A Highly Interactive Web-Based Model for House Price Prediction Using Machine Learning

Madhav Prabhu[1], Sara Aljabri[1] and Preethy Kurian[1#]

[1]Middle East College. Muscat, Oman
[#]Advisor

ABSTRACT

The real estate business plays a significant role in the country's economy, and forecasting the value of a house is of great importance in the real estate business. However, many people in Oman are not aware of how to decide the rate of a house and may face issues in buying and selling houses. Moreover, the price of a house fluctuates due to various economic aspects. This paper presents an overview of a web-based framework for predicting the value of a house in Oman. The paper also covers a detailed analysis of critical factors in deciding the price and other economic influential aspects.

Different machine learning models have been used in previous research to improve the accuracy of output. The study (Zulkifley et al., 2020) shows that XGBoost model gives more accuracy than other baseline machine learning prediction methods. The research study mentioned in the paper (Rawool et al., 2021) shows that random forest regression model also shows a high level of accuracy in the result. The proposed study also includes the feasibility of a suitable machine learning model based on the data set availability after considering the key parameters to be used for prediction.

The proposed application includes a web framework that acts as an interface that must be integrated with the Python model. The methodology follows a series of key stages, starting from collecting the raw data, structuring the data, preprocessing, exploration data analysis, and producing visual graphs.

The main objective of the proposed research is to provide the best user experience to the Oman community in predicting the price of a house and enable them to buy a house at a reasonable price. Also, to investigate the factors which influence the pricing of properties and concerned authorities can make strategic decisions on the country's growth based on these factors. The paper also includes the merits of the proposed application for the community and the recommendations. The recommendation for future work involves a few additional features which support the users in making the decisions on buying the house after getting the details of the price.

Introduction

House price prediction is an essential task for both the real estate industry and potential home buyers. Predicting the price of a house is a complex task that involves various factors– from location and neighborhood to the size and condition of the property. In recent years, data-driven approaches have become a popular method to predict house prices. Machine learning models can analyze large amounts of data, including historical sales data, housing market trends, and socio-economic indicators, to infer the price of a house.

House price prediction is of great importance in the field of real estate. As many people do not have enough experience in this field they may be deceived when buying or selling a home. We also know that the Omani economy and the real estate sector in the Sultanate of Oman are facing increasingly difficult conditions due to the weak oil prices and what the world has gone through due to the COVID-19 pandemic. Buying real estate in Oman for residency is a good idea, especially for young families, retirees who want to live in

comfort, and frequent travelers. The cost of living in Oman is not cheap, but it is more reasonable compared to many parts of Western Europe.

The primary goal of the suggested research is to give the Oman community the best user experience in estimating the price of a home and enabling them to purchase a home at a fair price. Also, to help both home sellers and buyers make informed decisions by predicting the market value of houses. Additionally, the project aims to showcase the power of machine learning in solving real-world problems and give insights into various techniques and algorithms used in machine learning.

Related Work

Similar system is a project like the title as this project gives an analysis of the requirements in the system. The user will enter the data in the required form, and then the system will predict the price of the house accurately, according to the data entered. (Sharma et al., 2022). This article helped me get a general idea of the application, as this project provides the user with ownership details according to his requirements.
Another system is an interactive web-based system that provides us with the price of homes in the Atlanta metropolitan area. It also provides travel information to nearby shopping malls in this area. Where users enter the required data, and the site provides results quickly. (Ajudiya, 2020).

Another system helps people determine the price of the house and whether the required amount is suitable for buying or selling a house or not. This application will help the seller or buyer to determine the house's features and prices through certain criteria, according to the data that the user will enter. (Kaushal & Shankar, 2022).

In addition to the previous projects, this project is also focused on creating a web application to predict house prices for buyers and sellers. We also know that houses have different features, which will determine the value of the houses, as these features are used to accurately predict house prices. (2021).
Another system is aim of this project that to predict the value of homes to reduce the problems faced by users. Because the market uses the manual method in calculating house prices, this application will help avoid errors that may occur during the calculation by the manual method. (Chogle et al., 2022).

Methodology

AGILE was chosen for this project because this methodology has high quality products. This methodology depends on the comments of developers and the ease of communication between them. It is also considered very flexible due to the continuous communication between developers. It also limits the risks that the project may face. It also increases customer satisfaction and speed of response to changes in the market. In addition, the project can be continuously improved and developed in the future. Agile methodology can enhance the accuracy for house price prediction projects through continuous feedback and iteration. By dividing the project into smaller, more manageable tasks or sprints, the development team can work on specific features or models, gather feedback from stakeholders or users, and make improvements as necessary.

The agile approach allows for more flexibility and adaptability in response to changing requirements or data trends. As a result, the models and features developed can be constantly refined and adjusted, leading to increased accuracy in house price prediction.
Additionally, agile methodology encourages collaboration and communication among team members, which can ensure that everyone is aligned on project goals and objectives. This helps to reduce the risk of miscommunication or misunderstandings that could impact the result.

System Architecture

This application is specially designed for people who want to sell or buy homes and they will benefit greatly from this application by relying on it to give them results close to the market when buying and selling. This application, which I will be working on, is an interface. The stakeholder will fill in the necessary data for each application to give a close value to the house that he wants to sell or buy. He can also view the database to get an experience of the various houses and their prices. So, I will use Linear regression for my project is a statistical method that is used to predict the relationship between two or more variables by fitting a linear equation to the observed data. Linear regression is a useful technique for estimating property values since it estimates the link between a house's price and its many qualities or properties. We can find which variables have a substantial influence on the home price and how much impact they have by studying the connection between the dependent variable (house price) and various independent variables (e.g., location, square footage, number of rooms, etc.).

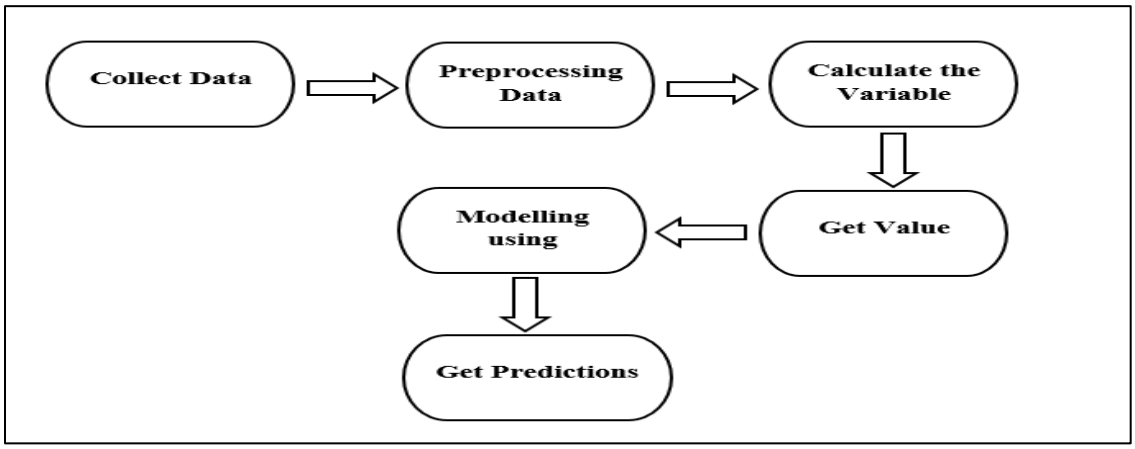

Figure 1. System Architecture

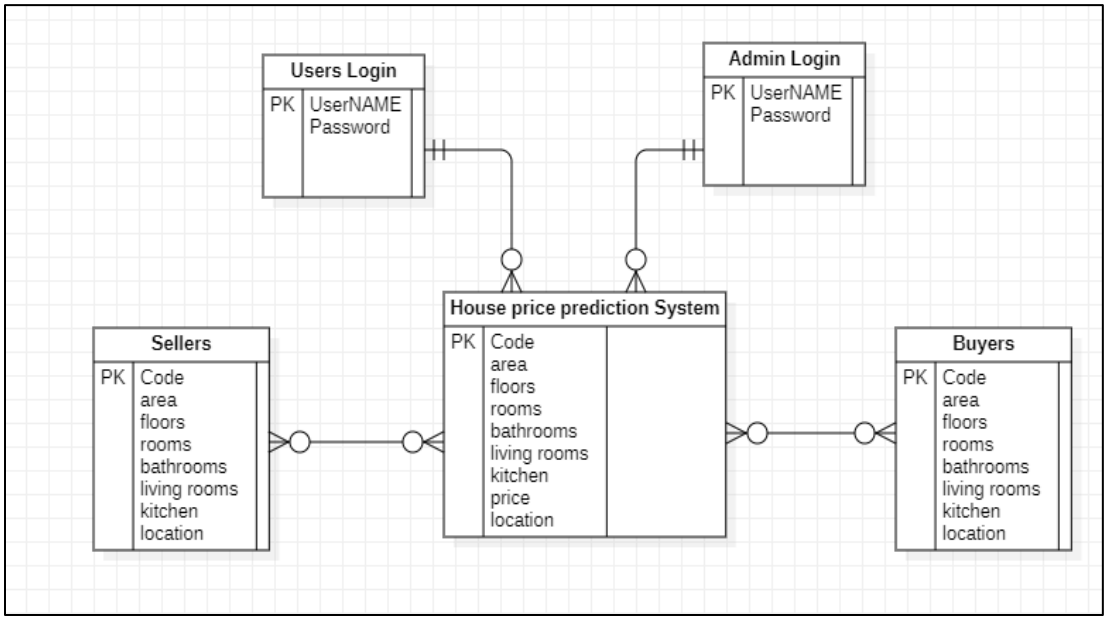

Figure 2. ER Diagram

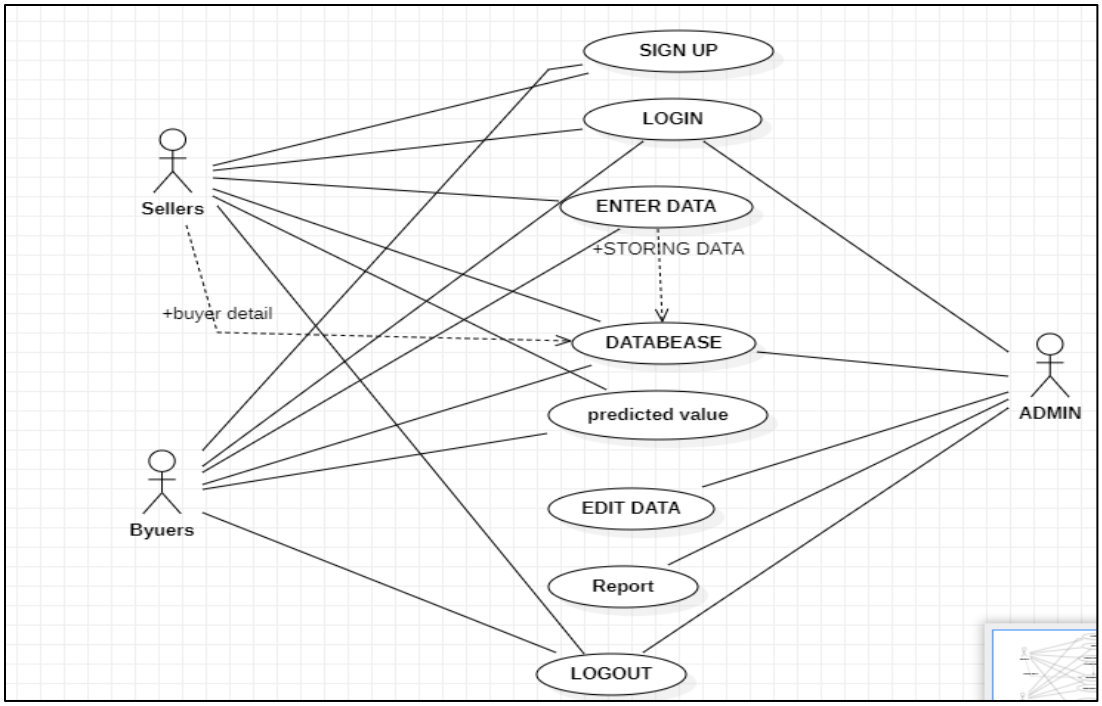

Figure 3. Use case diagram

Recommendations

This paper presents a design of a house price Prediction System. This system hopes to help buyers and sellers find an expected value close to house prices in the Sultanate of Oman. This system is important and useful for stakeholders so that they do not face fraud during buying and selling. The system can be developed in the future and expanded to include different areas such as cars.

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