Rajalakshmi Engineering College

**Department of Artificial Intelligence & Machine Learning**

III Year (2025 – 2026) - AI23521: Build and Deployment of ML app Mini Project - Abstract

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| **Title** | House Price Prediction System Using Machine Learning: An End-to-End Web Application | |
| **Team Members** | **Reg. No.**  **1. 231501146**  **2.**  **3.** | **Name**  **Sanjay R** |
| **Project Mentor** | V. Vijayabhaskar, Assistant Professor (SG), Dept. of AIML | |
| **Project ID** |  | |

**ABSTRACT:**

This project develops a comprehensive machine learning-based system for predicting residential property prices, encompassing the complete pipeline from data preprocessing to production deployment. Using the Ames Housing dataset from Kaggle containing 1,460 properties with 79 features, we will perform extensive data cleaning including missing value imputation, outlier treatment, and feature engineering to create derived variables such as house age, total living area, and quality indicators. Multiple regression algorithms will be implemented and compared—starting with Linear Regression as a baseline, followed by Decision Trees, Random Forest, and Gradient Boosting methods (XGBoost and LightGBM)—to identify the optimal model. Hyperparameter tuning using Grid Search and Randomized Search will optimize model performance, targeting an R² score above 0.90 and RMSE below $20,000. Model evaluation will employ metrics including MAE, RMSE, R² score, and cross-validation to ensure robust predictions, while SHAP values will provide interpretable explanations for individual price estimates.

The trained model will be deployed as a RESTful API using FastAPI framework, exposing endpoints for real-time price predictions with comprehensive input validation and error handling. A user-friendly web interface built with HTML5, CSS3, and JavaScript will allow users to input property features through an intuitive form and receive instant price predictions along with visual feature contribution breakdowns. The entire application stack will be containerized using Docker to ensure consistent deployment across different platforms, enabling easy scalability and maintenance. Comprehensive documentation will detail the complete workflow including data exploration insights, preprocessing decisions, model selection rationale, API specifications, deployment instructions, and testing procedures, making the system production-ready for real-world applications by home buyers, real estate agents, investors, and financial institutions

SUPERVISOR REVIEWER