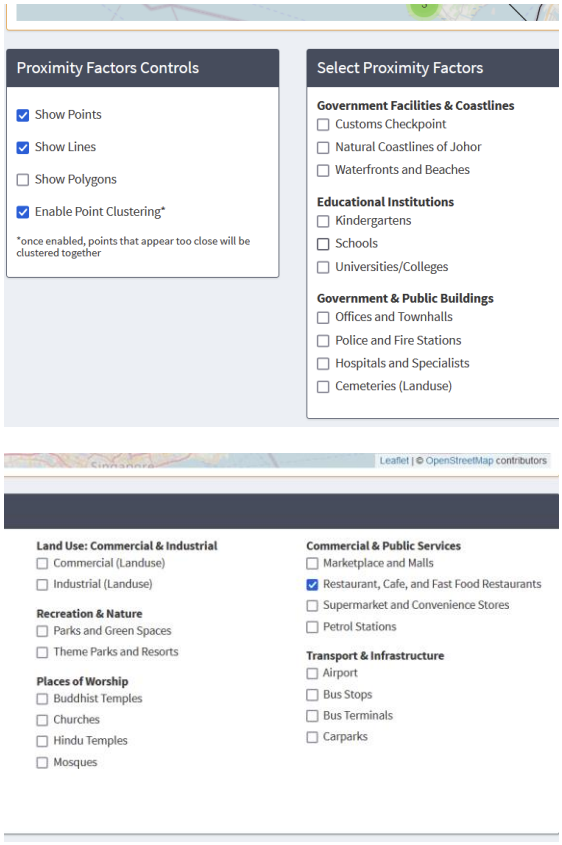
Users can navigate through the different tabs for the analysis of the property prices in JB. More detailed explanation of each tab is available in the subsequent sections.

The navigation bar of the application is as shown below.



Proximity Factors Mapping



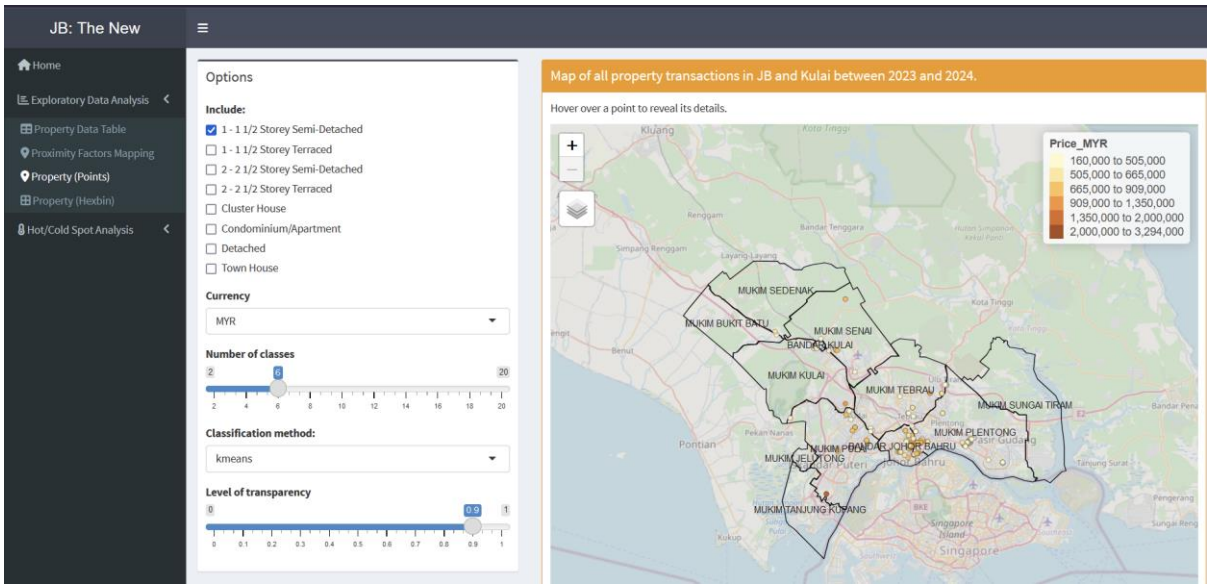


The input tab shows the POIs, sorted into different categories, which the user can select. This helps users narrow down suitable district(s) within JB in which to purchase a property.

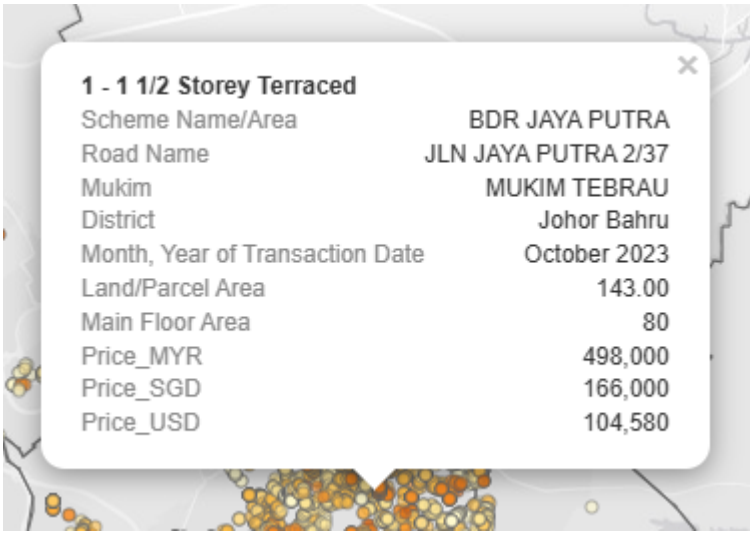
Users may then run other analysis to help make a more informed choice before purchasing a property in JB.

Base Map

The base map plots the point locations of property transactions between 2023 and 2024. Users may select the type and transaction price of the property in any of 3 desired currencies: Malaysian Ringgit (MYR), Singapore dollars (SGD) or United States dollars (USD) (all approximated). Users may also choose a classification method (k-means, equal, etc.) for colour coding the property points.



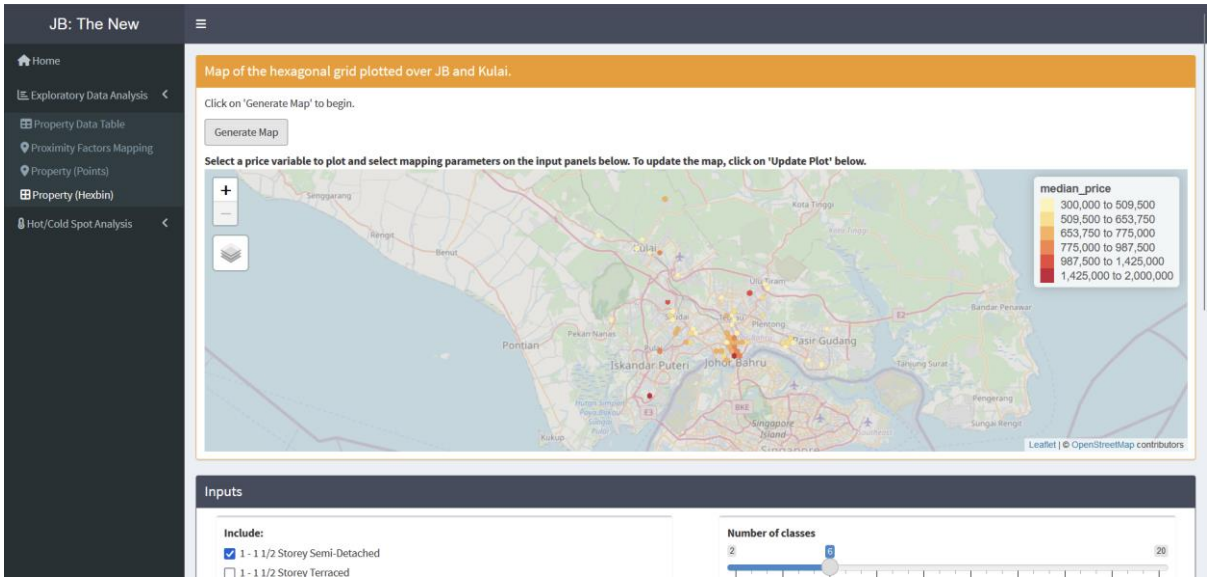
Clicking on a point displays more information about the property.

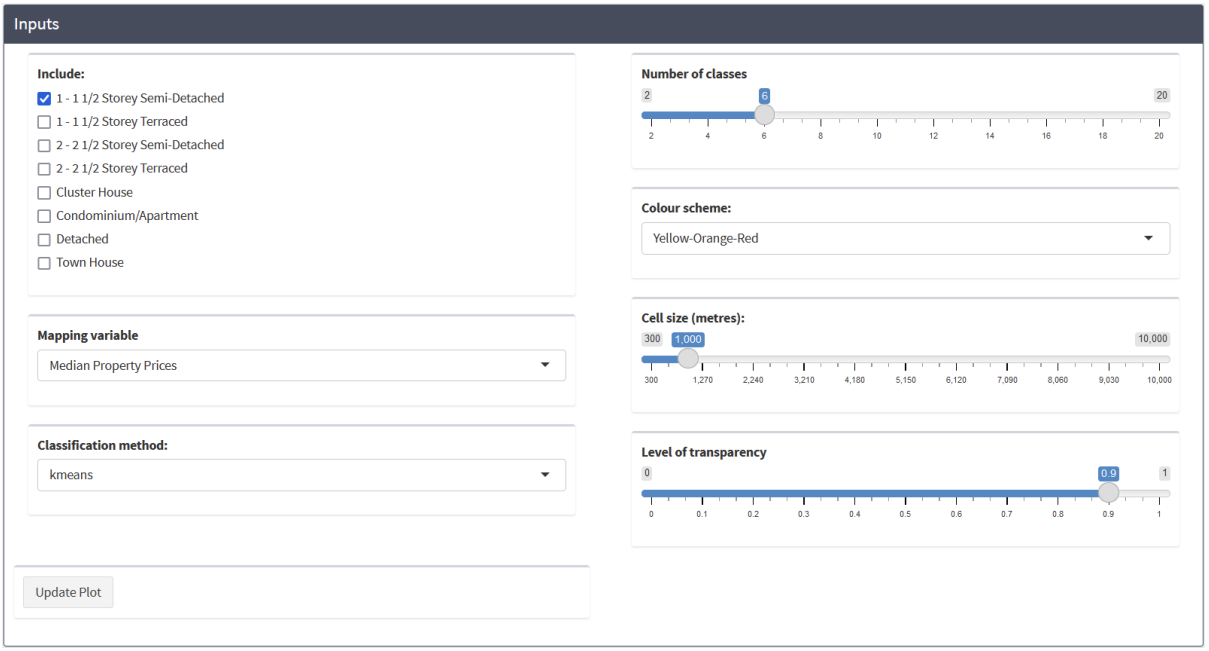


Hexagon Grid

The hexagon grid view breaks the study area into grids and aggregates the transaction prices of property within each grid. Users may select the type of property and whether to show the property density or the mean, median or maximum property price within each grid. This gives users a more general sense of the aggregate property prices in each

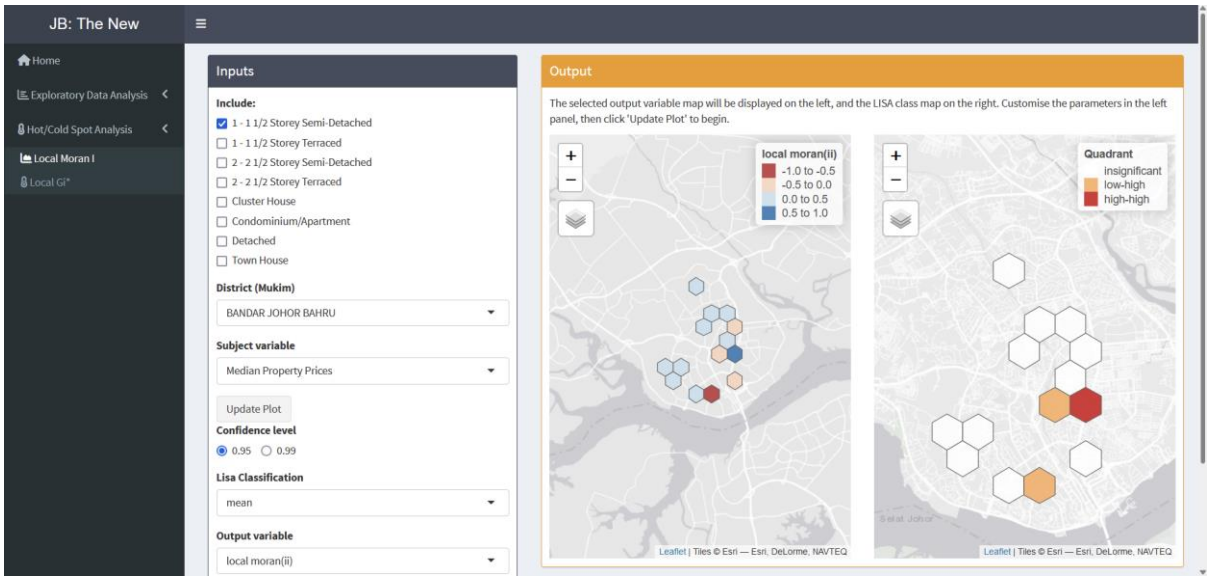
region, helping them scope down the district(s) within JB where they are interested in purchasing a property.

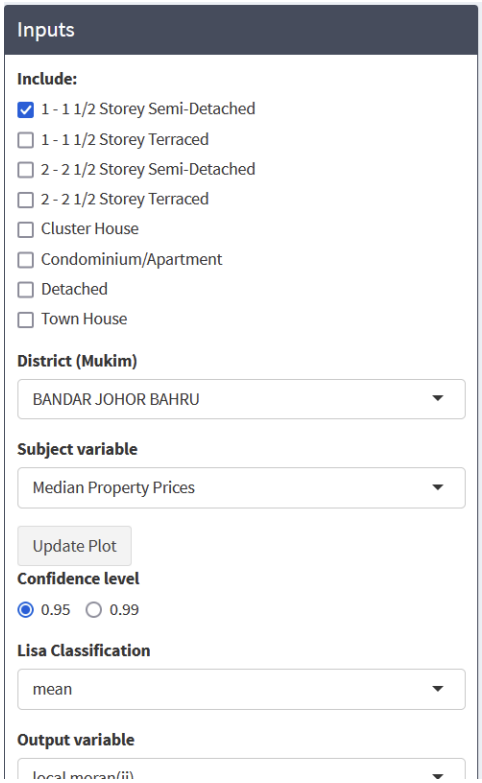


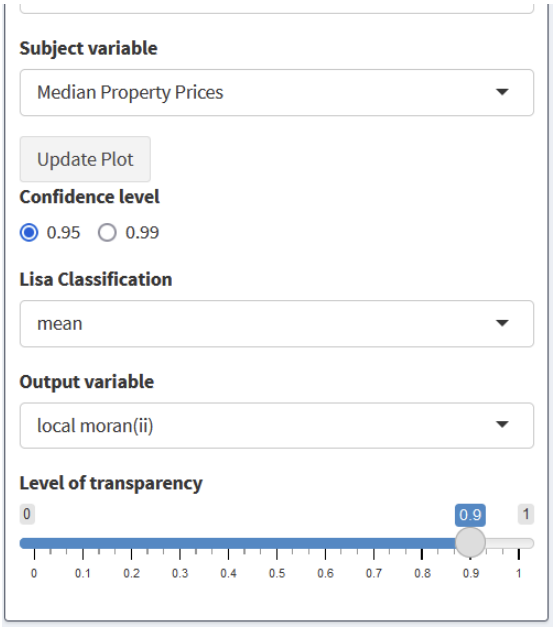


Local Moran's I

Users may analyse property prices using local Moran's I (ii) and LISA class map, which are built on the hexagon grid. Filtered by Mukim, users may understand the granular price trends within the Mukim by reviewing its Local Moran's I statistic and LISA quadrant.







Local Gi

Also built on the hexagon grid is the Local Gertis-Ord Gi* statistics view, which is also filtered by Mukim. Users may analyse property price hot and cold spots within the selected Mukim. The warm colours (red, orange) denote pricing hot spots where the mean, median or maximum property prices are at their highest, while the cool colours (blue) denote pricing cold spots where the prices are at their lowest.

Note: if the K value for k-means is too large, the application may run into errors because the number of data points selected is smaller than the chosen K value. In this case, reduce the K value on the slider and click on the update plot button again.