## **Project Overview**

The main goal of this project is to create a seamless experience for predicting housing prices using machine learning. This involves:

* **Backend**: A FastAPI server that hosts a machine learning model to predict housing prices based on input features.
* **Frontend**: A React-based user interface for collecting user inputs and displaying predictions.

## **Directory Structure**

source\_code/  
├── models/ # Contains pre-trained model files  
│ ├── house.pkl # House price prediction model  
│ └── student.pkl # Model for calculating student count (for additional feature usage)  
├── src/ # React front-end code  
│ ├── App.js # Main React component  
│ ├── components/ # Sub-components for user input and chart display  
│ ├── InputForm.js # Input form for collecting user data  
│ └── Charts.js # Component for displaying data charts (future improvement)  
│ └── index.js # React entry point  
├── main.py # FastAPI backend file  
├── requirements.txt # Python dependencies  
├── README.md # Project documentation  
└── package.json # Node.js dependencies for frontend

## **Setup Instructions**

### **Prerequisites**

* **Python** 3.x
* **Node.js** and **npm**
* **FastAPI** and other Python libraries specified in requirements.txt

1. **Set up a virtual environment** for Python.

bash

python -m venv venv  
source venv/bin/activate # On Windows: venv\Scripts\activate

1. **Install the required Python libraries**.

bash

pip install -r requirements.txt

1. **Run the backend server**.

Bash

uvicorn main:app --reload

The server should now be running at <http://127.0.0.1:8000>. You can access the FastAPI docs at <http://127.0.0.1:8000/docs>.

### **2. Frontend Setup (React)**

1. **Install Node.js dependencies**.

bash

npm install

1. **Start the React development server**.

bash

npm start

The frontend should be running at <http://localhost:3000>.

## **Running the Application**

1. **Ensure both servers are running** (FastAPI backend on port 8000 and React frontend on port 3000).
2. **Interact with the app** by entering the required information into the form on the React front end. The data will be sent to the FastAPI server, and a predicted housing price will be returned.

## **API Endpoints**

### **POST /predict**

* **URL**: <http://127.0.0.1:8000/predict>
* **Description**: Predicts housing prices based on input features.
* **Request Body**:

json

{  
 "Rooms": int,  
 "Postcode": str,  
 "Bathroom": int,  
 "Car": int,  
 "Landsize": float,  
 "Year": int,  
 "Type": str  
}

* **Response**:

json

{  
 "predicted\_price": float  
}

## **Frontend Usage**

* **Input Form**: Enter the required housing details in the form fields.
* **Predict Button**: After entering the details, click "Predict" to get the estimated housing price. The prediction result will display on the page.

## **Future Improvements**

1. **Enhanced Data Visualization**: Implement charts in Charts.js to visualize historical price trends and other relevant data.
2. **Model Optimization**: Explore additional features or alternate models to improve prediction accuracy.
3. **Deployment**: Deploy both the frontend and backend to a cloud platform for easy access.
4. **Error Handling**: Improve validation and error messages on the frontend and backend.

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