*Asian Journal of Advanced Research and Reports*

***Volume 17, Issue 4, Page 12-19, 2023; Article no.AJARR.97936***
***ISSN: 2582-3248***

# Location-Wise House Prediction Using Data Science Techniques

**Subhani Shaik [a], V. Kakulapati [a*] and Ramakanth Reddy Malladi [b]**

*[a] Sreenidhi Institute of Science and Technology, Yamnampet, Ghatkesar, Hyderabad, Telangana-501301, India.*
*[b] Samaskruti College of Engineering, Ghatkesar, Hyderabad, Telangana, India.*

***Authors' contributions***

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

***Article Information***

DOI: 10.9734/AJARR/2023/v17i4475

**Open Peer Review History:**
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/97936

***Original Research Article***

***Received: 15/01/2023***
***Accepted: 18/03/2023***
***Published: 22/03/2023***

## ABSTRACT

This paper mainly deals with the prediction of location based on customer requirements. It also describes the location of the house, stores nearby by the house, duration of the house, transaction of data by the house and the latitude and longitude of the house, nearby station, and areas nearby house by using its contents to summarize the data. Take these contents on the x-axis and count on the x-axis then predict the data by using some algorithms in data science. Now, find the accuracy of data by training and testing, and then locate the particular location by using maps. Maps are the ones that can easily locate any region. By this, the customer can easily get access and can get the house with any legal requirements. The real-estate person can be gone through illegal things. In South India, propose to develop a model that can anticipate housing prices. It is an application of data science that makes use of algorithms. Prices of homes go up and down every day, and they aren't always proportional to the properties' actual values. Predicting the pricing of homes using only actual criteria is the primary emphasis of this effort. In this study, plan to conduct an analysis based on each of the fundamental criteria, and customer requirement are considered in the process of determining the prices.

**Corresponding author: Email: vldms@yahoo.com;*

*Keywords: Data science; deep neural network; location of house; data prediction.*

## 1. INTRODUCTION

As know a lot of real-estate persons were doing illegal business to accurate money and many properties. This real-estate person will be having huge amounts of money, if they are highly skilled, they will apply some logical techniques and have huge amounts of money [1]. So as technology is evolving with the latest technological advancements in the IT industry can use data science and build models that can predict customer-estate requirements.

Date science in real estate and in-house prediction helps identify the customer risk factors, and also helps in finding forecast customer behavior. This mainly helps to boost the customer relationship and also easy to predict performance. Firstly, it organizes the data from many or different sectors and collects the data and analyzes the data based on the customer requirements, and acquires the login then it starts analysis [2], and the data is split into two sectors train and test the data then the data will train and test and it mainly removes the outliers and cleans the data which makes an easy way to predict the performance based on customer requirements.

Data is what serves as the most important 'raw material' of the real estate industry today. From planning products and policies depending on the insights gathered from different surveys to relying on them for the generation of buyer leads. Or gauging the performance of a given company to analyze how successful a particular product/service was, to decide on the next course of action, data science in real estate has developed as a whole new discipline of study. Data science applies advanced-level analytics and machine learning models to evaluate information and enhance decision-making in the developmental process of the real estate arena. With its help, consumer behavior can be understood, business strategies [3] can be optimized, emerging market trends can be assessed and any predicted risks can be artfully evaded and handled. Hence, the benefits of this field of study promise to influence customers, investors, and agents alike. From asset management and property analysis to value appreciation and improving marketing strategy, data science opens up novel avenues for the growth of any real estate company. The paragraphs below will shed light on how PropTech, particularly data science, is bringing major changes into the whole industrial setup by helping real estate professionals make data-driven decisions [4].

Customers are valued by the real estate that they will be invested by them to offer new or the 90's time house through training and the working environment by collecting data [5]. They too are also subjected to intentional attrition as it impacts customer services. Skilled real estate is being lost. Hiring is another issue; the replacement cost of the house. Here will be able to act swiftly by changing internal rules and methods if they can predict the area of the property. Data science techniques can be used to predict customer requirements. The proposed method will leverage customer-provided requirements by the environment, which will able to Kaggle, will train and test the out models using data science. Linear regressions were used to split the dataset splits. This will be adding the data and training proposed models. And this will predict the accuracy of the data set models.

In recent research authors have seen remarkable models progress in the CNN Algorithm, Lasso regression, so we have used a Linear regression model in order to provide and train the model accurately we will train and test the data by splitting the data accuracy of the model is 66-70% of that model [6,7]. So, we select the most accurate trained model so that we can make prediction more accurately based on the input data given to the training based on the prediction of the real estate. This work presented a novel method for location-based prediction.

## 2. METHODOLOGY

### 2.1 Analyzing Data to Predict Market Trends

Data science in real estate helps to forecast property market trends and any risks that might exist in the investment. By using data that consists of a combination of different variables and predictive analysis implemented to that, data scientists understand and analyze how-

- consumer groups have been behaving over time
- what type of properties have been in demand

- the kind of leisure activities consumers are involving themselves in
- facilities that can be integrated with residential spaces to enhance the consumer experience
- evolution in the rents being charged

These factors play an important role in determining how well or badly an investment would be able to perform.

## 2.2 Formulating the Property Price Indices

One of the most significant applications of data science in real estate is to collect and leverage information relating to adjoining local areas. These include supermarkets in the vicinity, educational institutes, business and commerce hubs, traffic in the neighborhood, crime rates, cafes and restaurants, and physical infrastructure. These qualitative and quantitative variables play in to influence the pricing of individual properties [8]. Furthermore, these variables also work to give us a sense of what areas might emerge as popular centers in the future.

Additionally, through data science in real estate, a system can be deployed wherein the individual variables work as additions. For example, there can be an average price set for the properties in one specific building. Now, the variables affected by the floor number, size of rooms, and the view from the window, work as additions that are charged for additionally. Therefore, the internal variables of the property alongside the hyper-local variables work to formulate the property price indices and help real estate agents to cater better to the needs of the clients.

## 2.3 Understanding Investment Performance

In the field of real estate, no two properties can ever be identical. Variables differ even with properties in the same building, not to mention the changing value of properties with time. Understanding individual sub-market performance is therefore a difficult problem to deal with. As a solution to this issue, the changing price of an asset (concerning the lifecycle, existing, and upcoming infrastructure) can be tracked over time by using data science in real estate.

## 2.4 Estimating Profitability of Investment and Construction

Whether one invests in a commercial real estate space or a residential one, location intelligence acts as a very important aspect to gauge whether the investment would be able to yield the expected profits in the future. With the proper information about the geography of a particular property, accessibility of services around it, land ownership, zoning, regional laws, etc, an investor or a real estate consultant can make a more informed decision by visualizing and analyzing prospects. Not limited to the aforementioned point, data science in real estate can also turn helpful in evaluating environmental conditions to finalize an appropriate time for beginning construction activities.


**Fig. 1. Predicting an area by using customer requirements**

## 2.5 Managing Finances of Properties

Let's assume that you manage a diverse pool of properties across various localities in Mumbai. All through the work is the same; you need to evaluate the reasons why one property is draining more resources in comparison to another. This could be in terms of losses incurred due to higher vacancy rates or systems malfunctions. Fortunately, data science in real estate management helps you in identifying the root cause.

This is done by gathering data such as receivables and budget, profitability and cost analysis, and planning for tenant build-outs from different properties. The data can then be evaluated based on various metrics; you can zone down to the bottom of the problem, and formulate solutions for the same.

## 2.6 Trimming down Energy Consumption

With the incorporation of data science in real estate, identifying the root cause of energy wastage has now become possible. Nowadays, there are a plethora of apps and software available that gather and assess energy data from smart meters and sensors, and can also detect faults in the heating, ventilation, and air conditioning (HVAC) systems. Based on the weather changes and the usage pattern, these apps offer a holistic understanding of energy spending. This can help property managers, homeowners, and tenants to alter their lifestyles and change energy consumption patterns.

## 2.7 Simplifying Home Searching or Buying Process

Incorporating data science in real estate not only benefits the investor and broker class, but also streamlines the home searching, buying, and renting process.

- It is very much possible that real estate property prices vary drastically across different cities. This can be attributed to factors that range from how well it is connected to the areas around it, the commercial centers present in the area, and the modes of transportation and commutation. When these are effectively analyzed through data science, it helps buyers decide upon a living location or understand the expenses involved if they have made up their minds to shift to another city.
- By examining user behavior, lifestyle preference, budget range, amenities preference, and other such factors, you can offer property suggestions that match the requirements of the users. This will therefore save customers' time in scooping through multiple property listings.

## 2.8 Revamping the Marketing Strategy

Data science in real estate aids in collecting and examining information through multiple sources. This can help agencies in understanding the behavior and preferences of the consumers, assess the competition, and market their services more creatively. Once user preference is understood, virtual staging, 3D rendering and visualization, Google or Facebook ads, and listings can be optimized in order to attract the target audience. Also, considering that an increasing number of people now prefer to look for property listings online, it is really important to pay attention to the real estate posts for social media marketing alongside maintaining the basic aesthetics of the content that is posted [9,10]. This allows buyers to streamline their property research and boil down only a few options that they are genuinely interested in.

It is also a common misconception that data analytics and AI nullify the role of real estate agents or act as a replacement for them. What is important to note here, is the fact that data science in real estate is simply helping in streamlining, organizing, and tailoring it as per the client demands and ensures satisfaction.

## 2.9 Identifying and Segregating Leads

A very interesting way to harness the power of data science in real estate is in the field of lead nurturing and segregation. Quite often, it becomes difficult for a real estate agent to follow up on every one of the hundreds or thousands of leads that they generate from multiple online and offline campaigns. However, with data science-backed applications and software, giving a "seller or buyer score" to leads that are most likely to sell/buy properties have now become possible. This assessment is made by evaluating factors like demographics, income changes, and purchasing behavior

## 2.10 MAPS

Without a map, one can't even imagine where would be without maps today. Maps are the guiding force for us to explore the world and also

get to destination every day. It also has helped in exploring and evolving understanding of the world. I work on using maps for finding the location from Golconda to Birla mandir. So, there I need a GPS tracker to find the location thus the maps are used in the maps. Today data science is the key to every field to explore and predict performance and accuracy.

Data science has been collecting wash data and getting allots of information that can be very difficult to predict so use a term called outliers.

Beans: bean is the technique that is used to fit noisy and statistical data, to reduce the impact of unwanted errors, and to prevent overfitting. And also, reduces the overfitting and compressors to the high complexity of the data.

## 3. RESULTS AND DISCUSSION

With this, conclude that the location of house prediction using data science is the accuracy of 60-70% of training and testing the data. And also that the area can be predicted using geographical maps this prediction of location can be made very easy and affordable. Testing and Training Accuracy 66 % and 69% respectively.

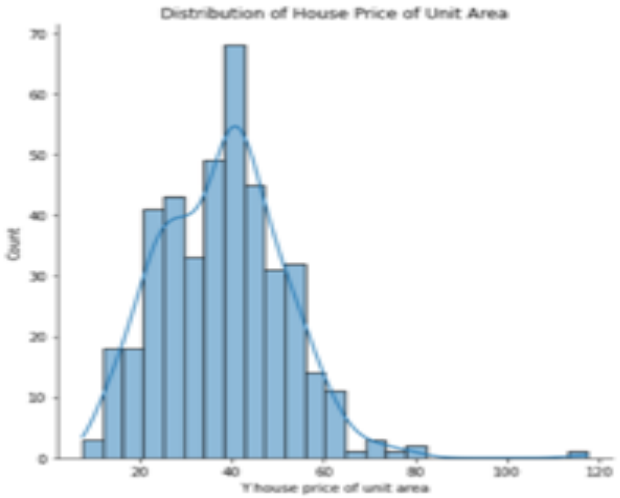


**Fig. 2. Distribution of House prices per unit area**

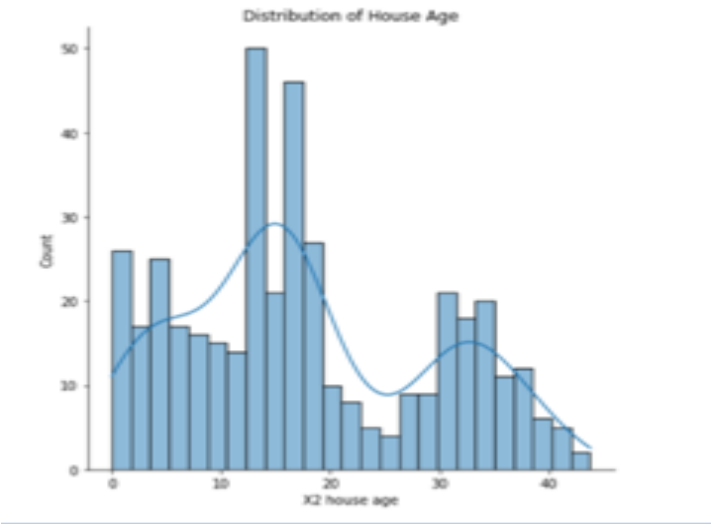


**Fig. 3. Distribution of age of the house**

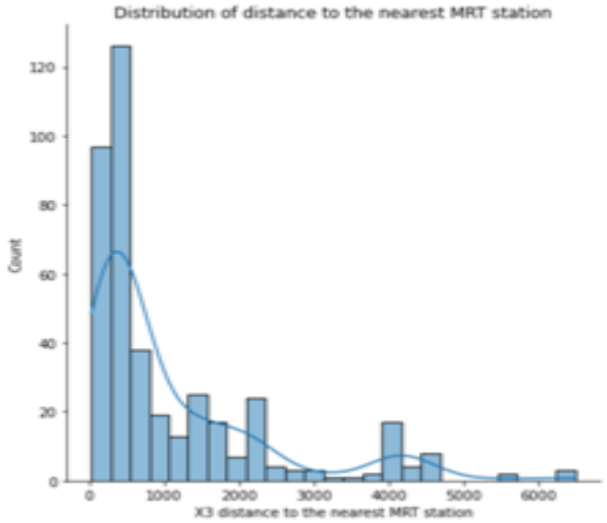


**Fig. 4. The distance from the nearest station**

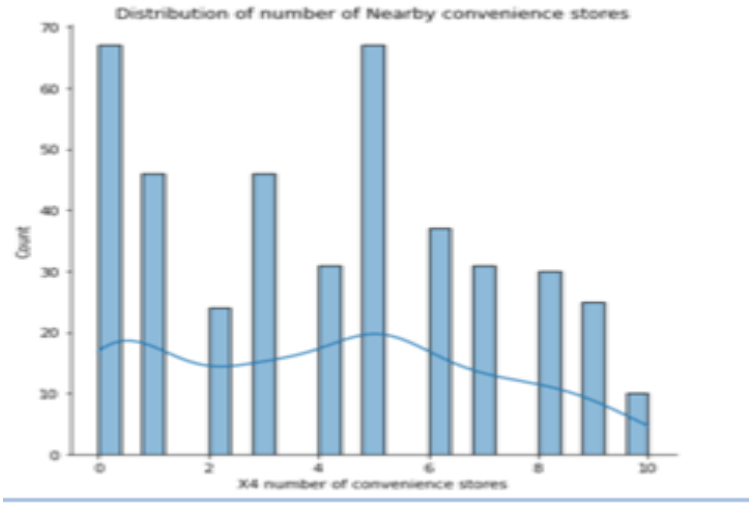


**Fig. 5. Distribution of the number of stores nearby the area**

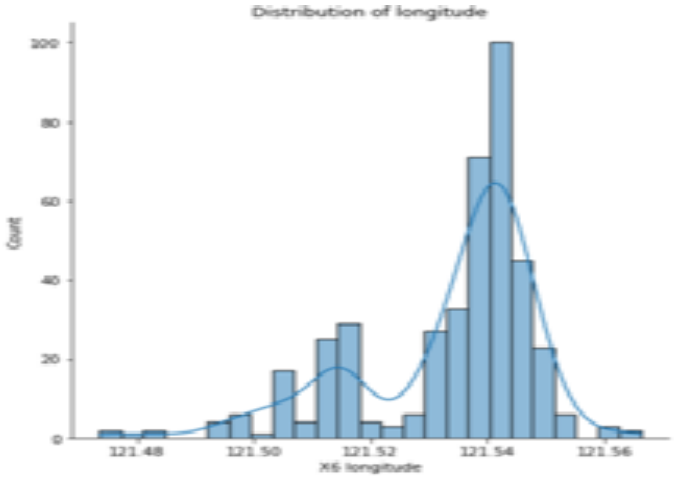


**Fig. 6. Distribution of Longitude**

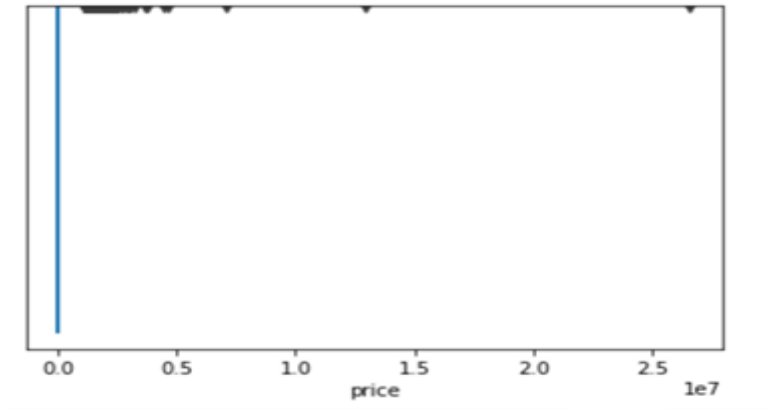


**Fig. 7. Linear regression for price prediction**


**Fig. 8. Heat map of linear regression price vs. other conditions**


**Fig. 9. Heat map for house prediction using linear regression**

## 4. CONCLUSION

With this, can conclude that the data collected and predicted by using algorithms and the training and testing of the data accuracy is 60-70%. After that, the data is predicted using maps to locate the area in that particular city. So, the study concludes that by using this project the customer can easily predict the location, duration, affectivity, age, latitude, longitude, and station nearby all these are customer requirements basic so that they can easily get predicted. And also they cannot be gone through illegal things.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES


1. Kaggle competition. Available:https://www.kaggle.com/c/house-prices-advanced-regression-techniques.
2. Mckinsey report. Available:https://www.mckinsey.com/industries/capital-projects-and-infrastructure/ our-insights/getting-ahead-of-the-market-how-big-data-is-transforming-real-estate
3. Zillow Zestimate. Available:https://www.zillow.com/blog/zestimate-updates-230614/.
4. Kam C Chan, Patric H Hendershott, and Anthony B Sanders, Risk and return on real estate: evidence from equity reits, Real Estate Economics. 1990;18(4):431–452.
5. T. Chen and C. Guestrin, Xgboost: A scalable tree boosting system, In Proceedings of the 22nd ACM SIGKDD international conference on knowledge discovery and data mining. 2016;785–794.
6. B. de Ville, Decision trees, wiley interdisciplinary reviews: Computational Statistics. 2013;5(6):448–455.
7. Dietterich TG. An experimental comparison of three methods for constructing ensembles of decision trees: Bagging, boosting, and randomization, Machine learning. 2000;40(2):139–157.
8. Fisher RA. Statistical methods for research workers, In Breakthroughs in statistics. 1992);66–70.
9. Franz Fuerst, George Matysiak. Analysing the performance of nonlisted real estate funds: a panel data analysis, Applied Economics. 2013;45(14):1777–1788.
10. Richard J Herring, Susan M Wachter. Real estate booms and banking busts: An international perspective, The Wharton School Research Paper. 1999;99-27.




*Peer-review history:*
*The peer review history for this paper can be accessed here:*
*https://www.sdiarticle5.com/review-history/97936*