ABES Engineering College (032)

Mini Project (RCA451)

Project name : ***Cafebuddy***

Hotel Recommendation System and Review classification on hybrid model using Machine learning.

Team Members :

Tarun Goyal (2018MCA3033)

Shikha Sharma (2018MCA3026)

Mentor : Mrs Surbhi Sharma

Outline

1. Introduction
    1. Problem statement
    2. Objective
    3. Modules in the project
    4. Role of team members
2. Literature survey
3. Proposed method
4. UML Diagrams
    - ER Diagram
    - Use case Diagram
    - Class Diagram
    - Package Diagram
    - Activity Diagram
5. Functional and Non-Functional Requirements
6. Technologies and Tools used in project
7. Conclusion

Problem statement

The problem we have addressed by creating this project is to build and test a complex Hotel recommender system that works on hybrid model means unlike any traditional Recommender system which uses a single approach to recommend hotels to the user, we are combining 3 different approaches of collaborative filtering technique to recommend hotels to the user based on his requirements and refined personal interests.

By doing so, we anticipate the user will get very personal and useful recommendations easily without providing much of his/her details and with maximum accuracy possible .

Objective of the project

The fundamental idea behind the project is to develop an application for Hotel recommendation system and review classification using latest machine learning algorithms and implement a web based platform where user can get Hotel recommendations based on his requirements and interests.

User can also see detailed information about a particular hotel and list all the reviews that are classified as positive and negative.

Not only this, he can also submit his own reviews that are also classified during the time of submission.

Modules in the Project

1. Recommendation system using Popularity based (on rating and review count)

2. Recommendations based on user interests that are determined by his browsing activity and those interests will be used to find matching hotels to be recommended by KNN algorithm over several different attributes.

3. Classification of reviews by labelling each of them with positive, negative classes by performing semantic analysis using Natural language Processing with Bag of words model.

Roles of team members:

- Tarun Goyal

  Developing the backend system for the application.

  Coding the logic for recommendation system by machine learning.

  Implementation and deployment of the project.

  Handling database operations.

- Shikha Sharma

  Handling design phase for the project by creating UML diagrams.

  Suggesting ideas for UI/UX.

  Responsible for optimizing the frontend of the system.

Literature Survey

We have gone through numerous research papers and online articles that have helped us building the project that we are extremely thankful for.

A Hotel Recommendation System Based on Collaborative Filtering

[https://ieeexplore.ieee.org/document/5474286]

Hotel Recommendation Based on Hybrid Model – CS229

[http://cs229.stanford.edu/proj2016spr/report/041.pdf]

Hotel Recommendation Based on Hybrid Recommendation Model – NevoProjects

[https://nevonprojects.com/hotel-recommendation-system-based-on-hybrid-recommendation-model/ %5D

Proposed Method

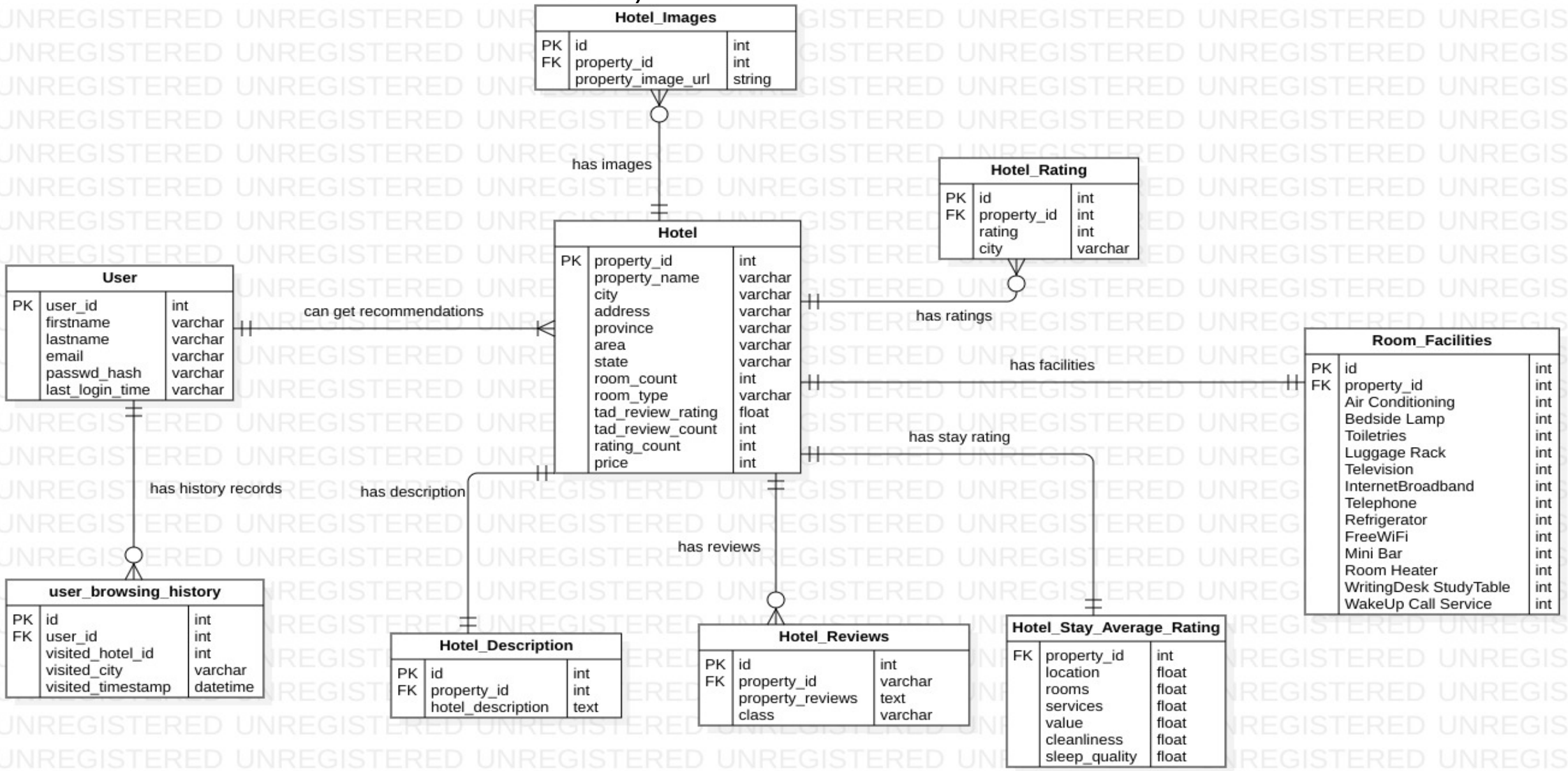
We’re using hybrid model that includes 3 different approaches to recommend a hotel to a user.

- Popularity based.
- Collaborative filtering to find matching hotel using KNN algorithm over user interests from his browsing activity.
- Review classification by performing NLP on each review using NLTK packages available in python.

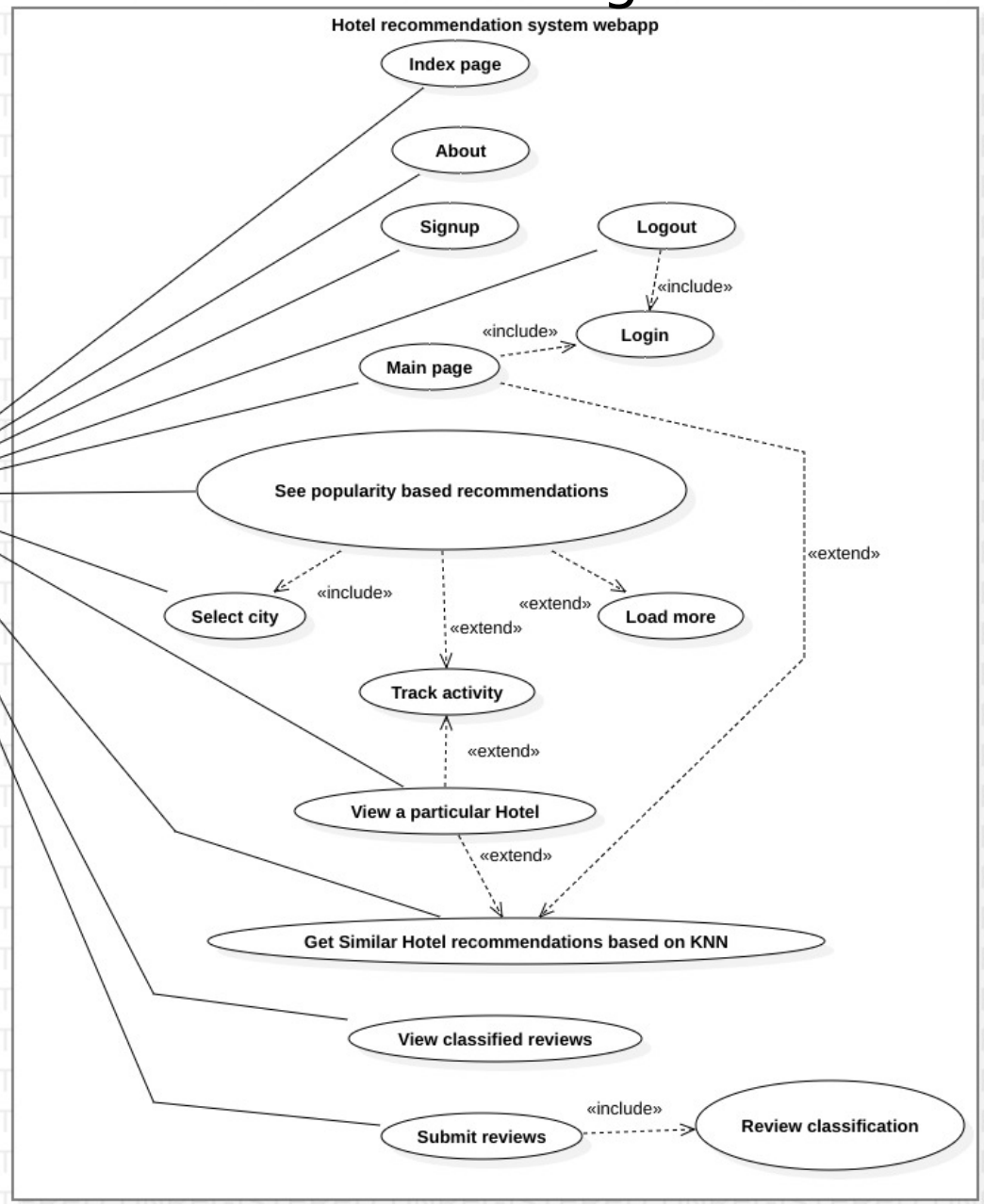
To create a Web application using Python ***Flask*** framework that work on MVC architecture.

To design UML Diagrams and use them for implementation of a live project.

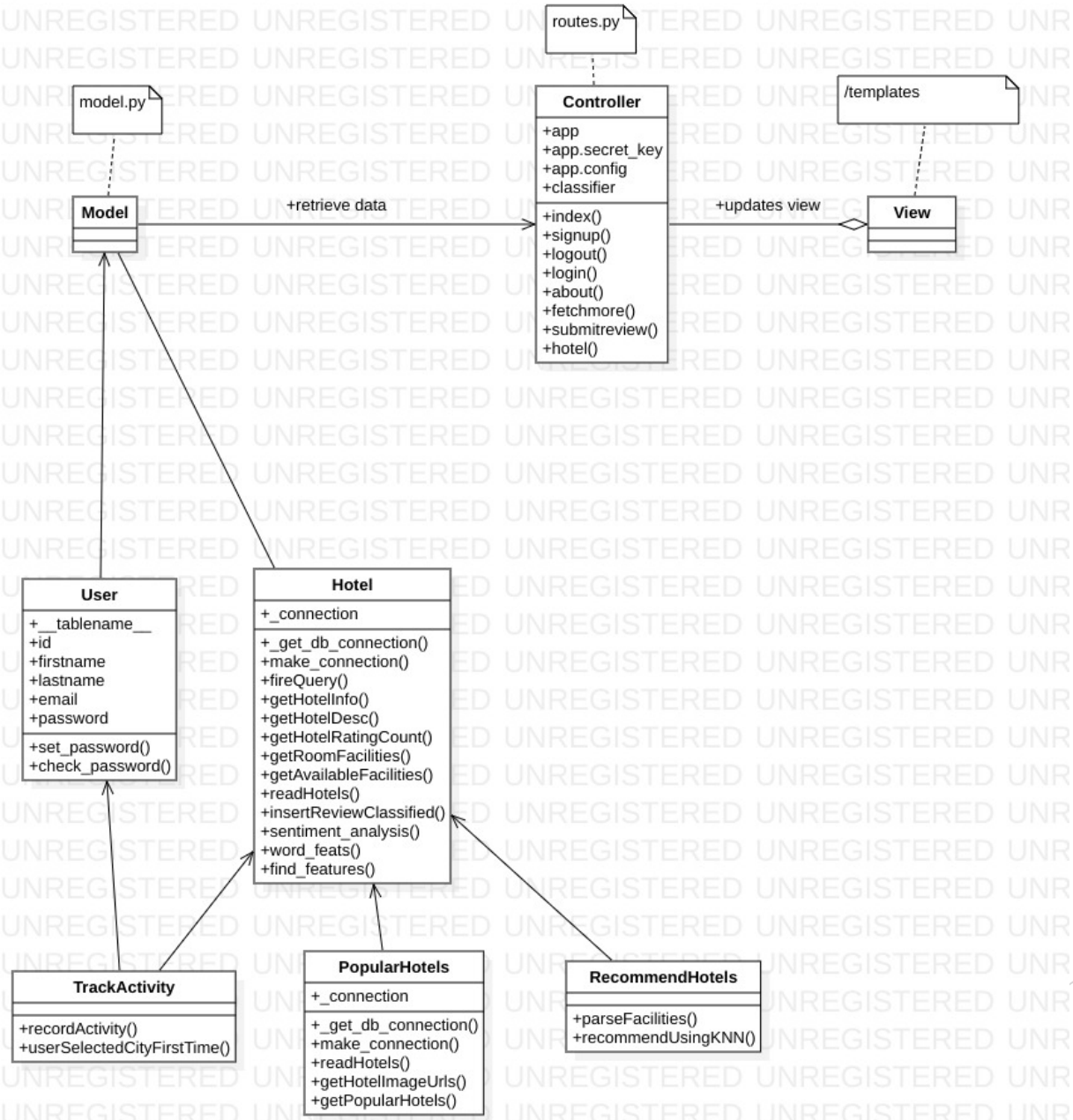
E-R Diagram (Relational model for database)



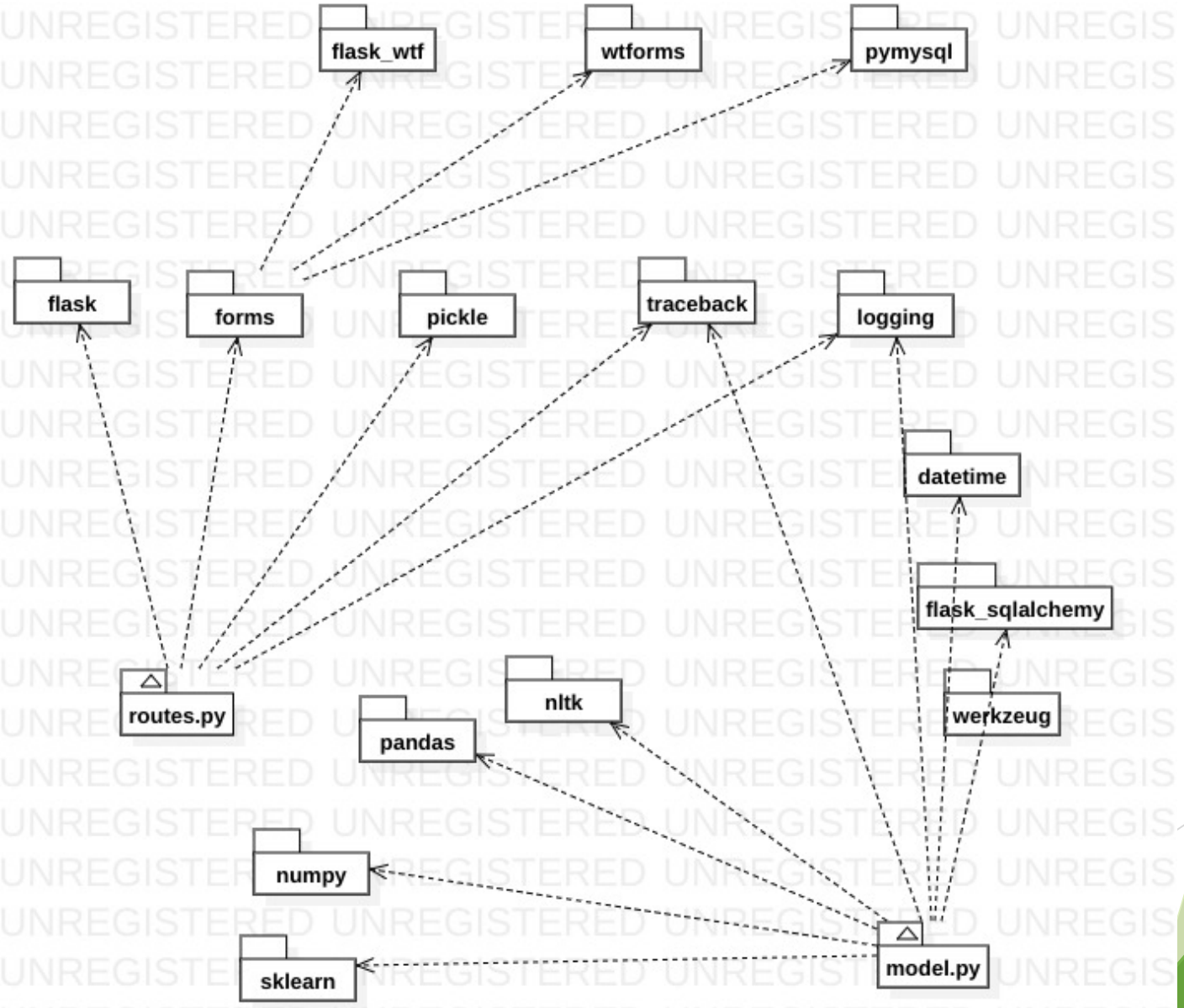
Use case Diagram



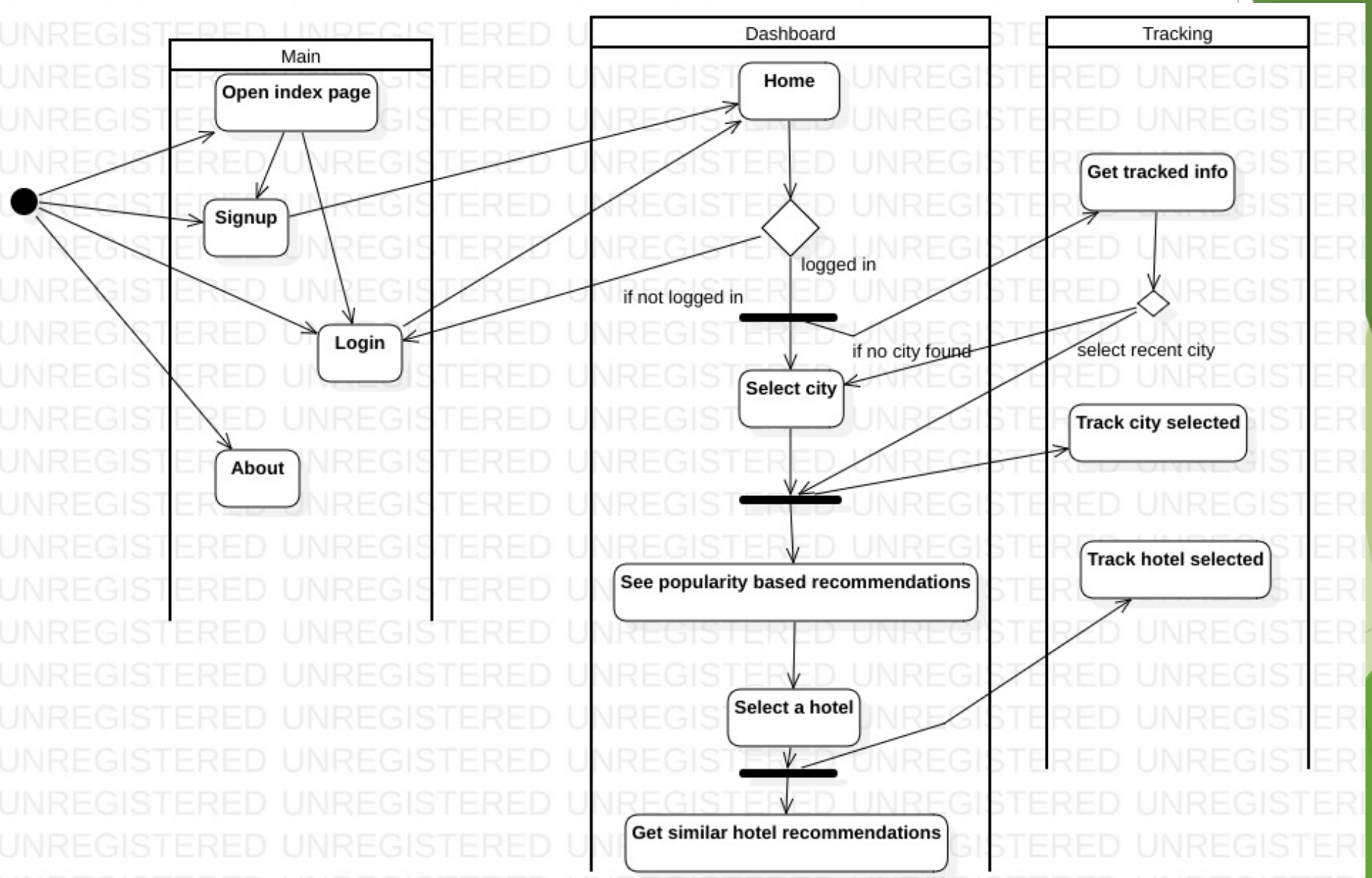
Class Diagram (MVC pattern)



Package Diagram



Activity Diagram



Functional requirements

1. When a user has signed up, then he must be redirected to main/home page.
2. If user is on main page, he can logout from the system through the logout button.
3. When user selects a city, then system should recommend the hotels to him based on popularity index.(no. of ratings)
4. When user selects a particular hotel, the hotel page will display all the details of hotels such as its name, city, address, amenities available.
5. On the hotel page, further recommendations should be displayed to the user based on selected hotel using KNN algorithm over attributes such as amenities, rating count and price.
6. A review classification section should show the classification of reviews given to the hotels.

Non-Functional requirements

1. A user has to sign up to see the home page and get recommendations.
2. Home page can only be accessed if the user is logged in.
3. A user has to select a city if it is using the system for first time in order to get recommendations.
4. Upon selection of city and/or hotel, user browsing activity is tracked in database.
5. Then if the user logs in again, he must be provided with the recommendations based on his previous browsing activity.

Technologies used in the project

- **Python 3.6:**
  - *Pandas*, Scilearn, Numpy (for machine learning)
  - Sql-alchemy and pymysql for handling the database connectivity.
  - Automator.py (self written) for automating dataset to the database
  - Python framework for web app: Flask

- **For front-end**:
  - J-Query, AJAX, wt-forms, etc.

- **For Back-end**:
  - Gunicorn server for python
  - MySQL for DBMS

- **For version control**:
  - Git and Github

- **For SE diagrams**:
  - StarmUML

Tools used in the project

- **Linux Ubuntu 18.04 as OS**
- **PyCharm IDE for python code and VCS operations**
- **Github for hosting repository for VCS**
- **Heroku as PaaS cloud provider for deployment**
- **etc.**