



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Issue 3, March 2024

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.423

9940 572 462

6381 907 438

[ijirset@gmail.com](mailto:ijirset@gmail.com)

[www.ijirset.com](http://www.ijirset.com)

# Residential Market Price Forecast Using Machine Learning

N Venkatramana<sup>1</sup>, P Sasikala<sup>2</sup>, M Sreelekha<sup>3</sup>, J Diwakar<sup>4</sup>, M Yaswanth Sai<sup>5</sup>

<sup>1</sup> Assistant Professor, Department of CSE, Faculty, AITS, Tirupati, India

<sup>2, 3, 4, 5</sup> Student, Department of CSE, Annamacharya Institute of Technology and Sciences, Tirupati, India

**ABSTRACT:** Residential land prices are a significant financial hurdle in acquiring a home. Accurately predicting these prices is essential for buyers, sellers, and real estate professionals. However, fluctuating market conditions make purchasing at the opportune moment challenging. This paper proposes a machine learning model to address this issue. The model leverages Linear Regression (LR) to estimate land prices based on user-specified criteria like location, city size, and property area. This approach empowers buyers and sellers to make informed decisions, minimizing financial risks and wasted time. Ultimately, this system aims to facilitate smoother negotiations and achieve better deals for all parties involved.

**KEYWORDS:** Residential marketprice forecast, linear regression, Machine learning, real estate.

## I. INTRODUCTION

The residential real estate market is a complex ecosystem where accurate land price predictions hold immense value. For buyers, these predictions can mean securing their dream home at the right price. Sellers, on the other hand, can leverage them to maximize their returns. However, the dynamic nature of the market, with prices constantly in flux, makes this a significant challenge. Buyers are left wondering if they should pull the trigger now, fearing prices might rise soon.

To address this uncertainty, we propose a machine learning model specifically designed for predicting residential land prices. This model will leverage the power of Linear Regression, a well-established algorithm, to analyze factors like location, demographics, and property characteristics. We'll also explore the potential of ensemble learning, where we combine multiple models to boost accuracy. Ultimately, our goal is to empower all stakeholders in the market. By equipping them with reliable price estimates, we aim to facilitate smoother negotiations, minimize financial risks, and foster a more transparent and efficient real estate landscape.

## II. RECENT WORKS

Recent research has seen a surge in efforts to predict residential land prices more accurately and efficiently using machine learning techniques. Integration of Geographic Information Systems (GIS) has advanced spatial analysis by incorporating geospatial data such as land use, zoning regulations, proximity to amenities, and environmental factors.

Ensemble learning techniques like Random Forest, Gradient Boosting, and XGBoost have been explored to capture complex nonlinear relationships and improve prediction accuracy by aggregating predictions from multiple base models. Moreover, researchers have emphasized feature engineering and selection techniques to identify and extract relevant features from diverse datasets, including text-based property descriptions, images, and satellite imagery, enriching input data and improving model robustness.

An Early Warning System (EWS) using LSTM neural networks to predict housing market bubble signals, demonstrating its efficacy in identifying risks across housing and stock markets. Additionally, the study contributed academically by revealing the link between housing bubble signals and financial market volatility, offering policy implications, and suggesting avenues for future research to enhance the EWS's predictive power.

Additionally, recent research has focused on integrating economic indicators like GDP growth, inflation rates, mortgage interest rates, and housing affordability indices into prediction models to enhance their robustness and generalizability across diverse market conditions. These interdisciplinary approaches aim to advance our understanding

of residential real estate markets and empower stakeholders with actionable insights for informed decision-making, contributing to the evolution of land price forecasting tools.

### III. PROPOSED WORK

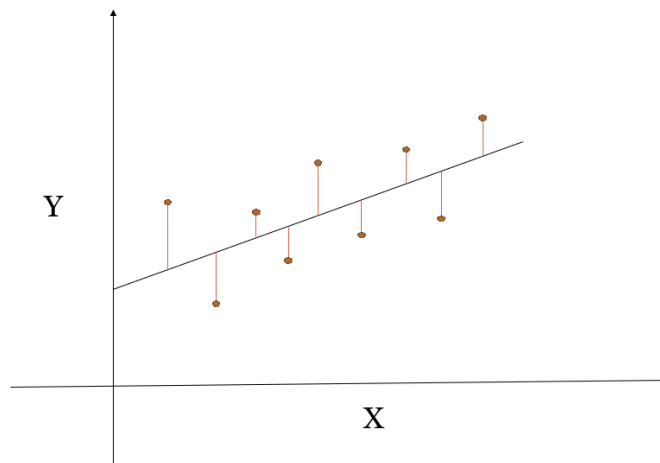
To predict the sale price of land in a particular location for the selected area, we will employ machine learning technique, with a focus on linear regression models.

#### 3.1 Linear Regression

Linear Regression is a type of supervised machine learning model designed to establish a linear relationship between dependent variables (Y in this case, land price) and independent variables (X in this case, location and total area). In this model, each observation is evaluated, and the actual value of the target variable (Y) is compared to its predicted value. Any disparities between these values are termed as residuals. The primary objective of Linear Regression is to minimize the sum of squared residuals.

Mathematically, Linear Regression is represented as:

$$Y = a_0 + a_1X + \epsilon$$



Here, X and Y represent the training datasets used for model representation. When Linear Regression is implemented, algorithms iteratively determine the optimal values of  $a_0$  and  $a_1$  to fit the best line through the data points. As a result, the model becomes increasingly accurate in predicting the response variable. By leveraging the calculated values of  $a_0$  and  $a_1$ , the model can be utilized to forecast the response variable based on given input variables.

#### 3.2 Proposed Methodology Architecture

In our work first we start with data processing where system tackles the challenge of residential land price prediction. It starts with a comprehensive dataset that includes historical prices and property details like location, demographics, and size. After cleaning and formatting the data, the system selects the most relevant features that impact price, here we took location and total area as the features. The bulk of this data is then used to train a machine learning model, specifically Linear Regression. This algorithm trains, to predict the price of a new land parcel, you input its features into the learned linear equation, and the model calculates the predicted price based on these features and the learned coefficients. In essence, linear regression predicts land prices by establishing a straight-line relationship between the features and the target variable, using this relationship to estimate prices for new data. Finally, the system validates its accuracy using a separate data set and, if successful, allows users to estimate prices for new properties. By analyzing historical patterns, the system empowers users with data-driven predictions for informed decision-making in the real estate market.

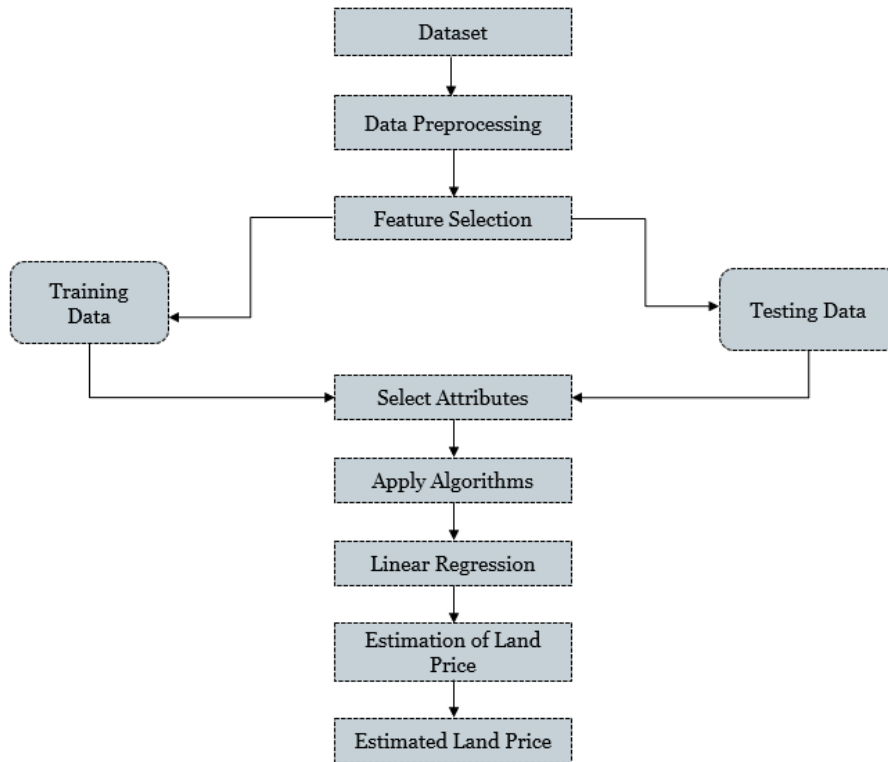


Fig: System Architecture

#### IV.RESULTS AND DISCUSSION

The results and discussion highlight the pivotal role of machine learning, specifically Linear Regression, in addressing the challenges associated with residential land price prediction. By leveraging user preferences and key variables such as location and city, the model offers enhanced precision in estimating property prices. This approach facilitates informed decision-making for buyers and sellers, empowering them to navigate market fluctuations more effectively. While Linear Regression serves as a robust foundation, future research could explore the integration of ensemble methods or advanced algorithms to further optimize prediction accuracy. Overall, the implementation of machine learning algorithms holds immense potential to revolutionize the real estate industry, fostering transparency, efficiency, and better outcomes for all stakeholders involved.





## V.CONCLUSION

In conclusion, our study highlights the promising application of machine learning in residential market price forecasting, benefiting both buyers and sellers. The paper presents a robust methodology for predicting housing prices using the Linear Regression algorithm. The study demonstrates the effectiveness of Linear Regression in estimating housing prices based on various features such as area, amenities, location, etc.

Overall, the findings highlight the potential of Linear Regression as a valuable tool for predicting residential prices, offering insights applicable to real estate markets.

Looking forward, advanced techniques like neural networks and ensemble methods could further refine forecast accuracy. Integrating real-time data and socioeconomic indicators may enrich predictive models, bolstering their utility in dynamic market conditions.

Ultimately, integrating machine learning in residential market forecasting empowers stakeholders with valuable insights, facilitating informed investment decisions and fostering market efficiency and stability.

## REFERENCES

- [1] Pei-Ying Wang, Chiao-Ting Chen, Jain-Wun Su, Ting-Yun Wang and Szu-Hao Huang “Deep Learning Model for House Price Prediction Using Heterogeneous Data Analysis Along With Joint Self-Attention Mechanism”, IEEE Access (Volume: 9), DOI:10.1109/ACCESS.2021.3071306, Apr 2021.
- [2] Daehyeon Park and Doojin Ryu, “A Machine Learning-Based Early Warning System for the Housing and Stock Markets”, IEEE Access (Volume: 9), DOI :10.1109/ACCESS.2021.3077962, May 2021.
- [3] Kankawee Chanasit, Ekapol Chuangsuwanich, Atiwong Suchato, and Proadpran Punyabukkana, “A Real Estate Valuation Model Using Boosted Feature Selection”, IEEE Access (Volume: 9), DOI :10.1109/ACCESS.2021.3089198, Jun 2021.
- [4] Zongyan Yang, Zhonghua Hong, (Member, IEEE), Ruyan Zhou, and Hong Ai, “Graph Convolutional Network-Based Model for Megacity Real Estate Valuation”, IEEE Access (Volume: 10), DOI :10.1109/ACCESS.2022.3210281, Sep 2022.
- [5] Eugene Khmelnsky and Gonen Singer, “Optimal Real Estate Pricing and Offer Acceptance Strategy”, IEEE Access (Volume: 11), DOI:10.1109/ACCESS.2023.3284549, Jun 2023.
- [6] Shubham Singh, Monika Nag K J, “Land Price Prediction using Machine Learning Algorithm”, International Research Journal of Engineering and Technology (IRJET), Volume: 07 Issue: 05, May 2020.



INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  [ijirset@gmail.com](mailto:ijirset@gmail.com)



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details