HOUSE PRICE PREDICTION USING MACHINE LEARNING

ABSTRACT

House price prediction is a critical aspect of real estate, financial planning, and urban development. Accurate forecasting helps buyers, sellers, and policymakers make informed decisions. This study explores the application of advanced machine learning algorithms—Support Vector Machines (SVM), Random Forest (RF), and Gradient Boosting Machines (GBM)—for predicting house prices. These algorithms were trained and evaluated on a dataset containing features such as location, size, number of rooms, and market trends.Support Vector Machines leverage hyperplanes to classify data, making them robust for handling non-linear relationships. Random Forest, an ensemble method, offers high accuracy by aggregating predictions from multiple decision trees, while Gradient Boosting optimizes predictive performance through iterative refinement. The models were evaluated using metrics such as Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE). Comparative analysis highlights that GBM achieves superior accuracy due to its ability to minimize bias and variance effectively, whereas RF provides robust performance with interpretable outputs. SVM, while effective, is sensitive to hyperparameter tuning.

The findings demonstrate that machine learning algorithms can significantly improve the accuracy and efficiency of house price prediction, enabling data-driven insights for stakeholders. Future work can extend this study by integrating deep learning methods and incorporating real-time data for enhanced prediction.

KEYWORDS-House price prediction, machine learning, Support Vector Machine (SVM), Random Forest (RF), Gradient Boosting Machine (GBM), real estate, predictive modeling, regression analysis, feature engineering, model evaluation.

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