# Research Project II Synopsis

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Course Name: Research Project II

## 1. Title of the Research Project

Hostel Recommendation System for College Girls Using Machine Learning

## 2. Abstract

In metropolitan cities, college-going girls face difficulty in finding hostels that match their needs regarding safety, affordability, amenities, and location. This project aims to develop a personalized Hostel Recommendation System using machine learning techniques. Based on user preferences such as budget, location, safety, and required facilities, the system will recommend hostels that best match their profile. The model will be built using content-based filtering and similarity metrics to provide accurate and relevant suggestions. This system is designed to enhance convenience and security for female students seeking accommodations.

## 3. Introduction

### 3.1 Background Information

In recent years, there has been a significant rise in the number of female students migrating to urban areas for higher education. Cities like Pune, Bangalore, and Mumbai are home to numerous colleges and universities that attract students from different regions. With this rise, the demand for safe, affordable, and well-located hostels for college girls has also increased. However, the process of finding suitable accommodation remains largely manual, time-consuming, and often uncertain.

### 3.2 Problem Statement

Despite the increasing number of hostels, there is no intelligent system available that can help female students find hostels tailored to their preferences. Students often rely on online listings or word-of-mouth, which may not always provide complete or personalized information. There is a clear need for a system that recommends hostels based on important factors such as location, safety, rent, room type, and required amenities.

### 3.3 Research Objectives

- To collect and preprocess hostel-related data including amenities, location, rent, ratings, and reviews.  
- To understand user preferences based on filters like budget, location, and amenities.  
- To design and implement a content-based filtering recommendation model.  
- To evaluate the accuracy and relevance of recommendations using appropriate metrics.  
- To visualize and interpret the recommendation results for usability.

### 3.4 Scope of the Study

This research focuses on creating a recommendation model specifically for college-going girls in urban areas. The system will be trained using synthetic or collected hostel datasets. It will offer basic features like preference input and ranked hostel suggestions. Advanced features like real-time availability, reviews, or bookings are out of scope for this version but can be implemented in the future.

## 4. Literature Review

Several studies and projects have explored recommendation systems in domains such as movies, e-commerce, and tourism. Most of these use content-based filtering or collaborative filtering models.

Resnick et al. (1994) introduced GroupLens, a collaborative filtering system that laid the foundation for modern recommender systems.

Sarwar et al. (2001) analyzed item-based and user-based collaborative filtering techniques, highlighting the effectiveness of cosine similarity.

Patel et al. (2020) implemented a real estate recommendation model using machine learning, which inspires the application of similar principles to hostel recommendations.

However, few studies focus specifically on hostel recommendations for female students. This project aims to address this research gap by offering a tailored solution.

## 5. Research Methodology

This project adopts an experimental research approach with the following framework:

• Data Collection Methods: A synthetic dataset of hostel information will be created or sourced from public listings. It includes attributes such as hostel name, rent, amenities, room type, safety score, and location.  
• Tools and Technologies: Python, Pandas, NumPy, Scikit-learn for ML model development, Streamlit for UI.  
• Analysis Techniques: The system uses content-based filtering with cosine similarity to match hostels to user preferences. Evaluation will be based on accuracy and relevance of recommendations.

## 6. Expected Outcomes

The system is expected to produce a functional machine learning model capable of recommending hostels based on user preferences. The user interface will display hostel suggestions ranked by similarity scores. This project will demonstrate the effectiveness of content-based filtering in solving real-world problems related to student accommodation.

## 7. Significance and Contribution

This research provides a practical application of machine learning in the field of education and accommodation. It simplifies the hostel selection process for college girls and enhances safety and convenience. From an academic perspective, the project contributes to the growing body of work in recommendation systems and promotes the use of ML for socially impactful solutions.

## 8. Timeline

• Week 1: Finalize project topic, define scope and objectives  
• Weeks 2–3: Collect or create dataset  
• Week 4: Preprocess and clean data  
• Weeks 5–6: Develop and test ML model  
• Week 7: Build a simple user interface  
• Week 8: Evaluate model and display recommendations  
• Week 9: Prepare final report and synopsis

## 9. References

1. Resnick, P., Iacovou, N., Suchak, M., Bergstrom, P., & Riedl, J. (1994). GroupLens: An open architecture for collaborative filtering of netnews.  
2. Sarwar, B., Karypis, G., Konstan, J., & Riedl, J. (2001). Item-based collaborative filtering recommendation algorithms.  
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4. Scikit-learn Documentation – https://scikit-learn.org  
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