



Investigating Pricing Factors Inside The Real Estate Market Of Brazil

Team 3 Cohort B

Anmol Srivastava, Prateek Naharia,
Yuesen Zhang, Hector He,
Anish Puthuraya

Real Estates In Brazil



Property Type

PH/Apartment/House



Location

HDI > 0.7 & Urban Type



Budget

USD 1 Million



Number Of Rooms

Minimum 4

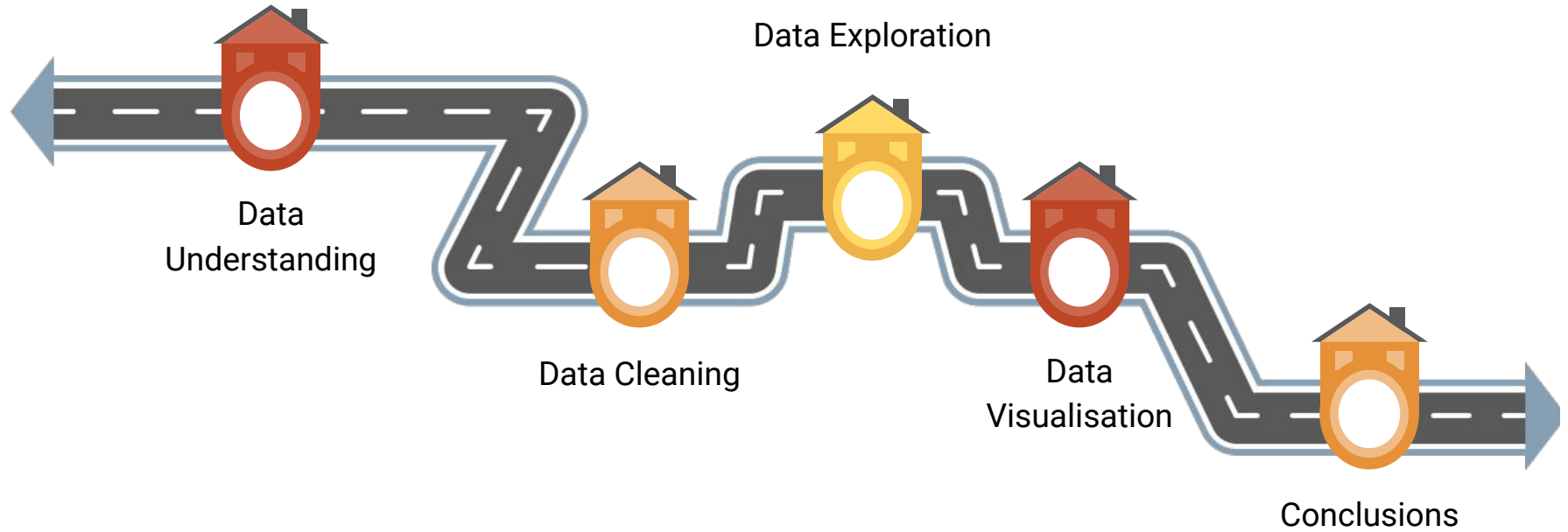


Buy

Purchase a Property



Roadmap

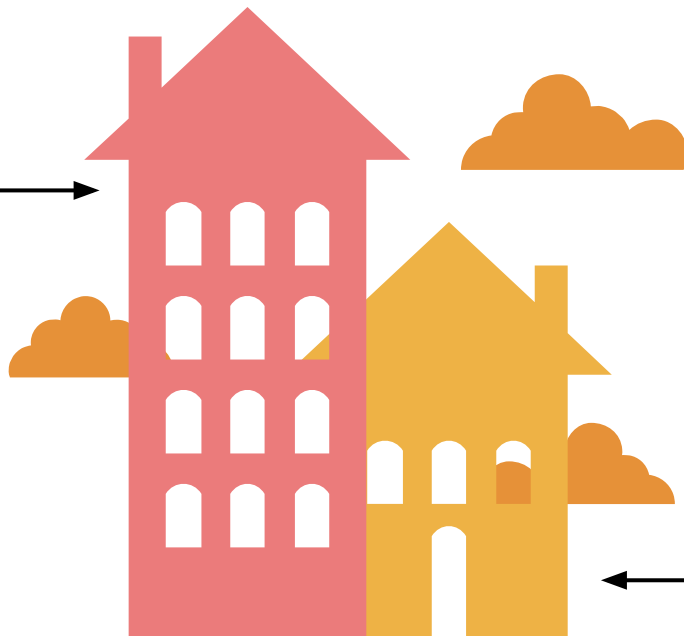


Data Understanding

Main Data

The dataset contains the sale and rent listing of properties such as houses, stores, and penthouses available on Properati for Brazil as of Jan 2015.

169,220 rows - 27 columns



City Data

This dataset is a compilation of several publicly available data points about Brazilian cities (GDP, HDI, Population etc).

5,578 rows - 81 columns

Data Cleaning



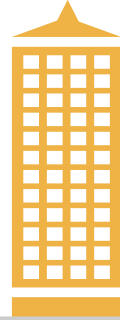
Grouping

Group on relevant columns, which correlate with the column we are trying to impute



Mean/Median

Compute the mean/median of the column which we are trying to impute

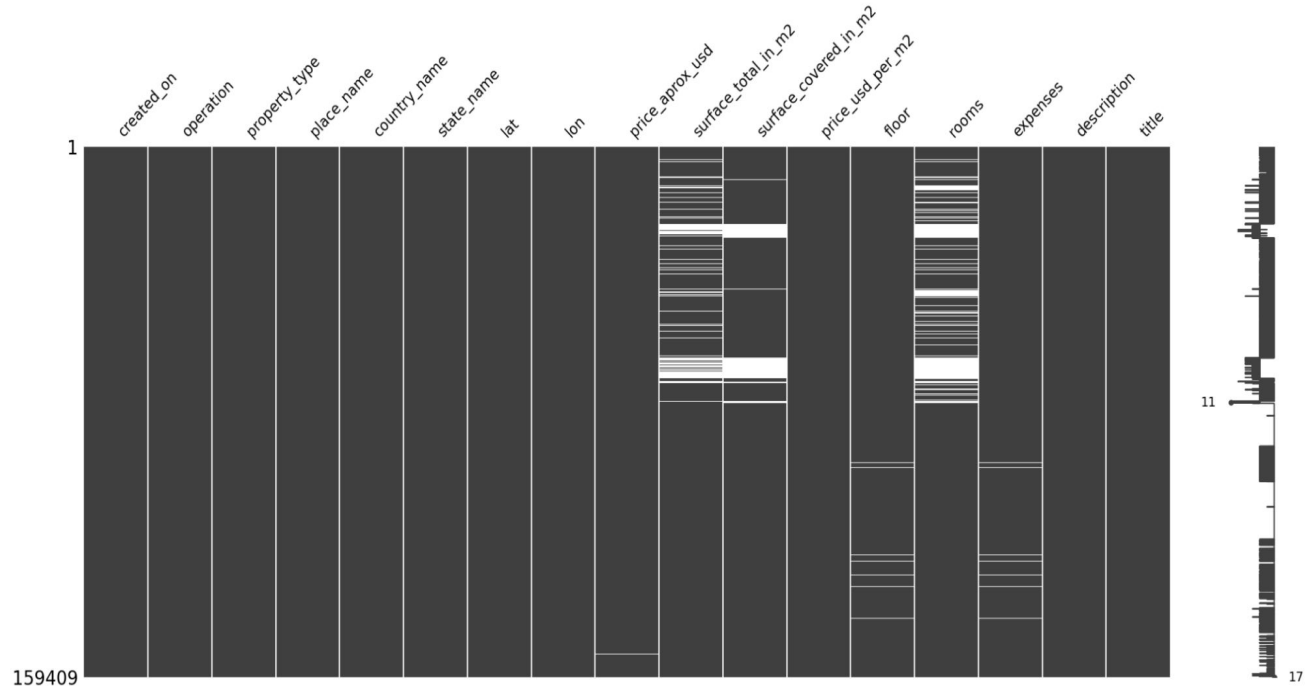


Merge

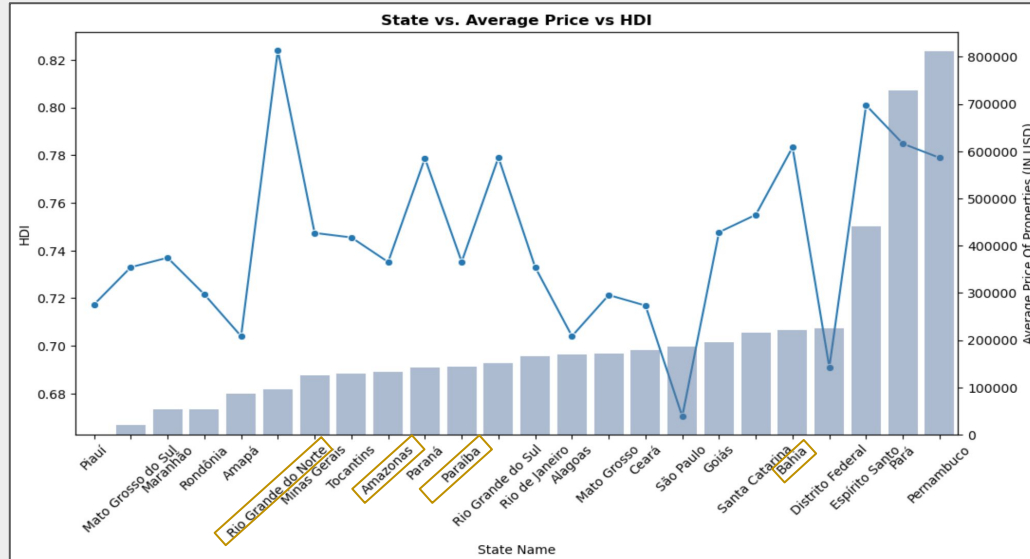
Perform a left join, followed by concatenating with the original data

Data Cleaning

Before

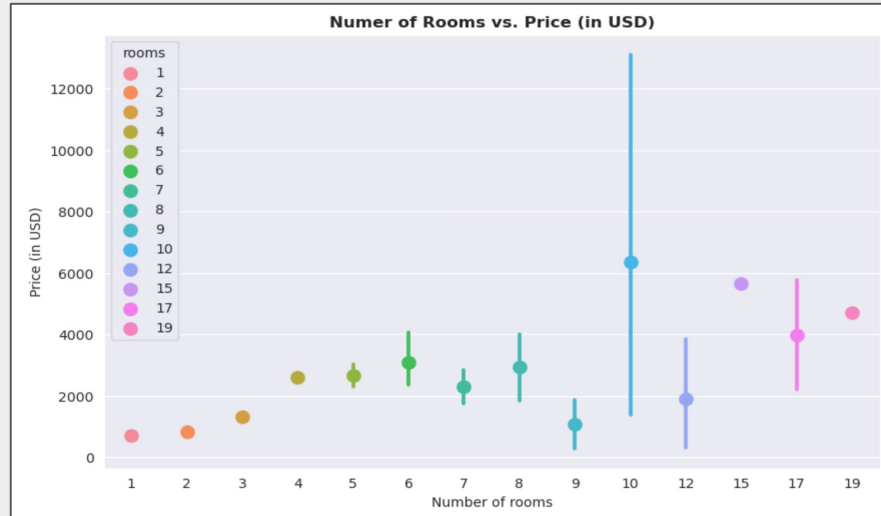


Geographical - State vs Price vs HDI



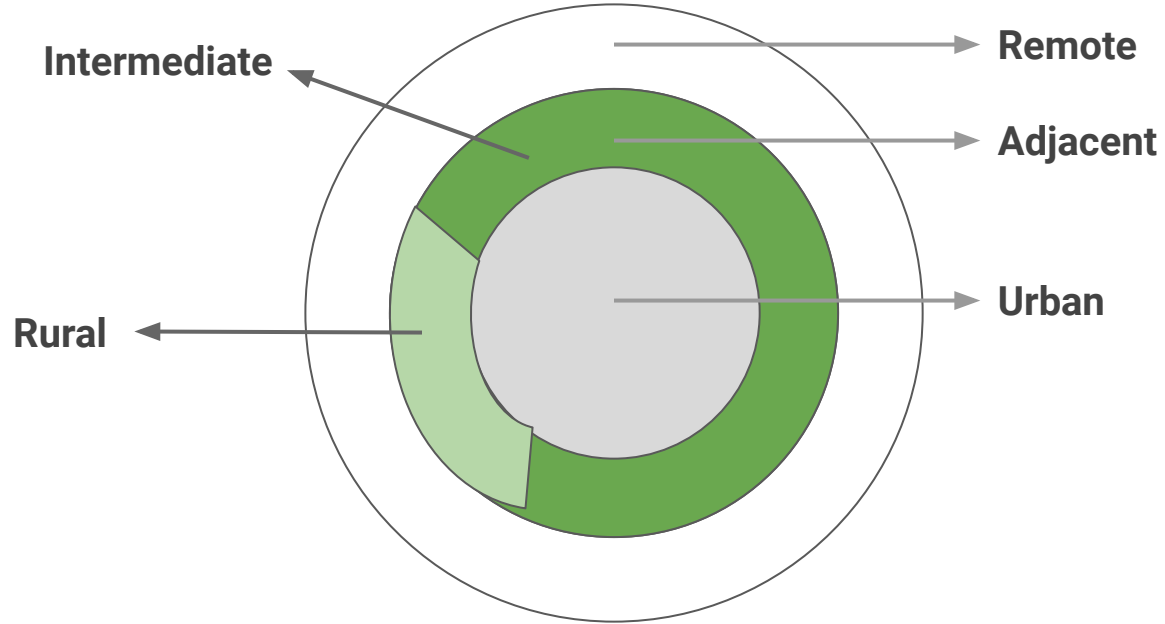
Cities with higher average price tend to have HDI above 0.76

Number of rooms vs. Price

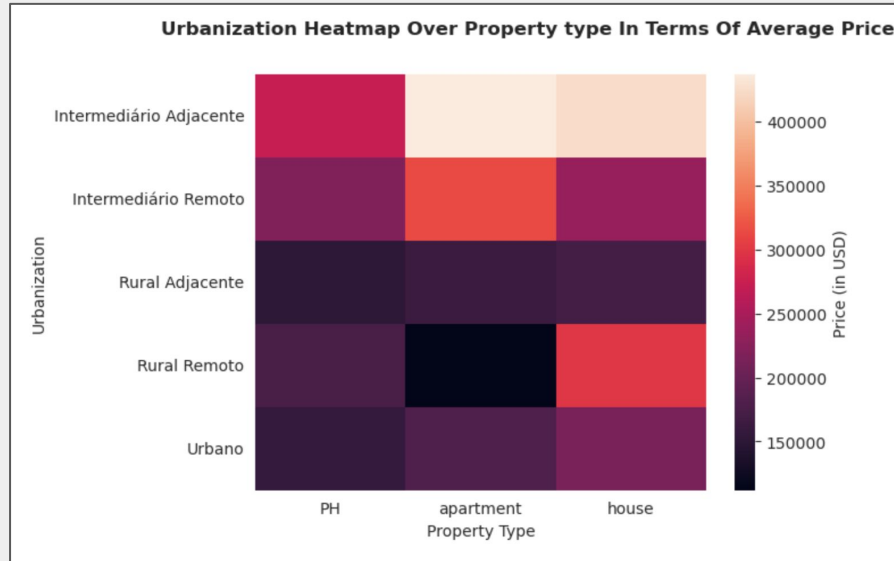


From the central tendencies of “Price in USD” and “No of Rooms” for rental operations, the number of rooms increase, the price of the property increases.

Urbanization

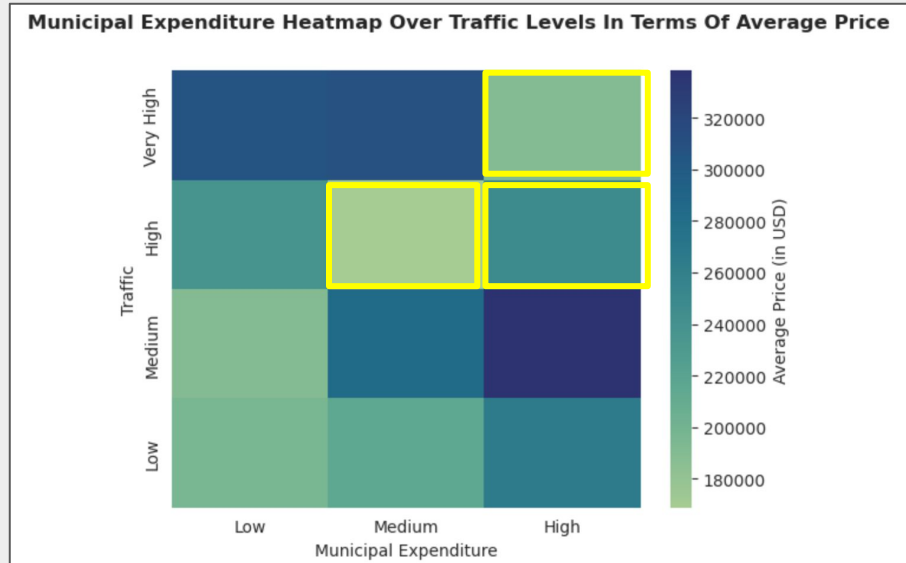


Property type & Location vs Price



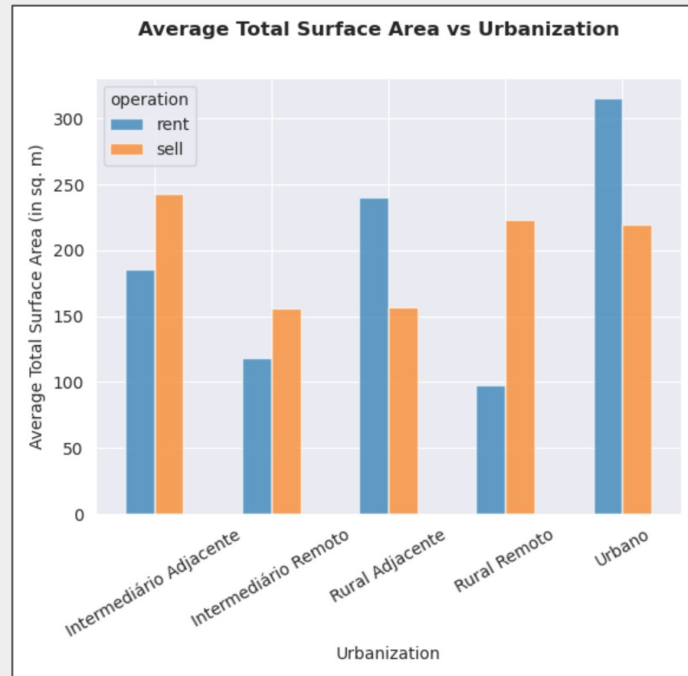
Average price for properties "Intermediario Adjacent" cities regardless of the property type are pretty high.

Municipal Expenditure and Traffic vs Price

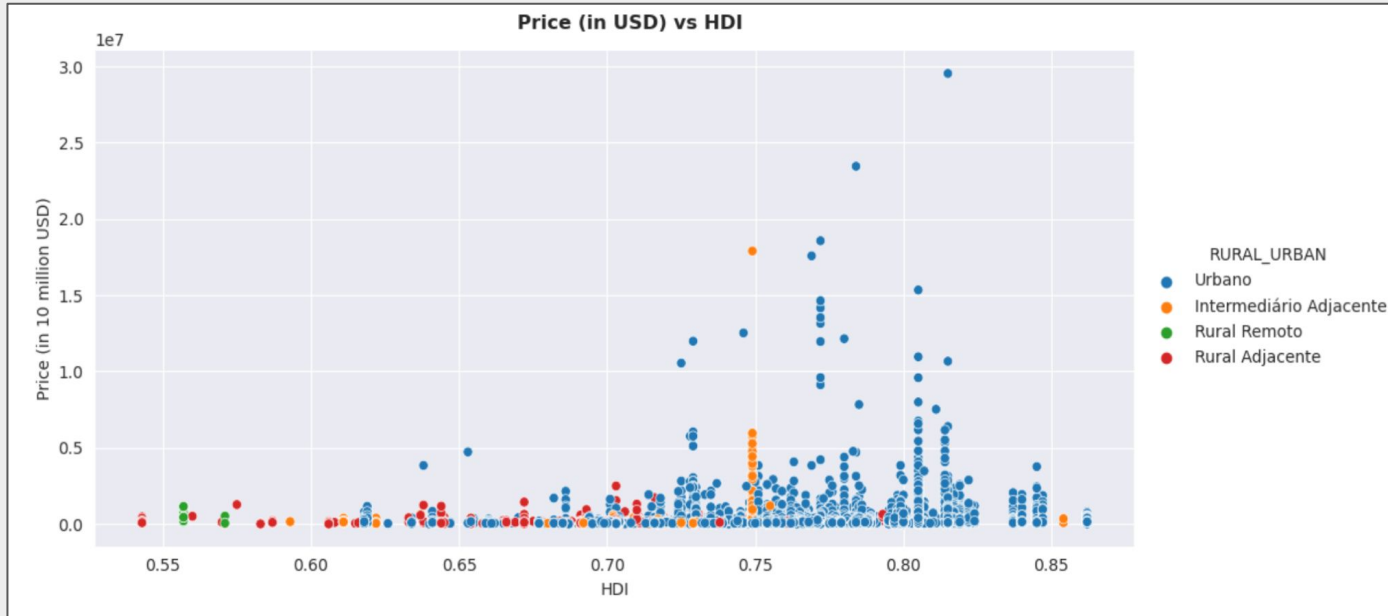


Favourable cities are associated with high municipal expenditures, low/high traffic combined with affordable prices

Urbanization & Economic Status

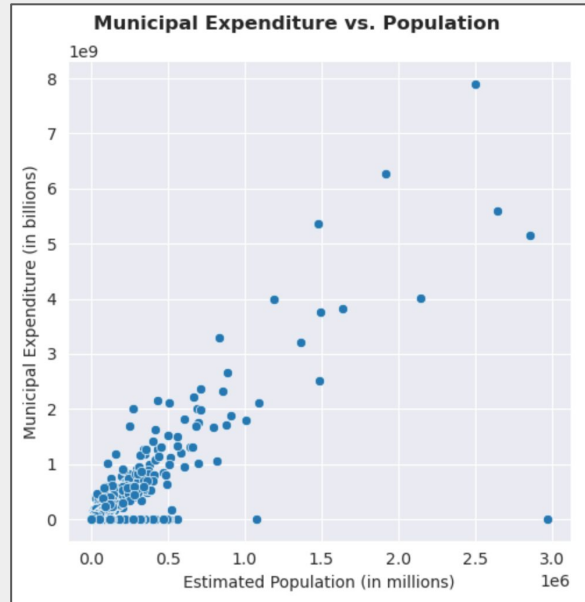


Urbanization & Economic Status



Cities with high HDI have more properties listed, and the prices of those properties also tend to be higher than those in cities with lower HDI. Cities which are in rural areas (Rural Adjacente/Rural Remoto) have fewer properties listed.

Municipal Expenditure vs Population



Cities with high estimated population are accompanied with higher Municipal expenditures.

Recommendations for John

Recommend the **top 5** properties adhering to all requirements and desires as per the rating

Define ratings metric as $\frac{rooms * surfaceArea}{expenses * pricePerUnitArea}$

Use the traffic heatmap to filter for cities with **high** municipal expenditure and **low-high** traffic

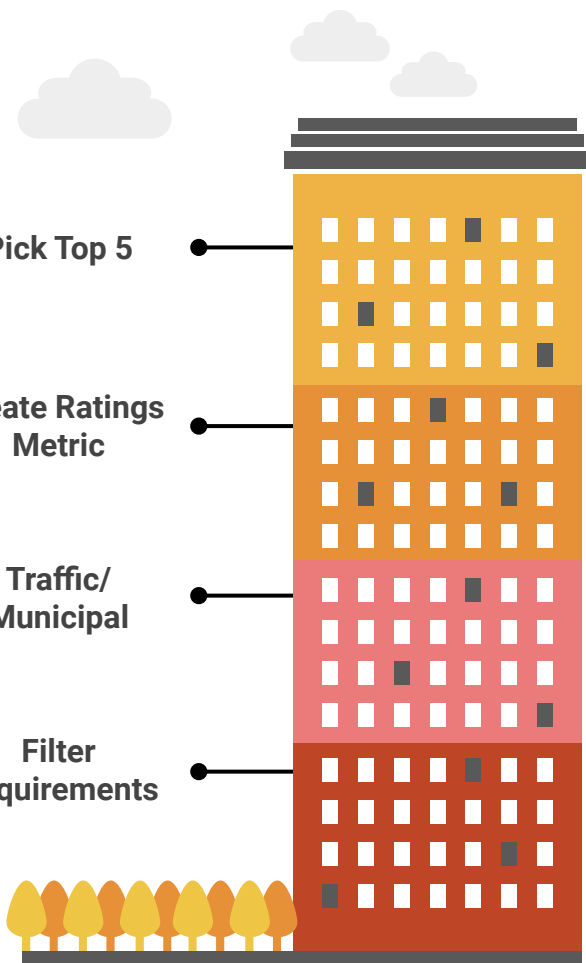
Filter for properties & cities with desirable qualities

Pick Top 5

Create Ratings Metric

Traffic/
Municipal

Filter Requirements



Top 5 Recommendations to John

House with :

Price: \$131k **Rooms:** 4 rooms
Area: 386m² **City:** Governador Celso Ramos
Floor: single floor **State:** Santa Catarina

House with :

Price: \$406k
Area: 711m²
Floor: single floor
Rooms: 5 rooms
City: Nonoai
State: Rio Grande do Sull

House with :

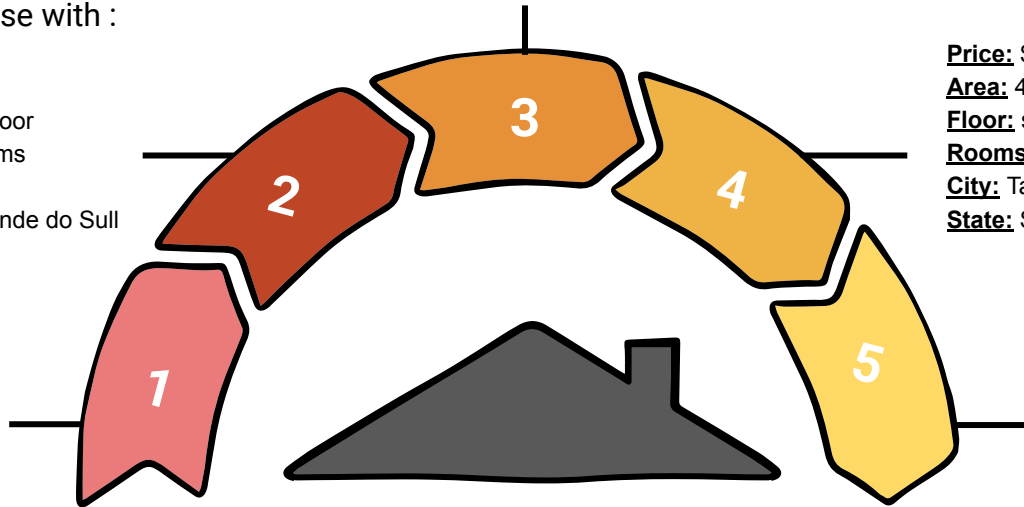
Price: \$131k
Area: 450m²
Floor: single floor
Rooms: 4 rooms
City: Tabatinga
State: São Paulo

House with :

Price: \$255k
Area: 1000m²
Floor: single floor
Rooms: 4 rooms
City: Sobradinho
State: Distrito Federal

House with :

Price: \$93k
Area: 250m²
Floor: single floor
Rooms: 4 rooms
City: Parnamirim
State: Rio Grande do Norte





Thank you for listening!

References

- “Brazilian Cities.” Kaggle, https://www.kaggle.com/datasets/crisparada/brazilian-cities?select=BRAZIL_CITIES_REV2022.CSV.
- “ISO 3166-2:BR.” Wikipedia, Wikimedia Foundation, 18 Sept. 2022, https://en.wikipedia.org/wiki/ISO_3166-2:BR.
- Guedes, Gilvan, et al. “Revisiting the Hierarchy of Urban Areas in the Brazilian Amazon: A Multilevel Approach.” Population and Environment, U.S. National Library of Medicine, May 2009, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3488306/>.
- “Matplotlib 3.6.2 Documentation#.” Matplotlib Documentation - Matplotlib 3.6.2 Documentation, <https://matplotlib.org/stable/index.html>.
- Nations, United. “Human Development Index.” Human Development Reports, 9 Nov. 2022, <https://hdr.undp.org/data-center/human-development-index#/indicies/HDI>.
- “Properati Data.” Properati., <https://www.properati.com.ar/data>.
- “Rural and Urban Typologies in Brazil a Comparison with the Proposed Global Methodology Claudio Stenner Coordinator of Geography of Brazilian Institute. - PPT Carregar.” SlidePlayer, <https://slideplayer.com.br/slide/17498136/>.
- “Seaborn.heatmap.” Seaborn.heatmap - Seaborn 0.12.1 Documentation, <https://seaborn.pydata.org/generated/seaborn.heatmap.html>.
- “Sign In.” RPubs, <https://rpubs.com/agrilive/brazil-development-analysis>.

Conclusions

1

Urban Areas generally have higher Human Development Indexes and higher prices

2

Properties in "Rural Adjacente" cities are suitable since the community is well developed and the mean area is large.

3

If a person is looking for a property to rent with a budget of \$5000, they're recommended not to seek properties with more than 5 rooms.

4

High HDI means High density of property. Low HDI means Low Density of property. Brazilian government plans to modernize and develop these areas. Areas have great potential and hence higher house prices.

5

High HDI & life quality: Rio Grande do Norte, Amazonas and Parabia (Urbano)
Low HDI & life quality: São Paulo & Distrito Federal (Intermediario Adjacente areas)

Data Cleaning - Inputting Nulls

LEFT
merge

Property Type + Median of floors = Floor

Property Type + Median of Expenses = Expense
Operations

State Name + Median of Price USD per m² = Price \$ per m²
Property Type
Operations

Surface total area m² + Median of rooms = Surface total area m²

Surface covered area m² + Median of rooms = Surface covered area m²

State Name + Mean of latitude + State Name = Latitude
Place Name + Mean of longitude + Place Name = Longitude
Price Range

*Yellow boxes: Main Dataset

*Pink boxes: City Dataset