Hostel Recommendation System for Female College Students in Pune

# 1. Project Overview

The primary goal of this project is to provide female college students in Pune, Maharashtra, India, with a system that recommends suitable hostels and paying guest (PG) accommodations based on their individual preferences. A key requirement is that the recommended hostels must be located in proximity to the user's selected college and should be under budget. Furthermore, the system employs a Linear Regression model to calculate and display a suitability percentage for each relevant hostel, indicating how well it aligns with the user's specific needs. The system streamlines the often time-consuming and challenging process of finding appropriate housing by filtering options based on college proximity, rent, amenities, and room type, and then ranking them by suitability.

# 2. System Architecture

The project employs a web-based architecture with the following key components:

\* Frontend: A user interface built with React and JSX.  
\* Backend: A Flask server handling requests and model integration.  
\* Database: MongoDB atlas for data storage.  
\* Machine Learning Model: Linear Regression for suitability prediction.

# 3. Frontend Details

\* Technology: React, JSX, React Router, CSS, Framer Motion (optional).  
\* Components: Hostel Card.  
\* User Flow: Home > Form > Recommendations.

### 1. Home Page

Introduction to the service and features

And get started button, directing o preference form page

### 2. Preference Form Page (Main input for the ML model)

Form Fields:

•college: dropdown for college options

• rent Range: slider 1000- 10000

• Room Type: Options like Single, Double, Shared

• Amenities Needed: Checkboxes for Food, Laundry, WiFi, AC, Security, Geyser, Attached Bathroom, CCTV, RO Water, Parking, Cleaning, Fridge, Warden.

• Hostel type: Select from Hodel and PG

Action Button: “Show Recommendations” – On submission, user preferences are sent to the backend ML model, and recommendations are received

### 3. Recommendations Page

Displays a list of recommended hostels in a clean card layout.

Each hostel card includes: hostel\_name, college, address, contact\_number, rent, room\_type, amenities, safety\_priority, rating, distance\_to\_college, hostel\_type

# 4. Backend Details

\* Technology: Flask (Python).  
\* Functionality includes routing, API endpoint `/get\_recommendations`, proximity filtering, model integration, and MongoDB interaction.

# 5. Database Details

\* Technology: MongoDB atlas  
\* Stores fields like hostel\_name, college, address, contact\_number, rent, room\_type, amenities, safety\_priority, rating, distance\_to\_college, hostel\_type

# 6. Key Technologies Used

\* Frontend: React, JSX, CSS.  
\* Backend: Flask, Python, PyMongo, scikit-learn.  
\* Database: MongoDB.

# 7. Machine Learning Model Details

\* Model: Linear Regression.  
\* Output: Suitability score as percentage.  
\* Includes feature engineering and training.

# 8. Synthetic Data Creation

\* Script: `data\_generation.py` using Faker.  
\* Attributes include : hostel\_name, college, address, contact\_number, rent, room\_type, amenities, safety\_priority, rating, distance\_to\_college, hostel\_type

# 9. List of Colleges in Pune

    "Fergusson College",

    "Symbiosis College of Arts and Commerce",

    "College of Engineering (COEP)",

    "MIT World Peace University (MIT-WPU)",

    "Brihan Maharashtra College of Commerce (BMCC)",

    "Sir Parashurambhau College (SP College)",

    "Nowrosjee Wadia College",

    "Ness Wadia College of Commerce",

    "Pune Institute of Computer Technology (PICT)",

    "Vishwakarma Institute of Technology (VIT)",

    "Cummins College of Engineering for Women",

    "Dr. D. Y. Patil Institute of Technology, Pimpri",

    "Modern College of Arts, Science & Commerce",

    "Deccan College Post Graduate and Research Institute",

    "ILS Law College",

    "Armed Forces Medical College (AFMC)",

    "Maharashtra Institute of Technology (MIT)",

    "Sinhgad College of Engineering",

    "AISSMS College of Engineering",

    "PICT Model College"

# 10. List of Amenities (Considered)

\* Food, Laundry, WiFi, AC, Security, Geyser, Attached Bathroom, CCTV, RO Water, Parking, Cleaning, Fridge, Warden.