INNOMATICS®
RESEARCH LABS

INNOVATION. AUTOMATION. ANALYTICS

PROJECT ON

Rent Analysis in Pune

About me

Name: Nikita Samadhan Nikam

Education: B.E – Information Technology

Status: Fresher

Why Data Science

I come from an Information Technology background with a strong foundation in programming and databases. During my academics, I worked on a Stock Market Prediction project using AI/ML, where I handled data preprocessing and model building to predict stock trends.

This project helped me understand the importance of data-driven decision-making and motivated me to pursue data science to strengthen my skills in data analysis, machine learning, and visualization, and to convert data into meaningful business insights.

LinkedIn:

https://www.linkedin.com/in/nikita-nikam-184b39240/

GitHub:

https://github.com/NikitaNikam1

INNOMATICS RESEARCH LABS

Business Problem and Use case domain understanding

Business Problem:

- Rental prices in Pune vary significantly across different localities and property configurations.
- Rent is influenced by multiple factors such as BHK, carpet area, furnishing status, and location.
- Comparing rental properties becomes difficult without structured and reliable data.
- A data-driven analysis is required to understand rent patterns and support informed housing decisions.

Use Case:

- Analyzes Pune rental property data scraped from the **MagicBricks website**.
- Identifies high-rent and affordable localities and key factors affecting rental prices.
- Examines trends and variations in rent across different areas of Pune.
- Supports tenants, investors, and real estate professionals in budgeting, relocation, and planning decisions.

INNOMATICS RESEARCH LABS

Objective of the Project

- To analyze the distribution of rental prices and identify the presence of outliers in the Pune rental market.
- To examine the relationship between carpet area and rent to understand how property size influences pricing.
- To study how BHK configuration impacts average rental prices.
- To evaluate the influence of location (locality) on rental price variation.
- To identify the most important numerical factors affecting rent using correlation analysis.
- To provide data-driven insights that can help tenants, landlords, and real estate analysts make informed decisions.

INNOMATICS RESEARCH LABS

Web Scraping – Details

Website Used :

- Data was collected from the **Magicbricks** real estate website.
- The website provides **city-wise residential rental property listings** across India.
- Rental listings for **Pune city** were used for this analysis.
- Data available on the website is **publicly accessible**.

Tools & Platform Used :

- **Jupyter Notebook** was used as the development and analysis environment.
- **Python** was used for web scraping, data preprocessing, and analysis.
- **Requests** library was used to fetch web page content.
- **BeautifulSoup** was used to extract property details from HTML pages.
- **Pandas** was used to store, clean, and process the scraped data.
- **Matplotlib & Seaborn** were used for data visualization and EDA.

INNOMATICS RESEARCH LABS

Process Followed :

- Data was collected from the **Magicbricks rental listings webpage**, which provides city-wise residential rental property information.
- **Jupyter Notebook** was used to write, test, and execute the web scraping code step by step.
- Webpage content was accessed using **Python and the Requests library**.
- **BeautifulSoup** was used to analyze the HTML structure and extract relevant property details.
- Property information such as **rent, carpet area, BHK configuration, furnishing, locality, and availability** was extracted.
- The extracted data was stored in a **Pandas DataFrame**, cleaned to handle missing values and inconsistencies, and saved as a **CSV file** for further analysis and visualization.

Raw Data

- The dataset contains **raw rental property listings** scraped from the Magicbricks website for Pune city.
- It includes details such as **property title, rent (text format), furnishing, carpet area, locality-related attributes, and availability information**.
- The data is **uncleaned**, containing text values, mixed formats, and some missing entries.
- Each row represents **one rental property listing**.

	Property_title	rent	furnishing	carpet_area	facing	balcony	bathrooms	floors	Tenants Preffered	availability	point_of_contact
0	2 BHK Flat for Rent in Kolte Patil Life Republ...	₹23,006	Semi-Furnished	910 sqft	East	1	2	17 out of 22	Bachelors	Immediately	Contact Agent
1	2 BHK Flat for Rent in Sinhgad Road, Pune	₹28,000	Unfurnished	750 sqft	East	2	2	8 out of 14	Family	Immediately	Contact Agent
2	3 BHK Flat for Rent in Shubh Gateway, Viman Na...	₹70,000	Unfurnished	1000 sqft	East	1	3	4 out of 12	Bachelors/Family	Immediately	Contact Agent
3	3 BHK Flat for Rent in Green Valley, Wanowrie,...	₹50,000	Furnished	NaN	East	2	3	1 out of 10	Family	Immediately	Contact Agent
4	2 BHK Flat for Rent in Gera World of Joy, Khar...	₹36,000	Unfurnished	740 sqft	East	1	2	5 out of 7	Family	Immediately	Contact Agent

INNOMATICS RESEARCH LABS

Exploratory Data Analysis

Data Cleaning :

- Removed irrelevant columns such as raw rent text and contact details.
- Handled missing values in carpet area using BHK-wise median imputation.
- Filled missing categorical and numerical values with appropriate defaults.
- Standardized column names and verified a clean, complete dataset.

Data Manipulation :

- Converted rent values from text format to **numeric values** for statistical analysis.
- Separated numerical and categorical variables to apply appropriate univariate and bivariate analysis techniques.
- Grouped data by **BHK configuration** to calculate average rent and carpet area.
- Generated summary statistics and correlations

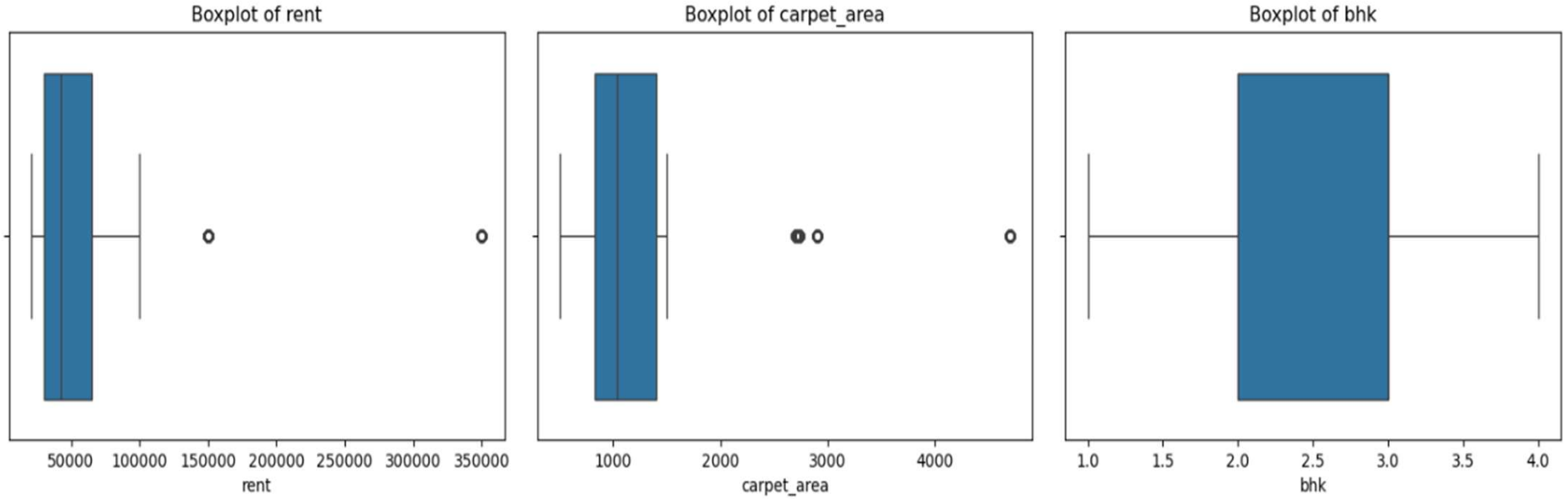
INNOMATICS RESEARCH LABS

Clean Data

	Property_title	furnishing	facing	balcony	bathrooms	Tenants Preffered	bhk	rent	property_type	locality	floor	availability	carpet_area
0	2 BHK Flat for Rent in Kolte Patil Life Republ...	Semi-Furnished	East	1	2	Bachelors	2	23006.0	Flat	Hinjawadi	17	Immediate	910.0
1	2 BHK Flat for Rent in Sinhgad Road, Pune	Unfurnished	East	2	2	Family	2	28000.0	Flat	Sinhgad Road	8	Immediate	750.0
2	3 BHK Flat for Rent in Shubh Gateway, Viman Na...	Unfurnished	East	1	3	Bachelors/Family	3	70000.0	Flat	Viman Nagar	4	Immediate	1000.0
3	3 BHK Flat for Rent in Green Valley, Wanowrie,...	Furnished	East	2	3	Family	3	50000.0	Flat	Wanowrie	1	Immediate	1300.0
4	2 BHK Flat for Rent in Gera World of Joy, Khar...	Unfurnished	East	1	2	Family	2	36000.0	Flat	Kharadi	5	Immediate	740.0

INNOMATICS RESEARCH LABS

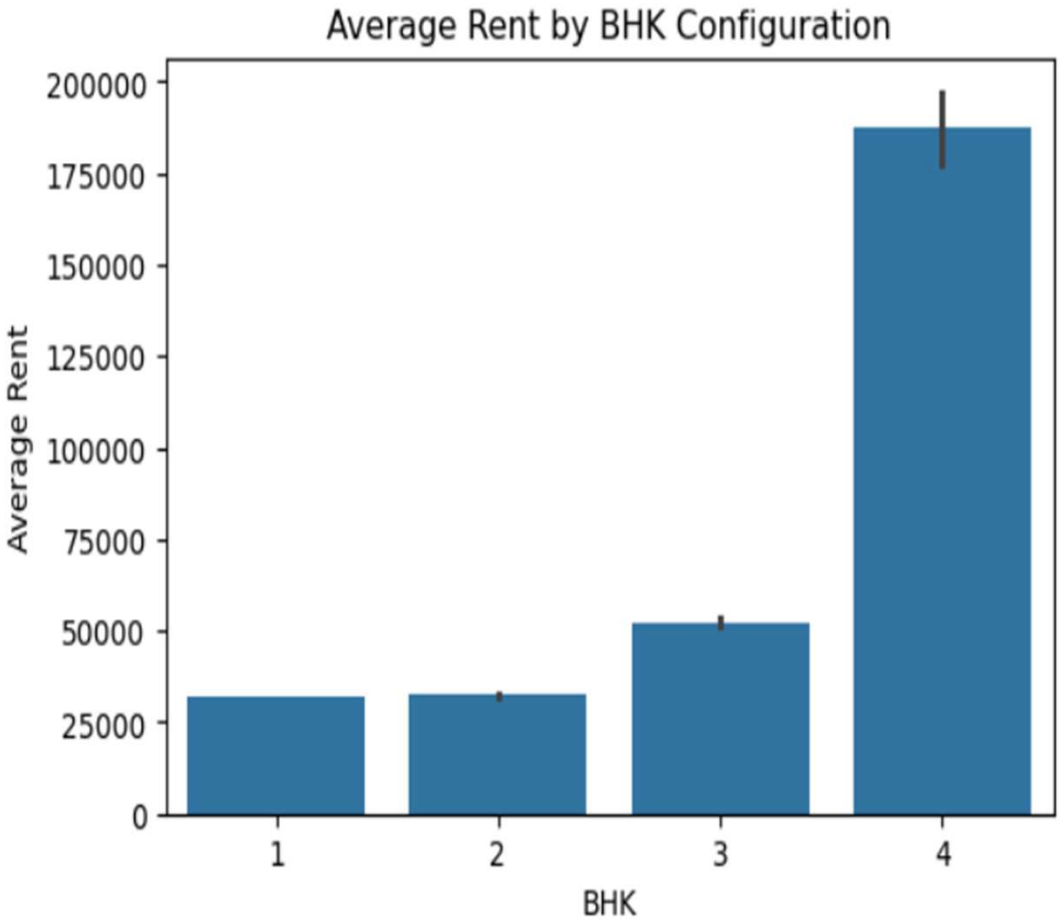
Key Insights from Rent, Carpet Area and BHK Distribution



- **Rent:** Right-skewed distribution with a few high-value outliers, indicating some luxury rentals.
- **Carpet Area:** Most homes have compact to mid-sized areas; a few very large properties exist as outliers.
- **BHK:** Majority of listings are **2–3 BHK**, showing stable and common housing preferences.

INNOMATICS RESEARCH LABS

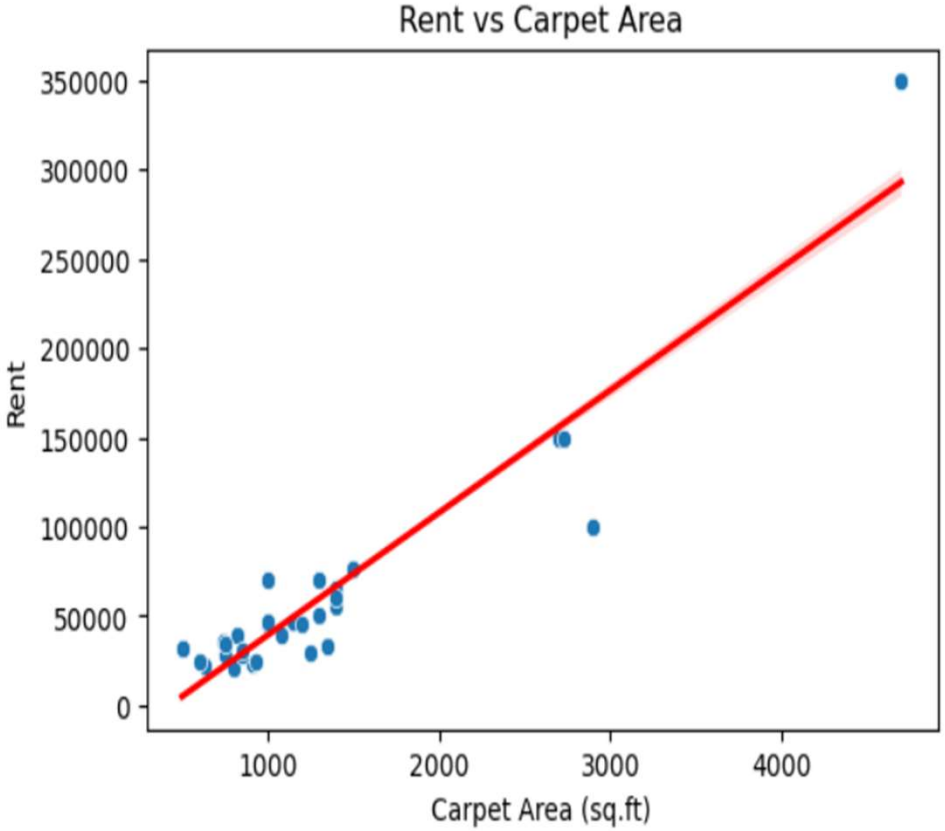
How does BHK configuration impact average rental prices?



- Average rent **increases steadily with BHK size**, showing a strong link between home size and rent.
- **1 BHK and 2 BHK** units fall in the **affordable to mid-range segment**, suitable for professionals and small families.
- **3 BHK rents rise noticeably**, indicating higher space and family demand.
- **4 BHK units are significantly costlier**, representing **premium or luxury housing** in prime localities.
- The sharp jump from **3 BHK to 4 BHK** highlights pricing driven by exclusivity and location.

INNOMATICS RESEARCH LABS

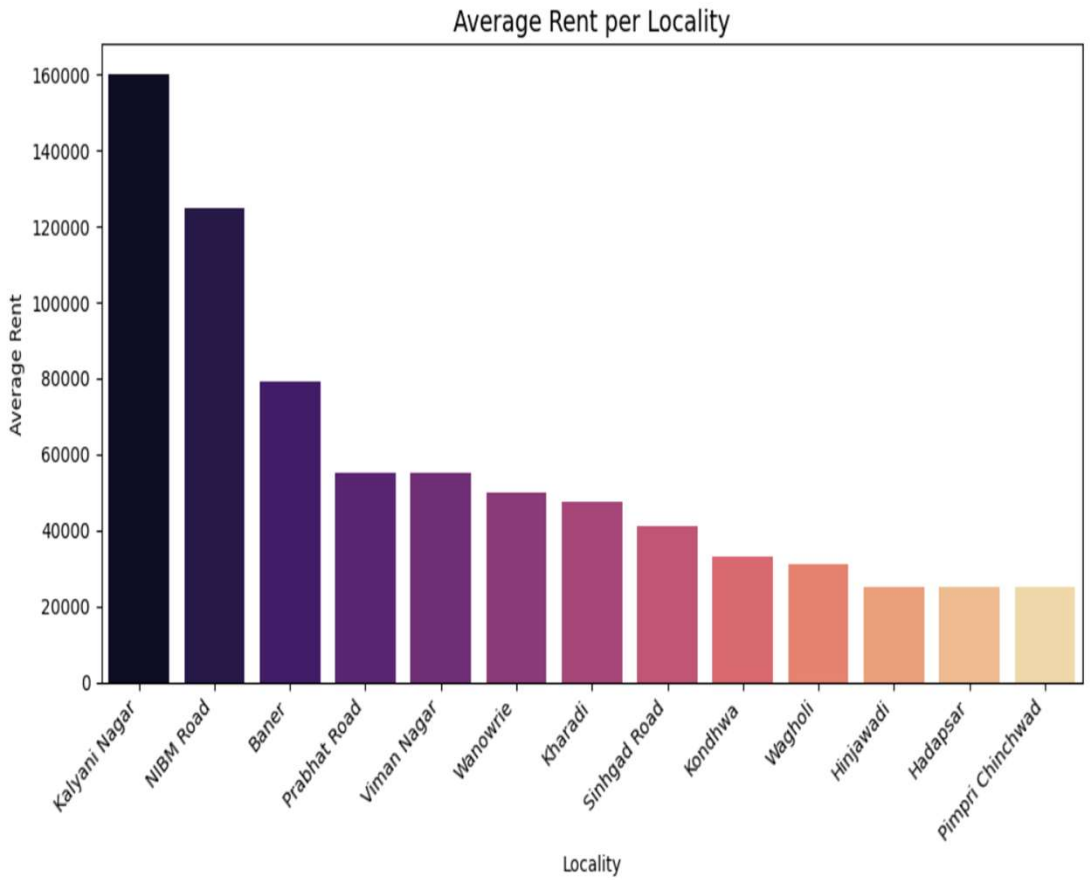
How does carpet area influence rental prices in Pune?



- The plot shows a **strong positive relationship** between carpet area and rent.
- As **carpet area increases**, rental prices **rise consistently**, indicating size is a major pricing factor.
- Most properties cluster between **800–1200 sq.ft**, reflecting common apartment sizes in Pune.
- A few **high-area, high-rent outliers** represent luxury or premium properties.
- This trend suggests that **larger homes command higher rents**, though location may also influence pricing.

INNOMATICS RESEARCH LABS

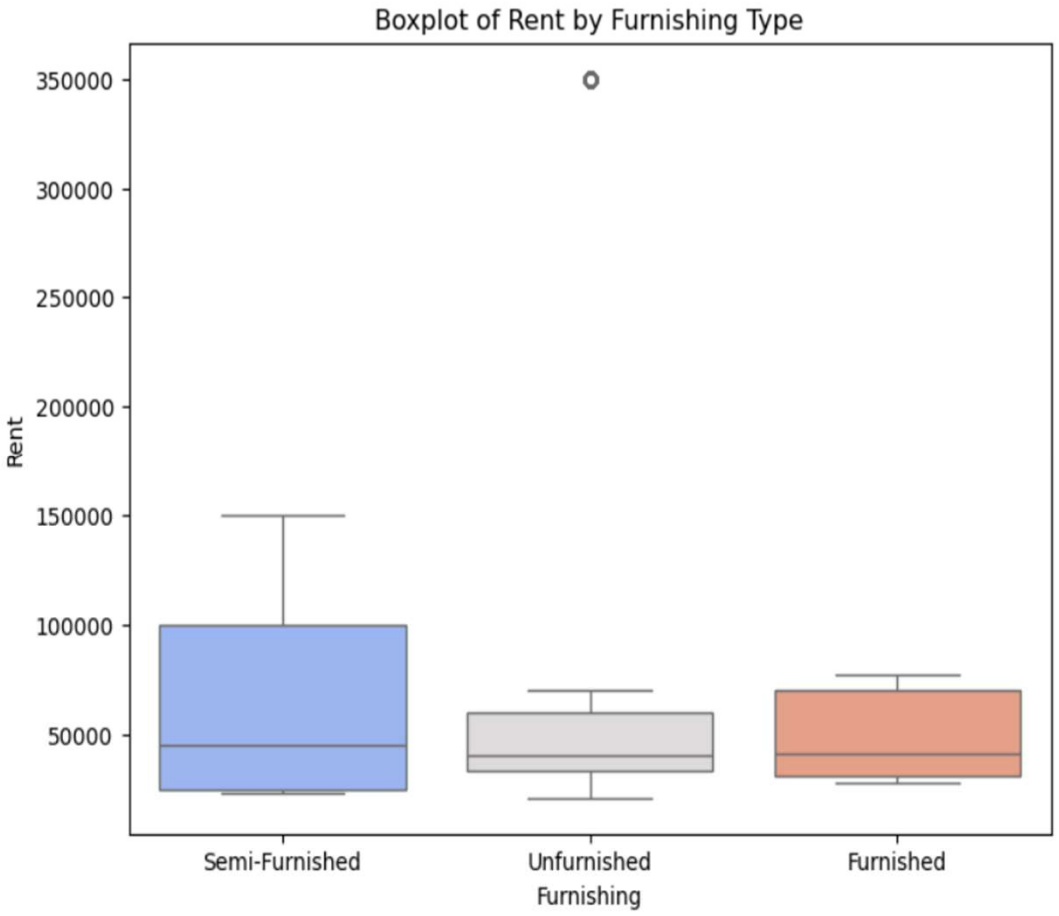
How does rental price vary across different localities in Pune?



- **Kalyani Nagar and NIBM Road** have the **highest average rents**, indicating premium residential demand.
- **Baner, Prabhat Road, and Viman Nagar** fall in the **upper mid-range**, balancing connectivity and amenities.
- **Wanowarie, Kharadi, and Sinhgad Road** represent **mid-range rental markets**, suitable for working professionals.
- **Hinjawadi, Hadapsar, and Pimpri-Chinchwad** show **lower average rents**, reflecting affordability and IT-hub driven demand.
- Significant rent variation across localities highlights **location as a key driver of rental pricing** in Pune.

INNOMATICS RESEARCH LABS

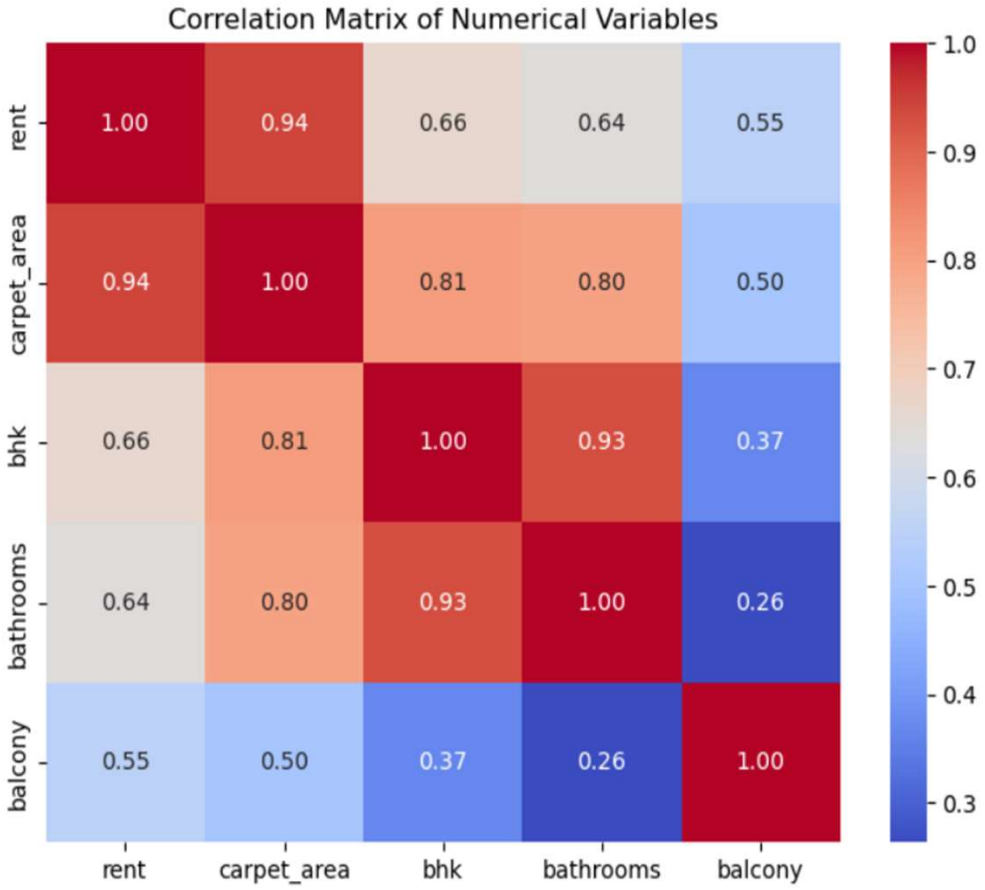
How Does Furnishing Type Affect Rent?



- **Semi-furnished homes show the highest median rent**, indicating higher typical rental pricing.
- **Unfurnished properties exhibit the widest rent variation**, including a very high outlier, suggesting the presence of premium listings.
- **Furnished homes have relatively lower and more stable rents**, likely due to a higher share of smaller 1–2 BHK units.
- The boxplot highlights that **rent is influenced more by size and property type than furnishing alone**.

INNOMATICS RESEARCH LABS

Which factors have the strongest relationship with rent?



- **Rent has a very strong positive correlation with carpet area (0.94)**, making carpet area the strongest predictor of rental price.
- **Carpet area is strongly correlated with BHK (0.81) and bathrooms (0.80)**, showing that home size drives both configuration and amenities.
- **Rent shows moderate correlation with BHK (0.66) and bathrooms (0.64)**, suggesting size and layout influence rent but less than carpet area.
- **Balcony has the weakest correlation with other variables**, indicating it has a limited direct impact on rent.

INNOMATICS RESEARCH LABS

Conclusion

- Rental prices in Pune are primarily driven by **carpet area**, showing a strong size–price relationship.
- **BHK configuration** also influences rent, with most demand concentrated around **2 and 3 BHK homes**.
- **Location plays a major role**, as premium areas like Kalyani Nagar, Baner, and Viman Nagar command higher rents.
- Amenities such as balconies have **limited impact** compared to space and locality.
- Overall, Pune's rental market is shaped by **space, configuration, and location**.

INNOMATICS RESEARCH LABS

THANK YOU

INNOMATICS
RESEARCH LABS