HOUSE PRICE PREDICTION

Samrudhi Chitrakar
KIT's College of Engineering (Autonomous)
Kolhapur, Maharashtra, India
samrudhichitrakar@gmail.com

Madhura Patil
KIT's College of Engineering (Autonomous)
Kolhapur, Maharashtra, India
madhurapatil822@gmail.com

Aditya Singh
KIT's College of Engineering (Autonomous)
Kolhapur, Maharashtra, India
pgadityasingh@gmail.com

Prathamesh Desai
KIT's College of Engineering (Autonomous)
Kolhapur, Maharashtra, India
prathameshdesai@gmail.com

Sujeeta Shah
KIT's College of Engineering (Autonomous)
Kolhapur, Maharashtra, India
sujeetashah@kitcoek.in

***Abstract*—This project aims to develop an accurate house price prediction model using various machine learning techniques. By analyzing factors such as location, size, and amenities, we train multiple models to forecast house prices. After selecting and fine-tuning the best model, we deploy it via a user-friendly web application. This tool assists buyers, sellers, and investors in making informed real estate decisions, showcasing the potential of data science in the housing market**

***Index Terms*—machine learning models,various features,web application,real estate decision.**

I. Introduction

Predicting house prices is a crucial task in real estate, helping buyers, sellers, and investors make informed decisions. In this research, we use machine learning techniques to forecast house prices. By analyzing various factors such as location, size, and market trends, we aim to provide accurate price predictions. Our study explores the effectiveness of different algorithms and identifies the key elements that influence property values. This research not only improves the accuracy of predictions but also offers valuable insights for the real estate market.

In India, the traditional parking method involves the parking attendant manually entering the number plate of the departing vehicle into the system. Verifying the transaction and ensuring that the vehicle being withdrawn is the one stated on the parking ticket are the goals of security measures. Because it requires the focus of employees handling numerous transactions, manually entering the number plate data is a laborious and error-prone operation. Moreover, inputting the number plate data is a time-consuming and inefficient process. Also, number plate regulations are rarely adhered to in India. There are significant differences in the number plates font styles, scripts, sizes, locations, and colors. A few times, the number plate has additional undesired decorations. While manual recording systems are predominantly used, there is potential for the commercial implementation of ANPR (Automatic Number Plate Recognition) technology in India. By referencing [1], adopting the Automated Number Plate Recognition method is proposed to address the limitations observed in India. This method uses the most recent advancements in computer vision technology to automatically identify the number plate data of arriving and leaving cars using a stationary camera placed in the parking area entrance, specifically addressing the challenges faced in college entrance incoming and outgoing vehicles.

The research article's goal is to present a comprehensive assessment of ANPR systems that automatically read, record, and collect number plate data from moving cars using optical character recognition (OCR) technology. The main goals are to reduce improving accuracy.

II. METHODOLOGY

House price prediction project involved several key stages. Initially, data was collected using real estate APIs like Zillow and Realtor.com, which provided detailed and up-to-date information on house prices and related features such as location, property size, and amenities. This data was then stored in a cloud-based database for efficient access and scalability. The dataset is cleaned to address missing values, remove duplicates to ensure consistency. Various machine learning algorithms, including Linear Regression, Random Forest, and XGBoost, were utilized for model training. Cross-validation techniques ensured model robustness. A RESTful API was developed using Flask to facilitate real-time predictions, allowing users to input house features and receive price estimates. The frontend interface, designed with HTML, CSS, and JavaScript, provided a user-friendly platform for interaction. Finally, a system for regular model updates was implemented to maintain prediction accuracy.

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TABLE I: Literature Review

Year	Author	Title	Methodology
2024	Anders Hjort , Ida Scheel , Dag Einar Sommervoll , Johan Pensar a	Locally interpretable tree boosting: An application to house price prediction [1]	It includes ML models like linear regression,decision trees and deep learning to analyze historical sales data and property features.
2024	Hemlata Sharma 1 , Hitesh Harsora 1 and Bayode Ogunleye	An Optimal House Price Prediction Algorithm: XGBoost [2]	TThe authors employed several ML techniques, including XGBoost, to predict house prices. They performed feature engineering and hyperparameter tuning to optimize the models.
2022	Nachiappan M, Mohammad Imran	House Price Prediction using Machine Learning [3]	Data Collection,Data Preprocessing.Feature Engineering,Model Selection ,Training and Validation,Evaluation
2022	Abigail Bola Adetunjia,Oluwatobi Noah Akande, Funmilola Alaba Ajala,Ololade Oyewo,Yetunde Faith Akande, Gbenle Oluwadara	House Price Prediction using Random Forest Machine Learning Technique [4]	Involves creating an ensemble of decision trees,each trained on random subset of the data and using majority voting for classificationfor regression.
2023	Kumar, Ujjwal, Rishu Kunwar, and Dr. Neha Garg	House price Prediction Using Machine Learning [5]	The method utilized the housing dataset available on Kaggle and provides a comparison of the performances of four machine learning algorithms. There are four machine learning algorithms linear regression, random forest, Decision tree and support vector regression. One with best accuracy will be used for predicting house price
2020	Quang Truong, Minh Nguyen, Hy Dang, Bo Mei	Housing Price Prediction via Improved Machine Learning Techniques [6]	It includes data preprocessing,data analysis,model selection like random forest,XGBoost and hybrid regression.
2019	G. Naga Satish, Ch. V. Raghavendran, M.D.Sugnana Rao, Ch.Srinivasulu	House price Prediction Using Machine Learning [7]	The authors has performed linear regression,Lasso regression ,multipal regression analysis,cost function,gradient boosting algorithm like Gradient Boosting,XGBoost,AdaBoost,Gentle Boost etc
2023	Hanxiang Zhang, Yansong Li and Paula Branco	Describe the house and I will tell you the price: House price prediction with textual description data [8]	In this paper authors have described the three main topics related to their work: statistical-based hedonic price models, machine learning models, and models that specifically make use of natural language processing techniques to tackle the house price prediction problem

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