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An Approach to Predict House Price Using Machine Learning

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ABSTRACT:

Many individuals, including the researcher, are curious about the sudden decline or steady increase in house costs. Many studies have been conducted on the topic of housing price fluctuations, and they all take slightly different approaches. This paper treats the subject of fluctuating home prices as a classification problem and discusses machine learning strategies for anticipating whether home prices will go up or down given current market conditions. In this work, we employ several feature selection methods, including the variance influence factor, Information value, principal component analysis, and outlier and missing value treatment, among others. Accuracy, precision, specificity, and sensitivity are four metrics used to evaluate machine learning methods. In this study, the values 0 and 1 are treated as discrete categories. A class with a value of 0 indicates a decline in home value, whereas a class with a value of 1 indicates a rise in home value.

Keywords: Machine learning, Accuracy, Precision, and sensitivity

1. Introduction

The rising need for dwellings can be traced back to civilization's march forward. Buyers, sellers, and lenders all share an interest in an accurate method of estimating future home prices. Predicting housing prices is a difficult problem that has been studied extensively. The combined efforts of researchers from all around the world have led to the development of numerous hypotheses. Some of these schools of thought emphasise the role that socioeconomic factors play in explaining why housing values rise or fall, while others believe that the geography and culture of a region are more important.

Predicting home prices is plainly a regression job because we all know that home prices are discrete numbers drawn from a finite set. One common strategy for estimating future home values is searching for homes that are comparable to the one being predicted. All of these facts point to the fact that predicting home prices is a new area of regression research that relies heavily on machine learning. This has inspired me to pursue a career in this field. Appraisal of real estate is essential in any real estate transaction. Appraisals are typically carried out by licenced professionals with experience in the field of real estate assessment. A computerised approach for estimating property values can be helpful for homebuyers trying to get a feel for the market value of the homes they're considering. Particularly useful for inexperienced first-time homebuyers, such a method can streamline the learning curve.

2. Related Work

This article details the findings of the VR4RE (Virtual Reality for Real Estate) initiative, which used cutting-edge technology to save costs and save time for the real estate industry. Blue mind Software has a number of cutting-edge projects under development, one of which, VR4RE, is very well along. This report further highlights the evolution of in-house technology efforts to provide suitable 3D and VR (Virtual Reality) presentation tools for real estate properties [1].

Patients with infections are identified and graded using a Convolutional Neural Network in this article. A Customised CNN Model: In order to classify images into one of three groups (normal, viral pneumonia, or bacterial), a collection of CNN-based models has been developed. DenseNet169 employs a Recurrent Neural Network (RNN) based architecture [2]. We looked at a Swedish commercial real estate firm that has implemented a technology-based self-service (TBSS) to assist tenants in lowering their energy consumption, in order to gauge the potential of smart CRE.

Different Support Vector Machine (SVM) and Particle Swarm Optimisation (PSO) models for cryptocurrency price prediction have been investigated. In the financial industry, it is crucial to have reliable projections of future worth. To better predict where the price of bitcoin will go in the future, we present a Support Vector Machine (SVM) that is optimised using Particle Swarm Optimisation (PSO). It's a type of AI that looks to the past in order to make predictions about the future [3]. In this study [4], they assess and contrast the performance of four ensemble approaches often used for real estate valuation in Mumbai: Bagging, Random Forest, Gradient Boosting, and Extreme Gradient Boosting. The data for this research came from the property listings on the real estate website 99acres. In comparison to the other ensemble models, the results showed that the Extreme Gradient Boosting (XGBoost) model was the most effective. The findings verify the value of using ensemble models to predict property values.

The paper [5] gives a summary of how to forecast home prices using several regression strategies and python packages. The proposed method took into account the finer details employed in the home price computation, allowing for a more precise forecast. In addition, it gives a quick rundown of the numerous graphical and numerical methods that will be needed to estimate a home's value. In this paper, we detail the house pricing model that we've developed using machine learning, including how it operates and the dataset that it draws from.

3. Research Gap

99acres, no broker, housing, magic bricks, and others list properties for sale/rent in India. These websites list identical houses at varying prices, which lacks openness and veracity. Customers may think a listed house's value is too high, but they can't verify the facts. Accurate property valuations and appropriate asking prices are vital because transaction prices are excessive for most consumers, especially in India. Fixing this problem will help customers and the real estate business. To predict housing prices based on input variables, we propose using machine learning and artificial intelligence. This algorithm can predict the correct property price based on various input factors, which is a huge business benefit for classified websites. This POC investigation may inform a valuation report. Honest customer property valuation price inputs prevent system errors. To our knowledge, this study on proactive housing pricing in India is new. However, house price prediction is an old subject, and many research and competitions have addressed it, including the Boston housing price challenge on Kaggle.

XGBoost can anticipate Bengaluru home prices in India. Machine Hack examined the 2018 Bengaluru real estate market. Given 9 parameters—area type, availability, location, price, size, society, total square foot, number of bathrooms, and bedrooms—predict Bengaluru house prices. Additionally, Mumbai and other Indian cities have performed housing price prediction research.

Proposed Methodology

Machine learning is a subfield of AI that allows computer systems to gain knowledge and performance enhancements via data. It is used to examine the creation of algorithms that make predictions on data. Machine learning is utilised to perform a multitude of computational jobs. It's also applied to computerised forecasting. Complex models are occasionally created using machine learning as well. The primary goal of machine learning is to give computers the ability to learn on their own. Machine learning is incredibly valuable and is frequently used over the whole world. Machine learning is the process of training computers to do a specific task using an input of data and a set of algorithms for model construction. Numerous applications, including those that use face recognition technology, can be developed with the help of machine learning. Machine learning is a subfield of software engineering that has had a revolutionary impact on the analysis of data.

The Support Vector Machine (SVM) is a well-known supervised learning algorithm that may be applied to both classification and regression tasks. To classify fresh data points efficiently in the future, the SVM algorithm seeks to find the optimal line or decision boundary that divides the space into n distinct classes. SVM Classifiers outperform the Naive Bayes algorithm in both accuracy and speed of prediction. They employ a smaller subset of training points in the decision phase, which allows them to make do with less memory. SVM performs well in high-dimensional spaces with distinct separation margins. Although SVMs do not directly produce probability estimates, class probabilities can be derived through the use of probability calibration techniques. Platt scaling, logistic regression on the SVM scores, fitted by additional cross-validation on the training data, is used to calibrate the probabilities in the binary case. In this article, we will utilise the SVM machine learning technique to anticipate property values based on a number of different factors in order to provide buyers with the most relevant and reliable information possible.

4. Proposed System

User input is accepted in the form of text, and the system proceeds to pre-process that data before extracting the necessary information and sending it on to be classified. A variety of algorithms are used to make predictions about prices based on classified data utilising the system's available train data set.

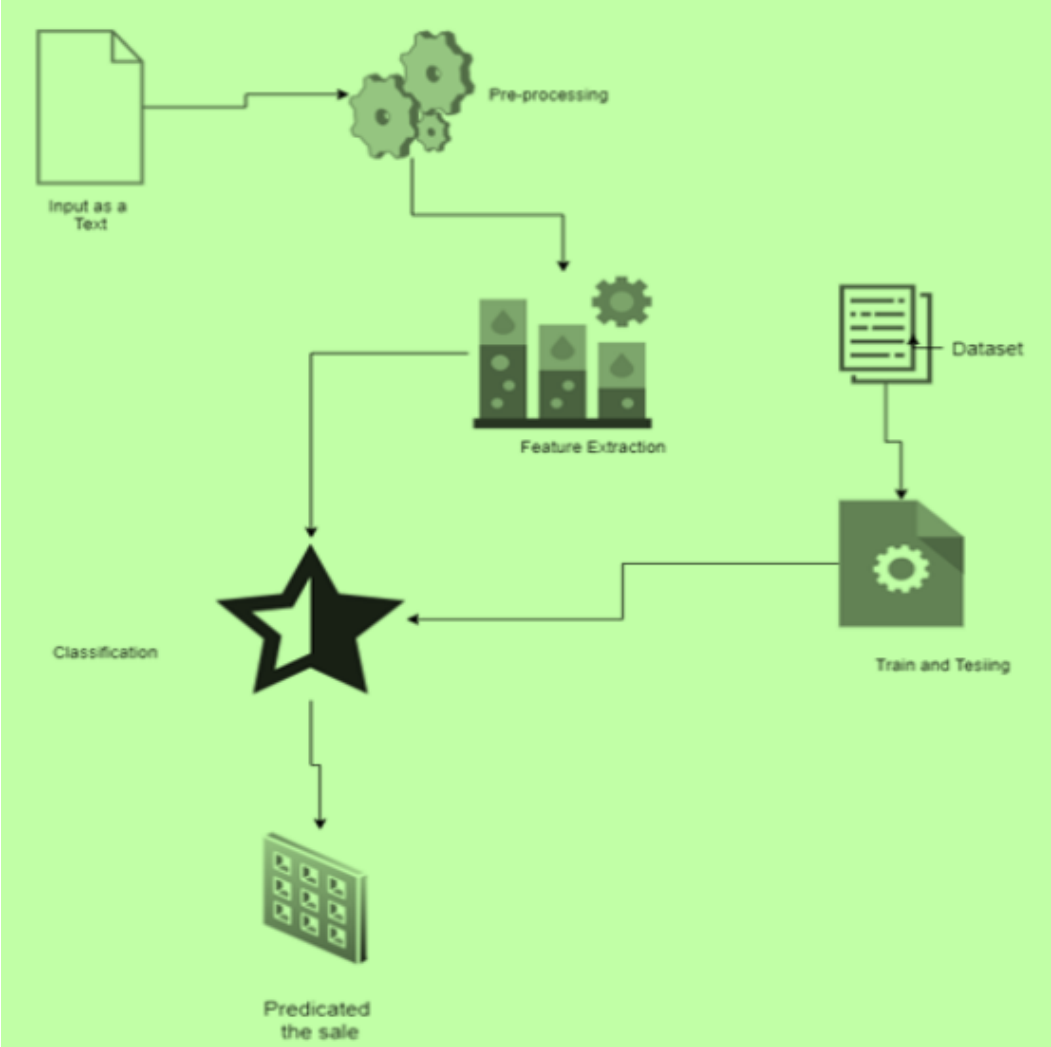

Figure 1: System model

5. Conclusion

This research investigates the application of the SVM algorithm for predicting home prices using machine learning. Using a combination of the user's input, data that is already accessible, and a number of different categorization algorithms, it is able to accurately anticipate the market value of a piece of real estate. This further verifies that the population and quality of the training dataset play a role in producing reliable prediction results. The results acquired initially using SVM were compared to those obtained using optimised SVM. The next section presents a comparison of SVM's value to that of other cryptocurrencies over the same time period. The accuracy of the model's price predictions will be improved in the future. Data pre-processing, including the sentiment data prior to testing and training experiments, will be the focus of future work.

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