# Project Documentation: House Materials Cost Estimation System

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## Project Overview

### Description

The House Materials Cost Estimation System is a Python-based application designed to help users estimate the costs of materials required for constructing a house. It integrates a machine learning model to predict the quantity of cement needed based on input parameters such as floor area and the number of rooms. Additionally, the system features a simple chatbot to assist users with queries related to the estimation process.

### Objectives

* To provide an interactive interface for users to input various construction parameters.
* To calculate the total costs of materials including cement, bricks, roofing, windows, doors, and flooring.
* Predicting the number of cement bags is required using a trained linear regression model.
* To assist users with a chatbot feature for queries and guidance.

## Technologies Used

* **Programming Language**: Python
* **Libraries**:
  + tkinter for GUI development
  + pandas for data manipulation
  + scikit-learn for implementing machine learning algorithms
* **Development Environment**: Visual Studio Code

## Installation

1. **Prerequisites**:

* Python 3. x installed on your system.
* Basic knowledge of Python and how to run scripts.

1. **Install Required Libraries**: Open a terminal and run the following command:
2. bash
3. Copy code
4. pip install pandas scikit-learn
5. **Clone the Repository** (if applicable):
6. bash
7. Copy code
8. git clone <repository\_url>
9. cd <repository\_directory>
10. **Run the Application**: Execute the Python script:
11. bash
12. Copy code
13. python main.py

## Features

### User Interface

* **Input Fields**: Users can input prices and quantities for various materials including cement, bricks, roofing, windows, doors, and tiles.
* **Calculate Costs Button**: Users can click this button to calculate and display the estimated costs based on the provided inputs.

### Machine Learning

* **Cement Prediction**: A linear regression model predicts the required number of cement bags based on the floor area and the number of rooms. The model is trained using sample data provided within the application.

### Chatbot

* **Interactive Chatbot**: Users can interact with a simple chatbot to get assistance regarding their queries. The chatbot can respond to predefined questions related to costs and materials.

## How It Works

1. The user enters the necessary parameters into the input fields.
2. When the user clicks the "Calculate Costs" button, the application retrieves the input values.
3. The system predicts the number of cement bags needed and calculates the total costs of all materials.
4. Results are displayed in a summary format.
5. The chatbot can be used to ask general questions about the estimation process.

## Future Enhancements

* **Data Collection**: Integrate a feature to collect user inputs and feedback to improve the machine learning model over time.
* **Advanced ML Models**: Explore other machine learning algorithms to improve prediction accuracy.
* **Graphical Representation**: Add visualization of cost breakdowns using graphs.
* **User Authentication**: Implement a user login system to save individual user estimates.

## Conclusion

The House Materials Cost Estimation System serves as a practical tool for anyone involved in construction planning. By combining cost estimation with machine learning and user support through a chatbot, this application aims to streamline the planning process and enhance user experience.