**Predicting house pricing using machine learning**

Abstract:

Accurate prediction of house prices is a complex yet vital task for various stakeholders in the real estate market, including buyers, sellers, investors, and appraisers. This research delves into the application of machine learning algorithms to construct predictive models capable of estimating housing values with high precision. We utilize a comprehensive dataset that incorporates a wide array of features influencing property prices, such as geographical location, living area, number of bedrooms and bathrooms, age of the property, presence of amenities, and local market trends. By employing a comparative analysis of several regression techniques, including linear regression, polynomial regression, ridge regression, lasso regression, support vector regression, random forest regression, 1 and gradient boosting regression, we aim to identify the most effective and robust model for this specific application. The performance of these models is evaluated using key metrics such as Mean Squared Error (MSE), Root Mean Squared Error (RMSE), Mean Absolute Error (MAE), and R-squared (R²) to determine their accuracy and reliability. Furthermore, we explore feature importance to understand the relative influence of different variables on house prices, providing valuable insights for real estate professionals. This study aims to contribute to the development of a sophisticated, data-driven tool that can enhance decision-making processes in the real estate market by providing accurate and reliable house price predictions, ultimately fostering transparency and efficiency in property transactions. The research also addresses potential challenges and limitations, including data quality, model generalization, and the dynamic nature of the real estate market, paving the way for future advancements in this domain.