Phase-1 Submission

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1.ProblemStatement

1. *In the real estate market, accurately predicting house prices is crucial for buyers, sellers, and investors.*
2. *However, due to market volatility and the influence of numerous variables such as location, size, condition, and neighborhood amenities, estimating property prices can be challenging.*
3. *This project aims to build a robust regression model to predict house prices with high accuracy, thereby aiding stakeholders in making informed decisions.*

2.Objectives of the Project

- *Develop a predictive model using regression techniques to estimate house prices.*
- *Analyze which features have the greatest impact on pricing.*
- *Evaluate the performance of different regression algorithms.*
- *Create an interpretable model that can assist in real-world pricing decisions.*

3.Scope of the Project

- *Key features to analyze: number of bedrooms, bathrooms, square footage, location, year built, etc.*
- *Focus on using public datasets (e.g., from Kaggle).*
- *Limited to regression-based models (Linear, Ridge, Lasso, Random Forest, XGBoost).*
- *Project will be implemented in a Jupyter notebook, not deployed.*

4.Data Sources

- *Dataset: Ames Housing Dataset from Kaggle.*
- *Public dataset, downloaded once (static).*
- *Contains a wide range of features useful for price prediction.*

Data Source:
https://www.kaggle.com/datasets/muhammadbinimran/housing-price-prediction-data

5.High-Level Methodology

- *Data Collection: Download from Kaggle.*
- *Data Cleaning: Handle missing values, outliers, and data formatting.*
- *EDA: Use seaborn/matplotlib for visualizations, correlation heatmaps.*
- *Feature Engineering: Encode categorical variables, log transformation, polynomial features.*
- *Model Building: Test Linear Regression, Ridge, Lasso, Decision Tree, Random Forest, XGBoost.*
- *Model Evaluation: Use RMSE, R^2 Score, Cross-Validation for evaluation.*
- *Visualization & Interpretation: Present feature importance, residual plots.*
- *Deployment: Not deploying in Phase-1; future deployment may use Stream lit.*

6.Tools and Technologies

- ***Programming Language:*** *Python*
- ***Notebook/IDE:*** *Jupyter Notebook*
- ***Libraries:*** *pandas, NumPy, seaborn, matplotlib, scikit-learn, xgboost*
- ***Optional Deployment Tools:*** *Stream lit or Flask (for future scope)*

7.Team Members and Roles

Name	*Role*	*Responsibilities*
Manoj M	*Data Acquisition& Initial Analysis*	*Responsible for data collection and preliminary analyses, ensuring the dataset is clean and ready for exploration.*
John Isaac K.	*EDA & Visualization Expert*	*Leads the exploratory data analyses (EDA) and assists in visualizing patterns and trends.*
Bharathi Kannan V. K	*Feature Engineering Lead*	*Incharge of feature engineering and transformation to enhance model performance.*
Ahisha J. P	*Model Development Tuning*	*Handles model selection, training and fine-tuning of various regression algorithms.*

Madhumitha V.	*Evaluation & Reporting Specialist*	*Oversees model evaluation, documentation, and presentation of results in a clear and structure format.*