House Price Prediction Using Machine Learning

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Abstract - House Price Prediction is most important factor of today's world. Future prediction of house price can help people to buy and sell houses using this website based on Machine Learning. Machine Learning Domain plays vital role in various fields like image recognition, Classification of Spam and Not Spam Emails and messages, Weather Forecasting Etc. Using classification and regression algorithm we can achieve prediction. Previous data used for Prediction is very important to estimate the price of the house that'll help people to check the prices of house according to their Budget. Housing price keeps changing in our day-to-day life sometimes increase rather than being based on valuation. Here we aim to make our evaluation based on every basic parameter that is consider while determining the price of house. We use various regression technique in this pathway of development of this model. The project gives the accurate result using liner regression.

Key Words: Machine Learning, Linear Regression, Prediction.

1.INTRODUCTION

House Price Prediction is very important factor for real Estate Market. The basic idea behind this project is to use Linear Regression Algorithm to Create the model for Prediction. Housing price estimation is important for changes in the rates of prepayments, and housing affordability of specific geographic areas. In recent years due to the growing trend towards big data, Machine Learning has become vital prediction Approach because it can predict house price more accurately based on various factors data is the heart of the technical innovations, achieving any results is now possible using predictive models. Machine learning means providing valid data and further on prediction based on that data, the machine learns itself how much importance a particular event may have on the entire system based on predefine data. And accordingly predicts the result.

For our research project, we have considered Bangalore as our primary location and are predicting house prices for various localities in the around Bangalore. We have used parameters like Locations, Area in square foot, Number of Bedrooms, Number of Bathrooms. We have collected the dataset using various website with diversity so as give accurate result for all condition. We have used various algorithm to find the accurate algorithm to give the more accuracy to our project. We have used Linear Regression, Decision Tree and lasso Regression in which the Linear Regression gives better result from three of them. Other than the prediction of house price we also added the more flexibility for admin who will host this website, in which they can manage the data of the houses that'll help people to add new houses and add thirl selling property.

3. LITERATURE SURVE

A literature review is a text of a scholarly paper, which includes the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. Literature reviews use secondary sources, and do not report new or original experimental work.

1.Paper name: "House Price Prediction Using Machine Learning and Neural Networks"

Author: Ayush Varma, Abhijit Sarma, Sagar Doshi, Rohini Nair

Real estate is the least transparent industry in our ecosystem. Housing prices keep changing day in and day out and sometimes are hyped rather than being based on valuation. Predicting housing prices with real factors is the main crux of our research project. Here we aim to make our evaluations based on every basic parameter that is considered while determining the price. We use various regression techniques in this pathway, and our results are not sole determination of one technique rather it is the weighted mean of various techniques to give most accurate results. The results proved that this approach yields minimum error and maximum accuracy than individual algorithms applied.

2.Paper name: "House Price Prediction via improved Machine Learning techniques"

Author: Quang Truong, Minh Nguyen, Hy Dang, Bo Mei

House Price Index (HPI) is commonly used to estimate the changes in housing price. Since housing price is strongly correlated to other factors such as location, area, population, it requires other information apart from HPI to predict individual housing price. There has been a considerably large number of papers adopting traditional machine learning approaches to predict housing prices accurately, but they rarely concern about the performance of individual models and neglect the less popular yet complex models. As a result, to explore various impacts of features on prediction methods, this paper will apply both traditional and advanced machine learning approaches to investigate the difference among several advanced models. This paper will also comprehensively validate multiple techniques in model implementation on regression and provide an optimistic result for housing price prediction.

3.Paper name: Prediction and Analysis Of Residential house price using a flexible Spatiotemporal model

Author: Lu Wang, Guangxing Wang, Huan Yu

House price prediction has traditionally been approached using linear or spatial linear hedonic models and focused on big cities. In this study, we developed a flexible spatiotemporal model (FSTM) to explore the spatiotemporal characteristics of the residential house price and the impact factors in middle-small cities. The FSTM integrated both spatial and temporal components of the residential house price, accounted for its spatiotemporal characteristics, and reproduced its spatial variability and temporal trends. The results showed that the governmental policy had a significant influence on the house price and led to the characteristics being different from those in big cities. The significant factors also included the density of roads, the density of banks, density of supermarkets, the area used by public and user shared area within a building. This study implied that FSTM provided the potential for spatiotemporal prediction of the residential house price in the middle-small cities.

4.Paper name: House Price Prediction Using regression Techniques

Author: Udit Deo

House price forecasting is an important topic of real estate. The literature attempts to derive useful knowledge from historical data of property markets. Machine Learning techniques are applied to analyze historical property transaction in India to discover useful models for house buyers and sellers. Reveled is high Discrepancy between house price in the most expensive and most affordable suburbs in the city of Bangalore. Moreover, experiments demonstrate that multiple linear regression that is based on mean squared error measurements is a competitive approach

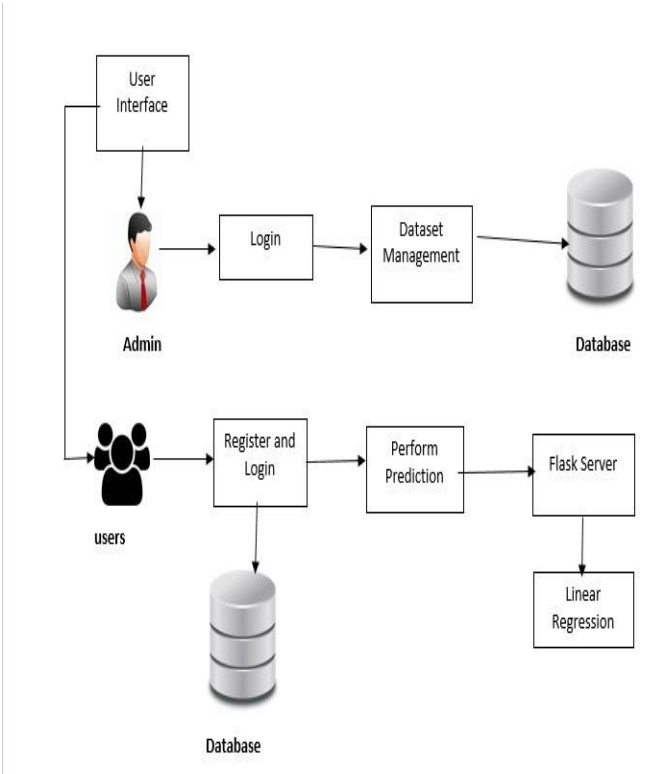
5. Paper name: Machine Learning Based Predicting House Prices Using Regression Technique

Author: J Manasa, Radha Gupta, N. S. Narahari

Predictive models for determining the sale price of houses in cities like Bengaluru is still remaining as more challenging and tricky task. The sale price of properties in cities like Bengaluru depends on a number of interdependent factors. Key factors that might affect the price include area of the property, location of the property and its amenities. In this research work, an analytical study has been carried out by considering the data set that remains open to the public by illustrating the available housing properties in machine hackathon platform. The data set has nine features. In this study, an attempt has been made to construct a predictive model for evaluating the price based on the factors that affect the price. Modeling explorations apply some regression techniques such as multiple linear regression (Least Squares), Lasso and Ridge regression models, support vector regression, and boosting algorithms such as Extreme Gradient Boost Regression (XG Boost). Such models are used to build a predictive model, and to pick the best performing model by performing a comparative analysis on the predictive errors obtained between these models. Here, the attempt is to construct a predictive model for evaluating the price based on factors that affects the price

4.PROPOSED SYSTEM

Our dataset comprises of various essential parameters and data mining has been at the root of our system. We initially cleaned up our entire dataset and also truncated the outlier values. Further, we weighed each parameter based on its importance in determining the pricing of the system and this led us to increase the value that each parameter withholds in the system. We shortlisted 3 different machine learning algorithms which are linear regression, decision tree and lasso regression and tested our system with different combinations that can guarantee best possibly reliability of our results. in those algorithms we conclude the linear regression gives the best result out of them.

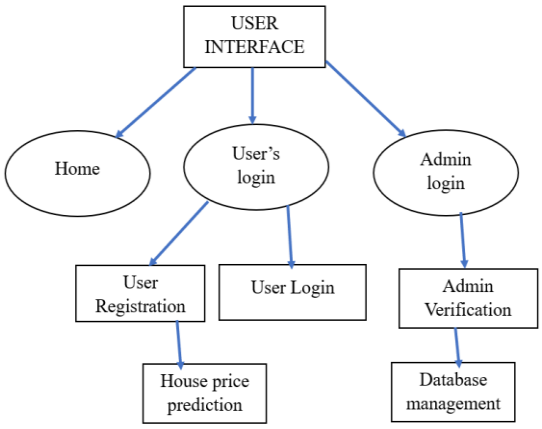


5.METHODOLOGY

As shown on a proposed system we consider predicting house price suing machine learning algorithm like linear regression. We predict house price using multiple features. In this proposed system we are able to train the model from various features like area in square foot, Number of Bedrooms, Number of Bathrooms and according to locality of the Bangalore city.

Other than that admin is able to modify the data using Database management System. Sellers are able to add their which they want to sell. It is also beneficial for buyers to explores various properties

6.SYSTEM ARCHITECTURE

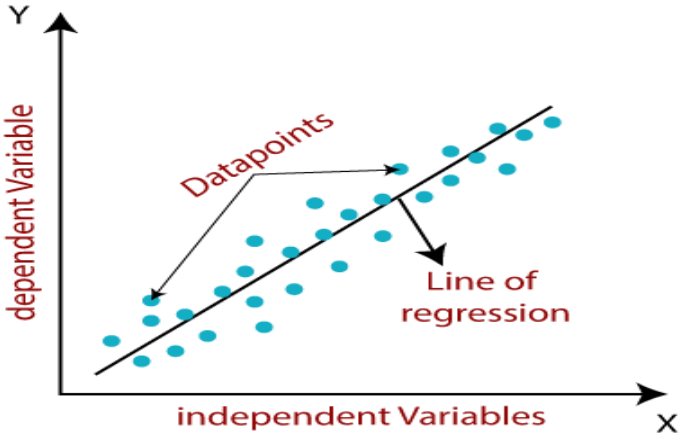


7.ALGORITHM

Linear Regression Algorithm –

Linear regression is one of the easiest and most popular Machine Learning algorithms. It is a statistical method that is used for predictive analysis. Linear regression makes predictions for continuous/real or numeric variables such as **sales, salary, age, product price,** etc.

Linear regression algorithm shows a linear relationship between a dependent (y) and one or more independent (y) variables, hence called as linear regression. Since linear regression shows the linear relationship, which means it finds how the value of the dependent variable is changing according to the value of the independent variable.



Here,

Y= Dependent Variable (Target Variable)
X= Independent Variable (predictor Variable)
The values for x and y variables are training datasets for Linear Regression model representation

The linear regression model provides a sloped straight line representing the relationship between the variables.

Types of Linear Regression

Linear regression can be further divided into two types of the algorithm:

- **Simple Linear Regression:**
  If a single independent variable is used to predict the value of a numerical dependent variable, then such a Linear Regression algorithm is called Simple Linear Regression.
- **Multiple Linear regression:**
  If more than one independent variable is used to predict the value of a numerical dependent variable, then such a Linear Regression algorithm is called Multiple Linear Regression

8.RELETED WORK

Due to increasing in the population of our country we know that finding house is more difficult that is why we came up with this project that can help people to buy house. using this project people can find their desirable houses according to their requirement and budget. Addition with project is hat admin can manage the whole data of the houses using database management system and can add new property is the database.

9.ADVANTAGES OF SYSTEM

1. User is able to find their house according to budget
2. Predict the house price accurately
3. Admin is able to manipulate data in dataset.
4. Security is Provided to user interface.
5. Verification is important for both user and admin to Login.
6. Saves time.

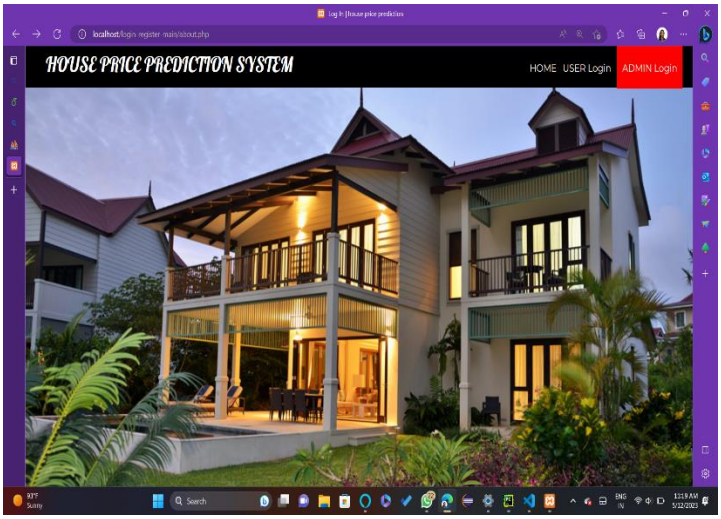
10.DESIGN GOAL

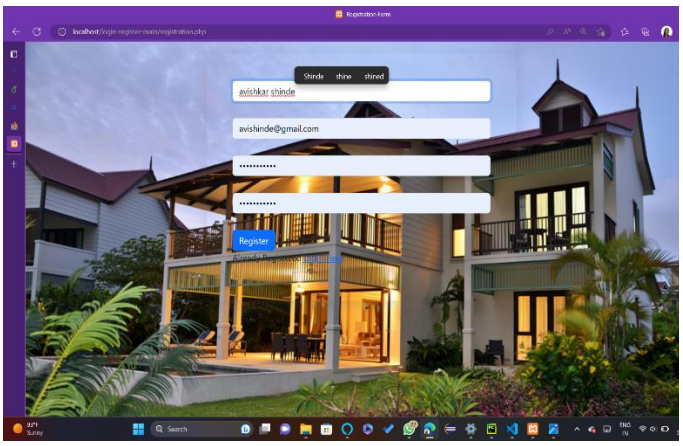
1. Predict house price
2. Accuracy is model
3. Result analysis
4. Help to buy house

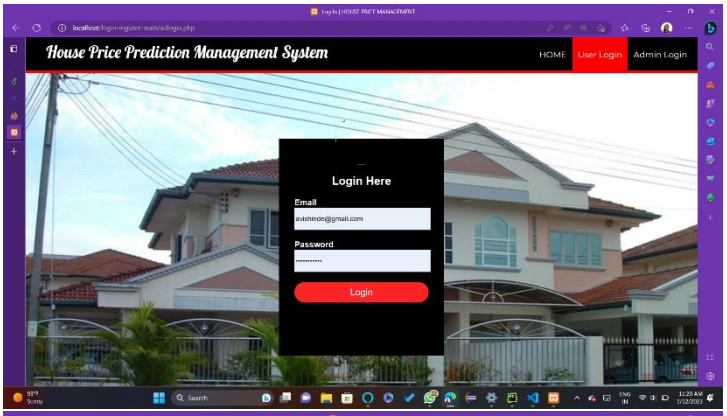
11.APPLICATIONS

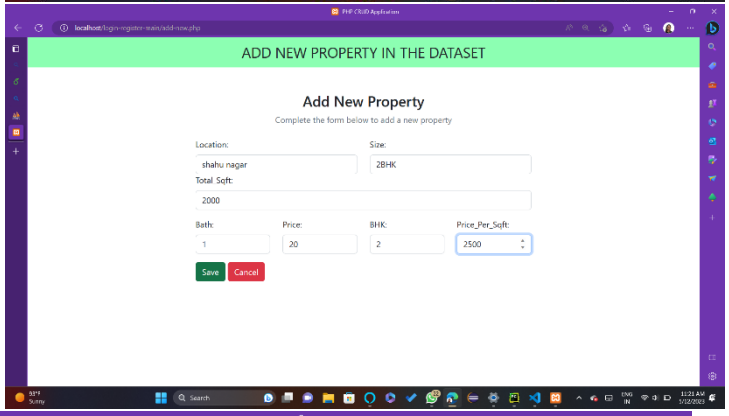
1. Predict house price according to Location
2. Real Estate Market
3. Help to find house who is new in city
4. Adding the information will be helpful for people

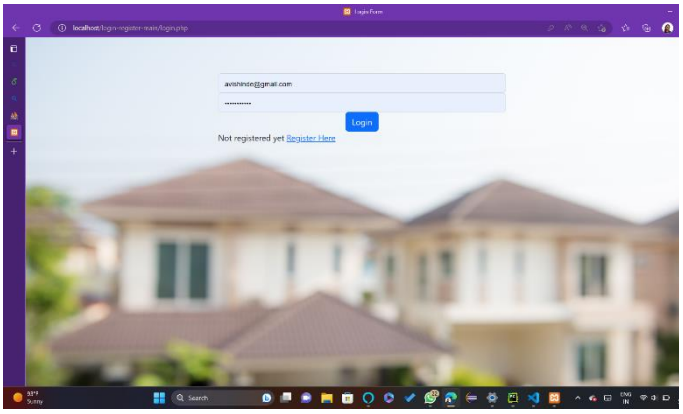
RESULTS

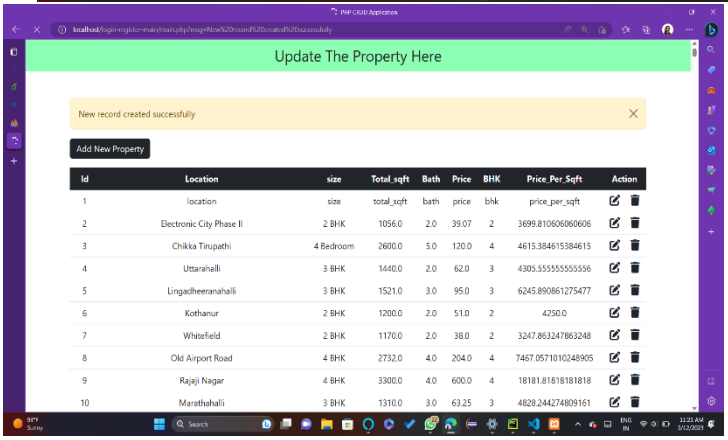


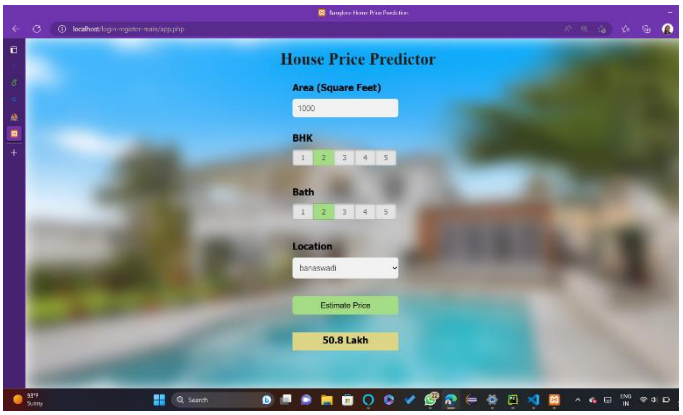












12. CONCLUSION

In this presentation several test have been performed using linear regression to perform house price prediction based on the Bangalore data of thirty thousand houses it can predict the value based on training data set.

13.FUTURE SCOPE

1. In future we can perform house price prediction on another city for finding realistic prices of houses.

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