JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

HOUSE PRICE VISION

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Abstract: Predicting house prices and loan prices is of paramount importance in the real estate and financial industries. This project aims to develop a web application using the flask framework integrated with Machine Learning models to predict house prices, loan prices, and rent prices. The application will provide users with a user-friendly interface where they can input relevant property and financial information. The ML models, trained on historical data, will then generate accurate predictions for house prices, loan prices, and rent prices. Users can make informed decisions about buying, financing, or renting properties, contributing to a more efficient real estate market. It aims to enhance the efficiency and transparency of the real estate and financial industries. By providing users with accurate and data-driven insights, it contributes to a more informed market, ultimately benefiting not only individual property buyers and investors but also the broader real estate ecosystem. The system will be designed with scalability, user-friendliness, and data security in mind, ensuring it aligns with the highest standards of the industry.

Keywords **- House Price Prediction, Home Loan Prediction, Home Rent Prediction.**

I. INTRODUCTION

In today's data-driven world, accurate predictions of house prices and loan prices are paramount in the real estate and financial sectors. In our project, we're using flask, a powerful tool, to help people in the real estate world. You know how it can be tricky to figure out how much a house should cost, how big of a loan you can get, or how much you might pay in rent? Well, our project uses clever computer programs to predict those things. We've made it easy to use, like a website, and it gives you smart advice based on things like where a house is, its size, and what's happening in the market. Whether you're a buyer, seller, or renter, we're here to make real estate decisions a whole lot simpler. The project simplifies these complexities by employing sophisticated computer algorithms to make predictions. It's designed as a user-friendly website, making it accessible to a wide audience. The predictions offered by this platform are based on a variety of factors, including the location of a property, its size, and the current market conditions. Whether you are a prospective buyer, a seller, or someone looking to rent, this project aims to provide smart advice that simplifies decision- making in the real estate domain. This means it can guide buyers to make informed purchasing decisions, assist sellers in setting competitive prices, and help renters understand their potential costs. By leveraging data and technology, this project has the potential to significantly streamline and enhance real estate-related choice.

II. LITERATURE SURVEY

House Price Prediction", authored by Aditi Shahasane, Mayuri Gosavi, Ayushi Bhagat, Nandini Mishra, and Amit Nerurkar in 2023, focuses on Machine Learning techniques to predict house prices. The paper highlights the importance of dataset selection, various models, and data preprocessing methods, aiming to benefit stakeholders in the real estate market. However, it notes that data quality can significantly impact prediction accuracy.[1]

In the paper titled "Real Estate Price Prediction" from 2022 by Yash Sheth, Sahil Morudkar, Palak Nayak, andAbhay Patil, Machine Learning algorithms are evaluated for sales prediction, particularly considering house size. While the study provides insights into different algorithm accuracies, it warns about the potential issue of data overfitting.[2]

"Loan Approval Prediction" (2021) by Kritika Pathak and Shazia Shaikh utilizes Machine Learning and Logistic Regression to predict loan approval based on historical applicant data. Although the model aids in decision- making for loan applications, it lacks adaptation to changing market conditions.[3]

Vipashi Kansal, Dr. Upma Jain, Ashutosh Kumar Gupta, and Ms. Manisha Aeri authored "Home Loan Prediction using Machine Learning" in 2021. Their paper employs Decision Tree algorithms to predict loan approval, providing insights for customers to gauge their eligibility and assisting bank employees in applicant assessment. However, it is noted to lack image visualization[4].

Lastly, "House and Rent price prediction using regression" (2023) by Sujata Khandaskar, Chirag Panjwani, Vinit Patil, Prerna Bajaj, and Deanna Fernandes addresses challenges in real estate market analysis. Through advanced techniques like machine learning, data preprocessing, and feature engineering, the paper aims to provide more accurate predictions. Nonetheless, it acknowledges data quality issues as a challenge impacting prediction accuracy in real estate analysis.[5]

III. METHODOLOGY

The house price prediction system starts by gathering input features from clients, such as location, size, bedrooms, bathrooms, and amenities. These details are then processed for consistency and compatibility with the machine learning model. Using a dataset of house prices and features, the system trains the model to understand the relationships between different features and house prices. Once trained, the model predicts the house price based on the input features provided by the client. Finally, the predicted price is presented to the client via a user interface or application, helping them make informed decisions about buying or selling properties.

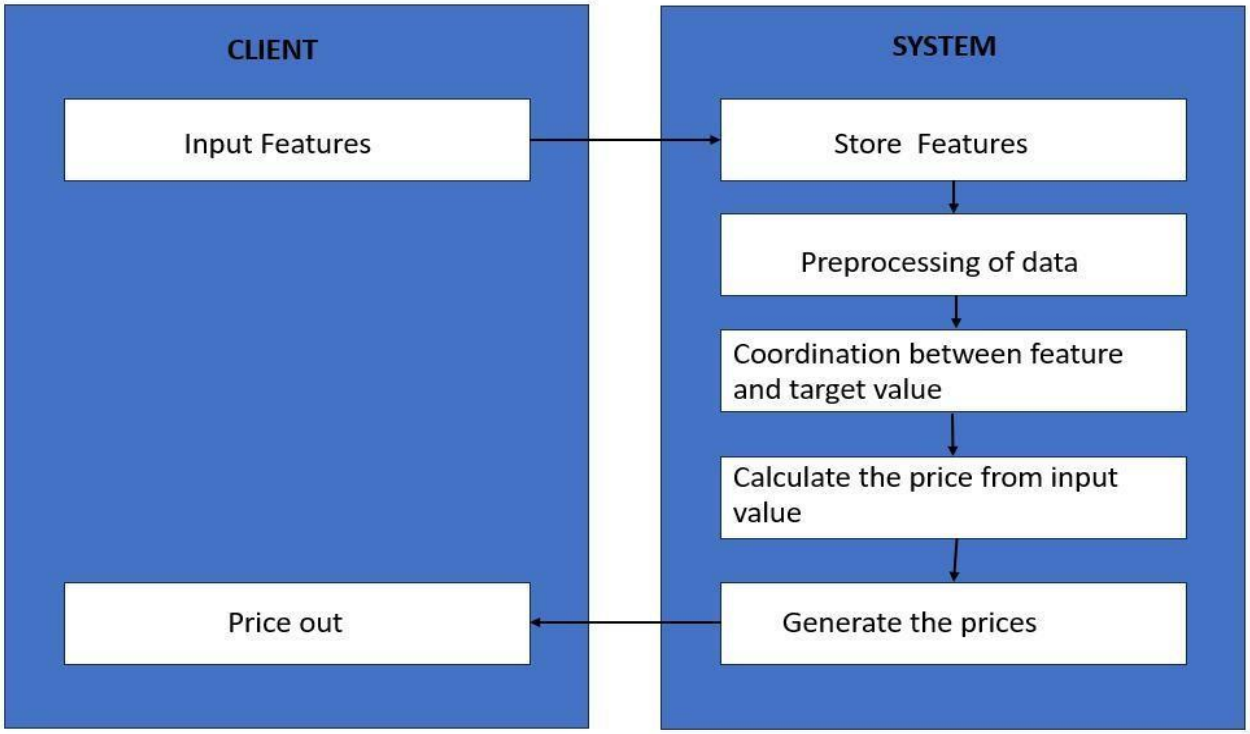


Fig. 1. Working of Proposed System

RANDOM FOREST ALGORITHM

The Random Forest algorithm is an ensemble learning technique widely used in machine learning. It creates a collection of decision trees, each trained on a random subset of the data with a random subset of features considered at each node. This randomness mitigates overfitting and enhances generalization. During prediction, each tree "votes" on the outcome, and the most frequent prediction is taken as the final result for classification tasks. For regression tasks, individual tree predictions are averaged. Random Forest excels in handling high-dimensional data, providing robustness against outliers, and offering insights into feature importance Random forest algorithm is used in house price prediction by creating an ensemble of decision trees, where each tree is trained on a random subset of the data. During prediction, each tree in the forest independently predicts the house price, and the final prediction is the average (regression) or majority vote (classification) of all individual tree predictions. This approach helps in reducing overfitting and improving the accuracy of house price predictions.

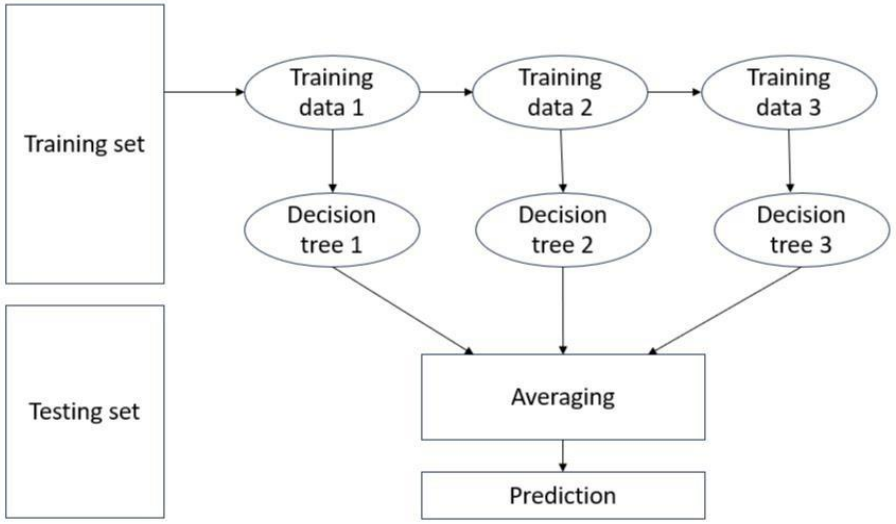


Fig 2 working of algorithm

Step 1- Randomly select subsets of data with replacement for eachtree. Step 2 - Consider a random subset of features at each node for splitting. Step 3- Grow deep decision trees with the selected data andfeatures.

Step 4- Each tree "votes" on the class for new samples.

Step 5- For regression tasks, average the outputs of each tree.

Step 6- Diverse subsets and feature selection help mitigate overfitting. Step 7 - Adjust parameters like tree count for optimal performance.

Step 8 - Majority vote for classification mean prediction for regression.

IV. SYSTEM SETUP SOFTWARE SETUP:

- **Browser:** Browsers act as the operating environment, allowing extensions to modify, interact with, and add features to web pages.

- **Stable Internet Connection:** A stable internet connection is vital for effective phishing detection because it allows for real-time updates on evolving threats. It enables timely queries to external services for website verification, reducing false positives/negatives**.**

- **Operating System:** It manages hardware resources, provides a user interface, organizes files, enables device communication, ensures security, handles processes, facilitates networking, manages software, and handles errors.

- **JAVASCRIPT**: Adds interactivity to web pages, runs on browsers, enables dynamic content and animations, and is supported by all modern browsers. It's complemented by popular frameworks like React and Angular for building robust web applications.

- **PYTHON 3.0:** Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together.

scikit-learn (sklearn): Sklearn is a Python library for machine learning, offering tools for classification, regression, clustering, and model evaluation. It provides efficient algorithms and user-friendly interfaces, making it a go-to choose for building and deploying machine learning models.

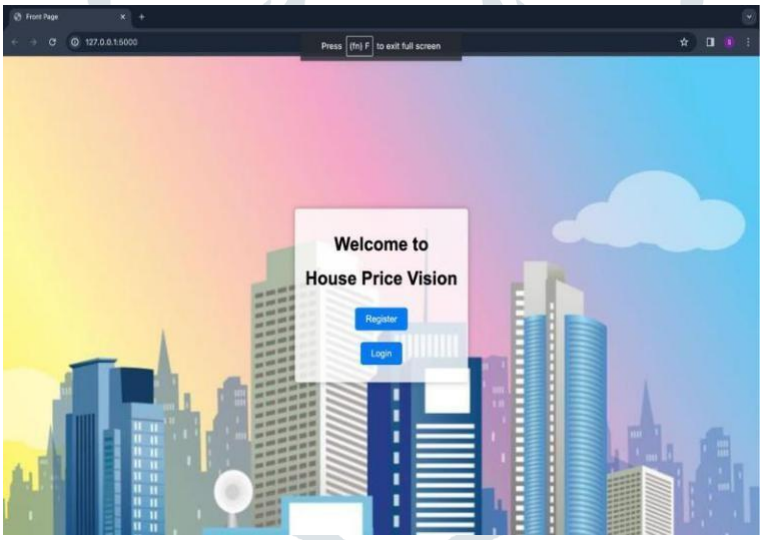
NumPy: NumPy is a core library for numerical computing in Python, facilitating operations on large, multi- dimensional arrays and matrices. It's essential for efficient numerical computations and is widely used in scientific computing and data analysis.

Pandas: Pandas is a versatile Python library for data manipulation and analysis, built on top of NumPy. It simplifies tasks such as data cleaning, transformation, and exploration with its powerful data structures and functions, making it indispensable for data science projects.

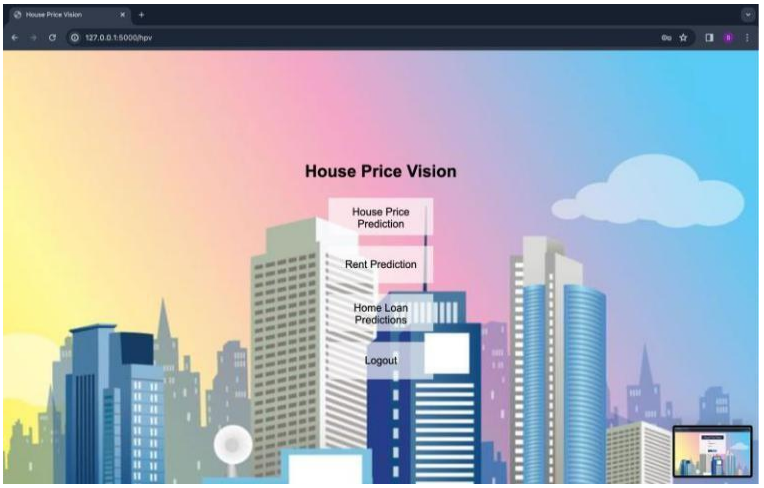
HARDWARE SETUP:

- **Processor** – Intel core i5-1335U
- **RAM** - 16 GB
- **SSD** – 512 GB
- **System** - Dell Inspiron 5430 13th gen laptop

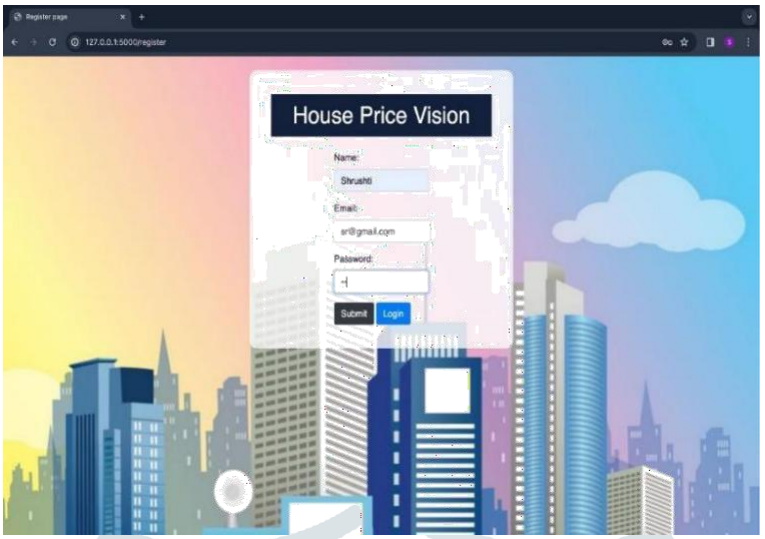
V. RESULTS



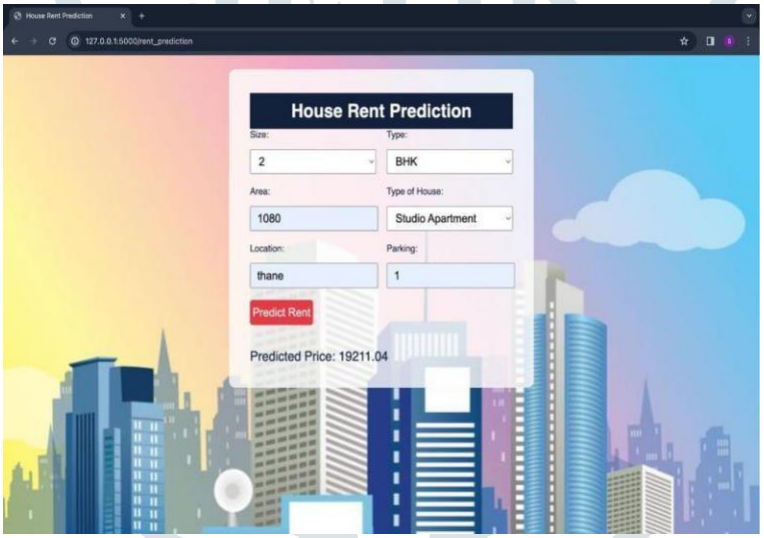
6.1 Welcome page.



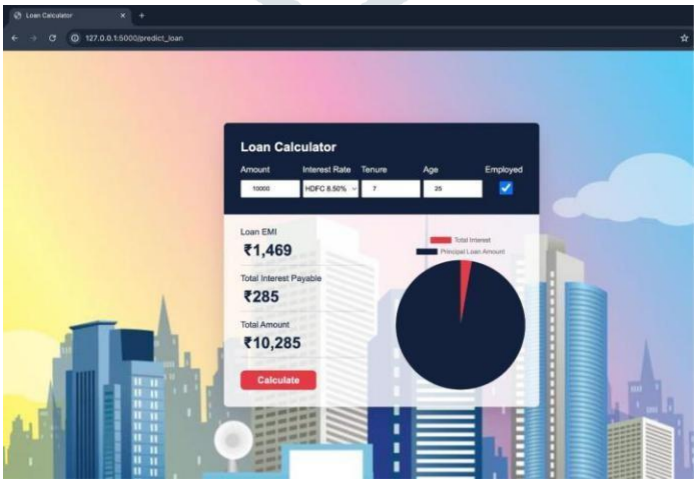
6.2 Home Page.



6.3 House price prediction page.



6.4 House rent prediction page.



6.5 Loan calculator page.

VI. CONCLUSION

Real estate prediction project utilizes advanced machine learning to offer precise insights into house prices, rental trends, and home loans. With a user-friendly interface and robust data in the preprocessing, we empower homeowners, renters, buyers, and sellers to make informed decisions in the complex real estate market. By addressing data quality challenges and optimizing models, our project aims to enhance the reliability of predictions, contributing to a more transparent and efficient real estate ecosystem that Benefits all stakeholders

ACKNOWLEDGEMENT

The completion of the project depends upon co-operation and combined efforts of several sources of knowledge. I express our profound gratitude and extend sincere thanks to our guide and mentor Prof Pallavi Chandratre , HOD Dr. Uttara Gogate, Principal Dr. Pramod Rodge for this guidance, counselling and above all his genuine zeal to our success. My profound gratitude to Prof. Pallavi Chandratre for her contribution that enabled us to complete the project successfully. Finally, we would also like to thank our department staff members and my parents & friends who helped us a lot in finalising this project within the limited time frame.

REFERENCES

1. Aditi Shahasane, Mayuri Gosavi, Ayushi Bhagat, Nandini Mishra, Amit Nerurkar [2023] Available at: IRJET-V10I4194.pdf

2. Yash Sheth, Sahil Morudkar, Palak Nayak, Abhay Patil [2022] Available at :IRJET-V9I4495.pdf

3. Kritika Pathak, Shazia Shaikh [2021] Available at : IRJET-V8I9269.pdf

4. Vipashi Kansal, Dr. Upma Jain, Ashutosh Kumar Gupta, Ms Manisha Aeri [2021] Available at: 218- 1663049807.pdf (ilkogretim-online.org)

5. Sujata Khandaskar, Chirag Panjwani, Vinit Patil, Prerna Bajaj, Deanna Fernandes [2023] Available a：House and Rent Price Prediction System using Regression | IEEE Conference Publication | IEEE Xplore