IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 5, June 2022
Impact Factor: 6.252

House Price Prediction using a Machine Learning

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Abstract: *Data mining is now widely used in the real estate market. The ability to extract data to extract relevant information from raw data makes it very useful to predict house prices, important housing features, and much more. Studies have shown that fluctuations in housing prices often affect homeowners and the housing market. A literature review was conducted to determine the appropriate characteristics and most effective models for real estate forecasting. The findings of this analysis confirmed the use of Artificial Neural Network, Support Vector Regression and XGBoost as the most efficient models compared to others. In addition, our findings also suggest that local agents and real estate agents are key to predicting real estate prices. This research will be of great benefit, especially to housing developers and researchers, to find the most important indicators for determining housing prices and to identify the best machine learning model that will be used to conduct research in this field.*

Keywords: Housing Predicting, Machine Learning Model, Vector Support Processing, Artificial Neural Network, XGBoost.

I. INTRODUCTION

A house is one of the most important necessities of life, as well as other basic necessities like food, water, and more. Demand for housing has grown exponentially over the years as living standards improve. Although there are people who make their homes as an investment and property, yet many people around the world buy a house as their living space or as a means of subsistence.

Housing market has a positive impact on the national economy, which is an important measure of the country's economy. Homeowners will buy furniture such as furniture and furnishings, and homeowners or contractors will buy building materials that meet the needs of housing, which is an indication of the economic impact of the new housing market. Apart from that, buyers have the opportunity to invest a lot of money, and the construction industry is in good shape and reflected in the country's high quality of housing.

In this article, the literature review focuses on home pricing based on machine learning modeling and analysis of features used primarily in previous research affecting house prices. This paper is structured as follows: the first section summarizes the entire study. The second section describes the most common features used in real estate prices around the world. This was followed by a brief discussion of the machine learning model used in a previous study to predict house price. In the next section, the broad outcomes of the current model of house price forecast are considered. Finally, paragraph 5 and paragraph 6 respectively provide the definition and conclusion of this comprehensive review of the literature.

1.1 Machine Learning Model

According to a study the housing demand paradigm can be divided into two categories namely standard method and advanced measurement method. A standard measurement scheme, which combines a recurring regression method with a gradual regression process, while a hedonic pricing tool, a neural network (ANN) and a spatial analysis framework is a pre-determined measurement method. The choice of model to be used to predict the price of the house is very important as there are a variety of models available. One of the most widely used models in this field of research is Regression Analysis which is used in many studies. Another common model of real estate prices is Support Vector Regression (SVR).

A. Decrease Analysis i. Hedonic Price Model

The housing market is a little different from the common good use. According to a study, the housing market is unique in that it reflects the characteristics of durability, flexibility and spatial harmony. Therefore, the hedonic method is chosen to accurately predict market differences.

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1.2 Multiple Row Route

Deviation analysis is a model used to determine the relationship between variables to assess related correlation, coefficient of integration or regression equation can be used. Many retrospective models can determine which features are most important in different dependent definitions. Detailed retrospective analysis also allows for specific price forecasts by capturing different independent and dependent data. The variability of the multi-regression model can be seen when the number of relationships between dependent and independent variables is measured.

This model can be accessed using house price as varied and depends on house prices, house size, type of building, number of bedrooms, and much more. Therefore, house price is set as targeted variation or dependency, while other attributes are set as independent variables to determine the principal variance by determining the relative coefficient of each attribute

1.3 Artificial Neural Network

In 1958, a neural synthetic network known as the ANN was formed. Walter Pitts and Warren McCulloch published a paper entitled "Logical Calculus of Imaginary Ideas in Nervous Activity" in 1943 which noted that the neural network can be created automatically, based on the role and structure of the biological neural network. In some studies, as this model often promotes learning, artificial neural networks are said to be artificial brain diagrams.

The artificial neural network model is always selected when an indirect factor is involved. Real estate inspections should also use this model as real estate considerations are also indirect.

II. RELATED WORK

A total of 14 articles were reviewed and evaluated to take into account all factors affecting the price of the house. In an article it is said that a square picture of a house unit is the most important difference in predicting the price of a house, followed by the number of bathrooms and the number of bedrooms. In addition, research shows that the value of a house increases by 2.6% when the floor area of a house is raised by 100 square meters. They conclude that there the operating year of the building is less than 1 year, the value increased by 0.3 percent. In addition, the price of a house will increase by 10.4 percent or 13.7 percent, if there is only one bedroom or one more bathroom.

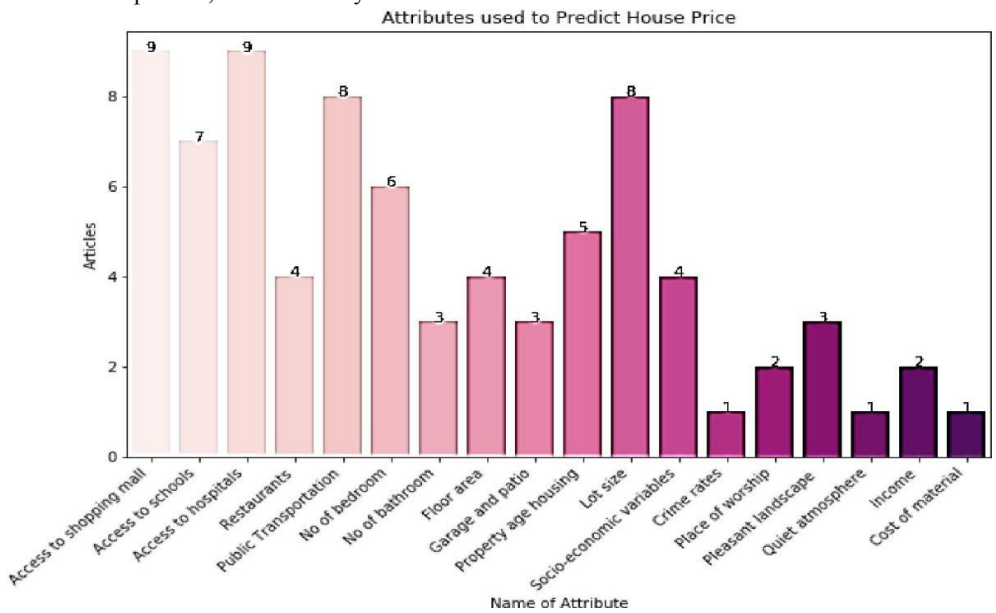

Fig.1. Types of attributes used in the previous study

Since the previous revised study, 19 attributes are said to have been used extensively by other researchers to assess housing prices. Features from article 12, shown in Fig. 1, both collected and presented in a bar graph. It is therefore clear what factors researchers have used most in determining housing prices. The number in the bar above represents folding pages that use attributes as a prediction.

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The diagram above shows that the mall, the hospital entrance and the size of the house are the main sources of housing. Recent research has dominated controversies about local features, including access to shopping malls and hospitals, as well as construction features, including the number of bedrooms and the size of the house.

The contribution of low cost housing as predicted from primary residential districts to tertiary residential districts. It is pointed out that the prices of the four most affected houses by hospitals, schools, campuses, and recreation parks, could be included in local features.

In comparison, 8 out of 14 studies used structural features to determine housing prices, including the number of bedrooms, the number of toilets and the size of the house. It is specified that the three main factors influencing house sales prices are square footage, overall efficiency and total number of bath units. These findings are consistent with a finding that the number of bedrooms and toilets and the price of a house have a significant relationship. Similarly, it is emphasized that additional floor, bedroom and bathroom add 13 percent, 16 percent and 2 percent of the total house value, respectively.

In addition to local buildings and structures, many researchers use local attributes to determine house prices. The influence of neighbors affects the price of a house, because residents can choose a better place today. Neighborhood factors include low crime rates, a pleasant environment and a peaceful atmosphere. These factors will determine whether the price of the house is high or low.

Although only a few researchers have chosen an economic index, which includes individual income and housing costs, as a factor in determining house prices, we acknowledge that economic analysts have a significant impact on house prices. The price of a house can be determined on the basis of an individual's income because the government plays a role in determining the price of the house based on individual financial circumstances. The analysis of key factors affecting the price of the house is important and is related to the initial research question of this study.

After examining the key factors affecting house price determination, the mining data model (within the context of this study is a forecast model) can be used to estimate house price.

III. CONCLUSION

This paper reviewed and analyzed current research on key aspects of real estate prices as well as analytical data mining techniques used to predict real estate prices. Technically, affordable housing such as access to shopping malls or other amenities is often more expensive than rural homes with limited resources.

An accurate forecasting model will allow investors or real estate buyers to determine the price of real estate and real estate developers to determine the price of affordable housing. This paper discusses factors used by previous researchers to predict house prices using various speculative models. Taken together, the survey results showed the power of SVR, ANN and XGBoost in predicting house prices. These models are developed based on a few installation features and work very well for house price. In conclusion, the impact of this study was intended to assist and assist other researchers in developing a real-life model that could easily and accurately predict house prices. More work on the real model should be done using what we have found to validate it.

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