System Design Description
For
Digital Twin of a Smart Building

By
Nuren Samia
Sushanta Saha
Issac Fatokun
Nino Lahiani
Arshavee Das
Shreyas Harinath
Soumya Kumbar

1. Use case Diagram

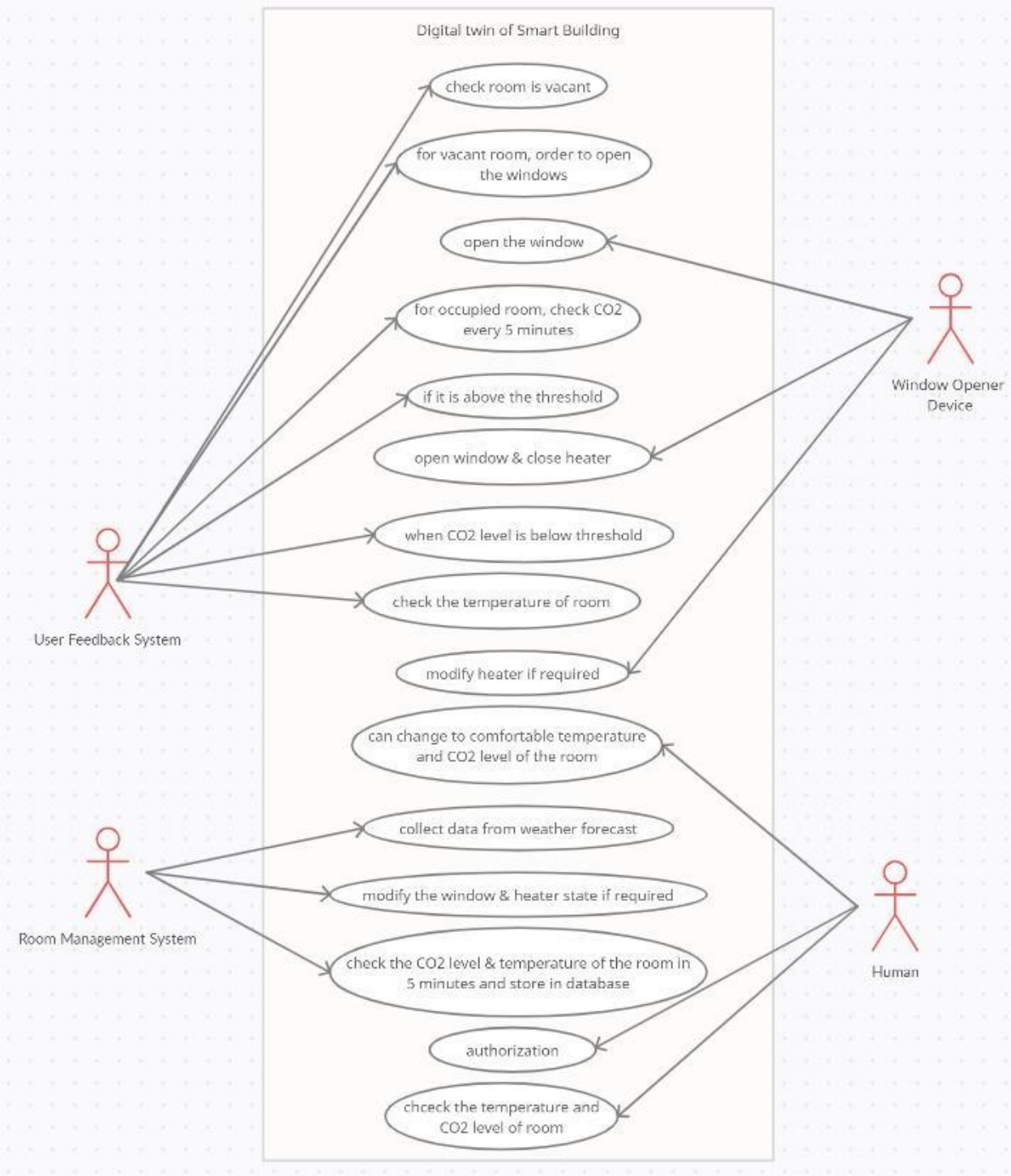

Fig.1 Illustrates the Use Case diagram of Digital Twin of a Building.

There are four actors involved:-

- Window Opener Device
- User Feedback System
- Room management System
- Human

1. User_device will collect the temperature and CO2 level of the room.
2. Visualize this information to the user
3. User can change comfort temp and change the mode
4. user_ device will change the mode for the user
5. user can able to open/ close the window with the help of the User_device and window_device.
6. user will log in to their portal and can see the CO2 level, the temp of the room.
7. Room_manager will connect with wifi and collect weather information from the weather forecasts.
8. Room_manager will connect and collect data from the user device.
9. Room_manager will save data in the Database.
10. Room_manager It will analyze the data.
11. Room_manager will turn on / turn off the Heater.

2. Activity Diagram

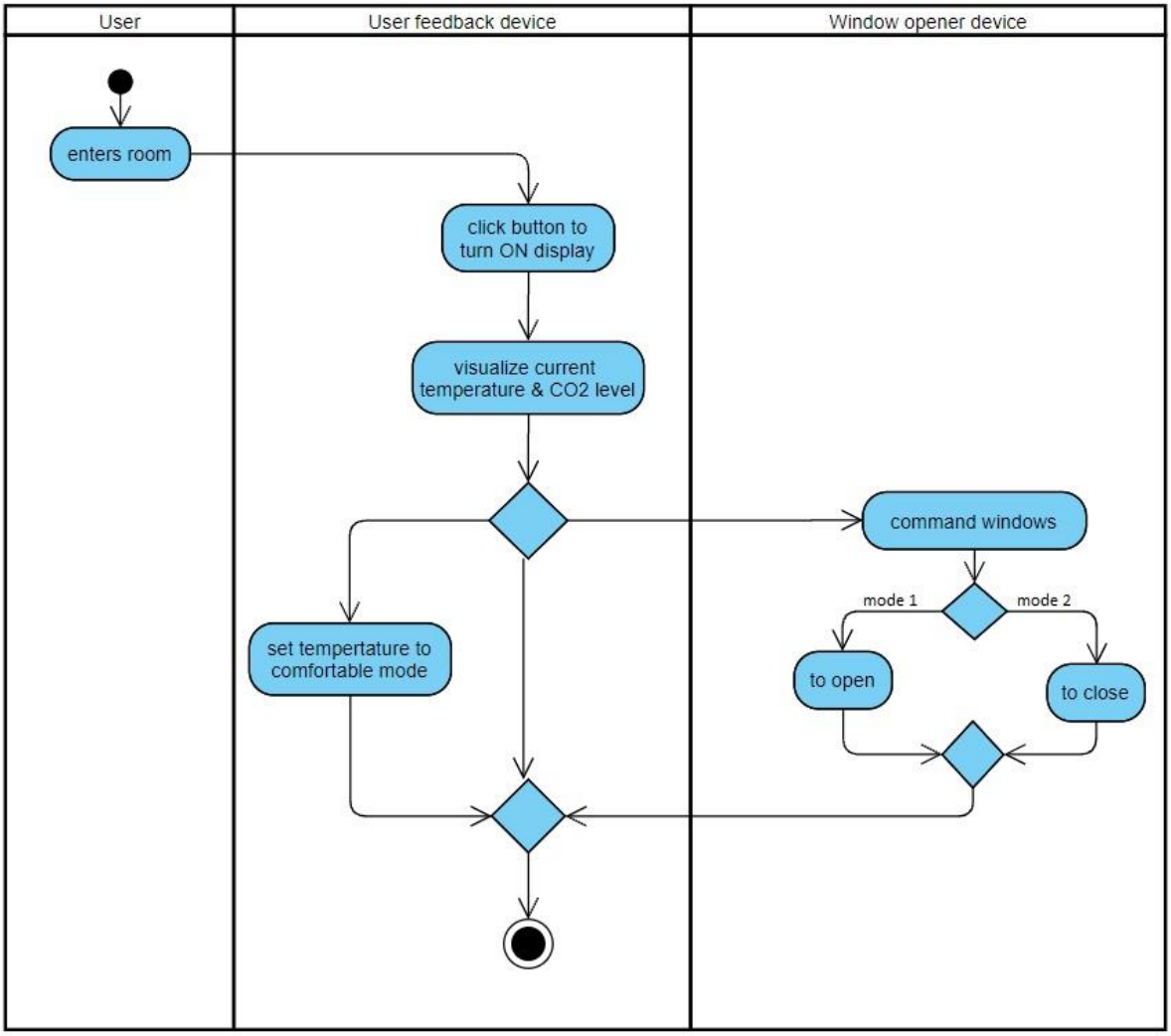

Fig.2.1 Illustrates the Activity Diagram when user wants to check the temperature, CO2 level and change the status of the window, taking decision based on the levels of CO2 and room temperature

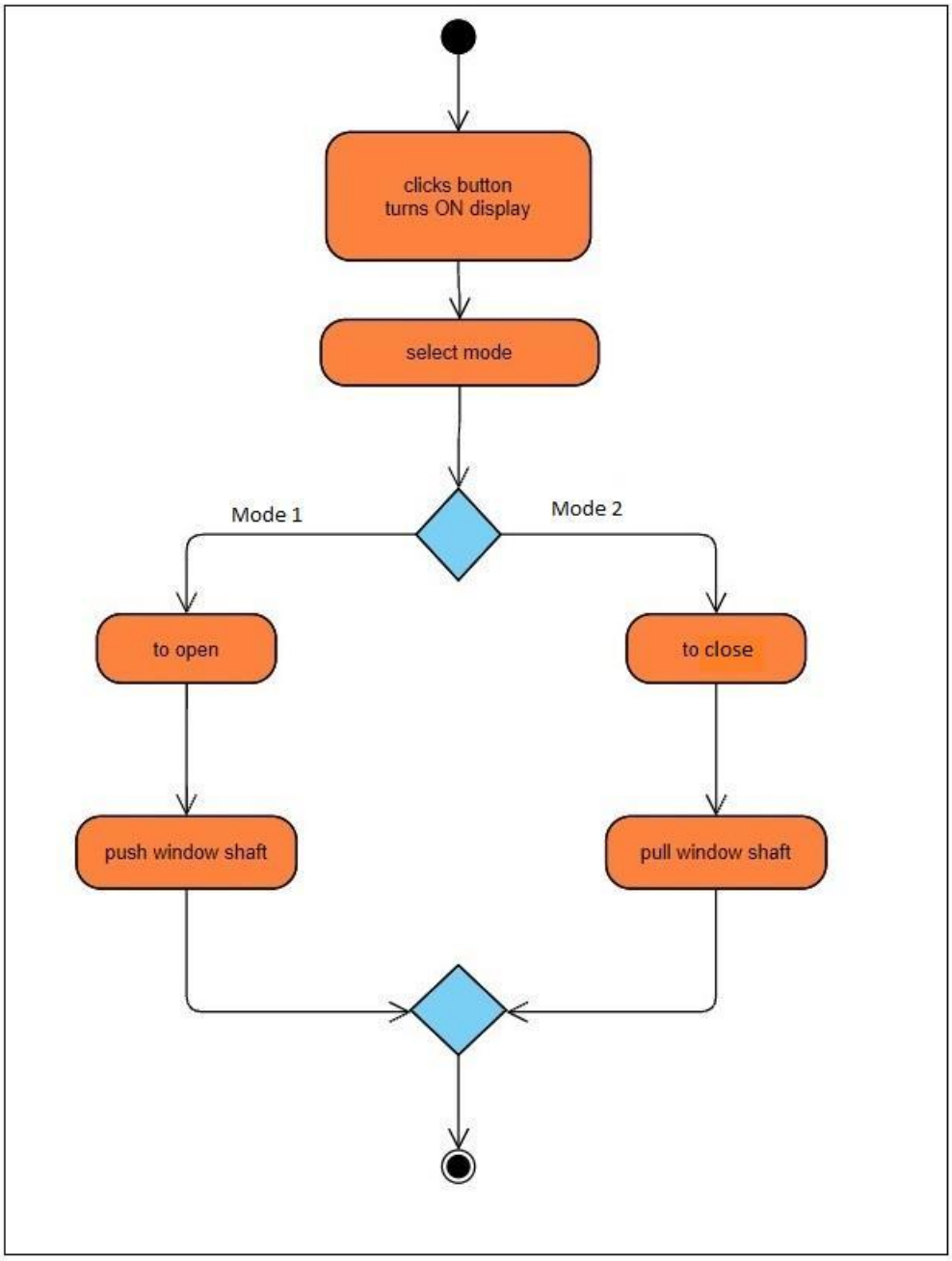

Fig.2.2 Illustrates Activity Diagram when user wants to change the status of windows

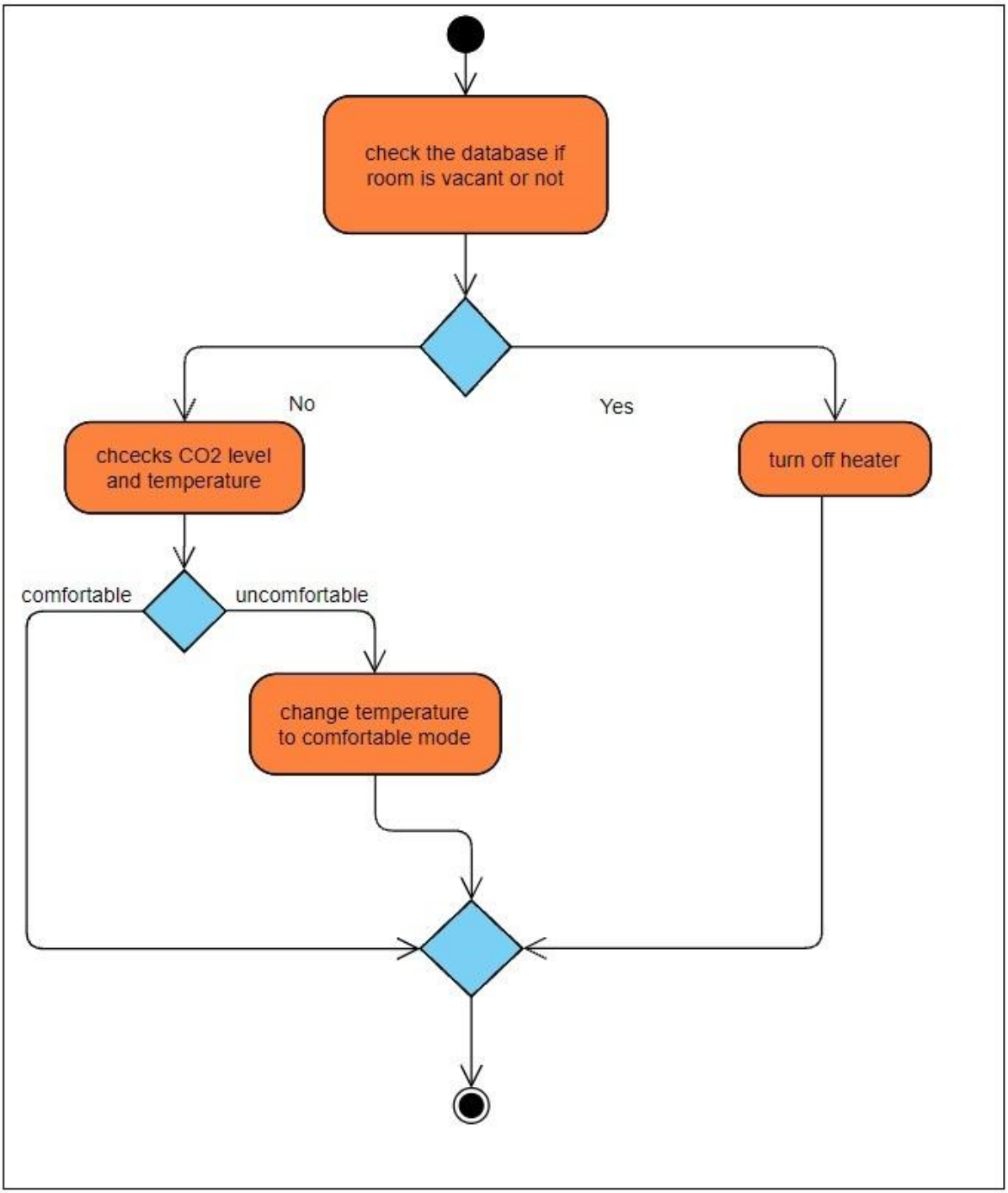

Fig.2.3.Illustrates Activity Diagram when Room management system is accessing Database for the room status to check the Temperature levels and CO2 levels.

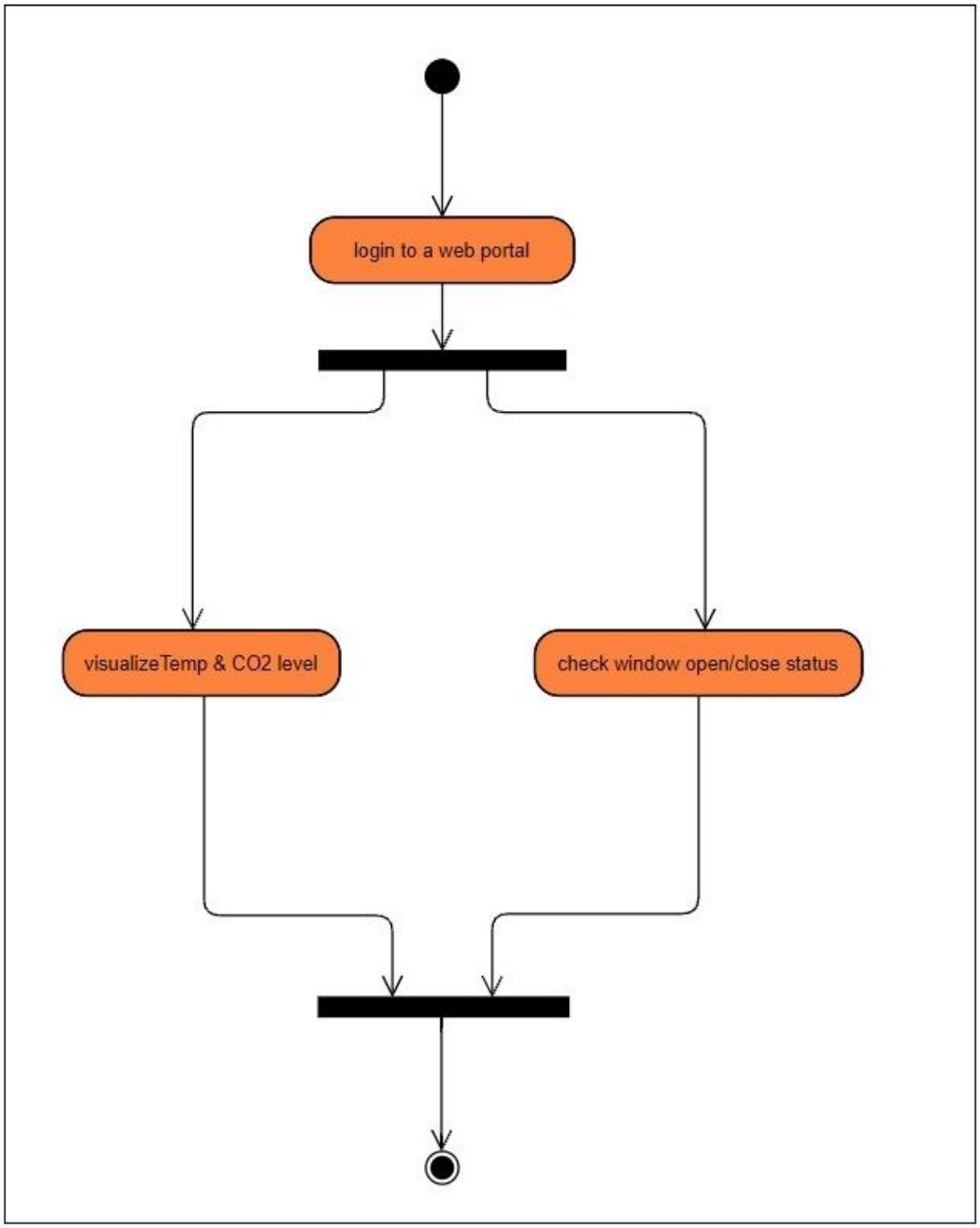

Fig.2.4. Illustrates Activity Diagram when an authorized user wants to login to web portal and visualize the history of temperature and CO2 levels

3.Class Diagram

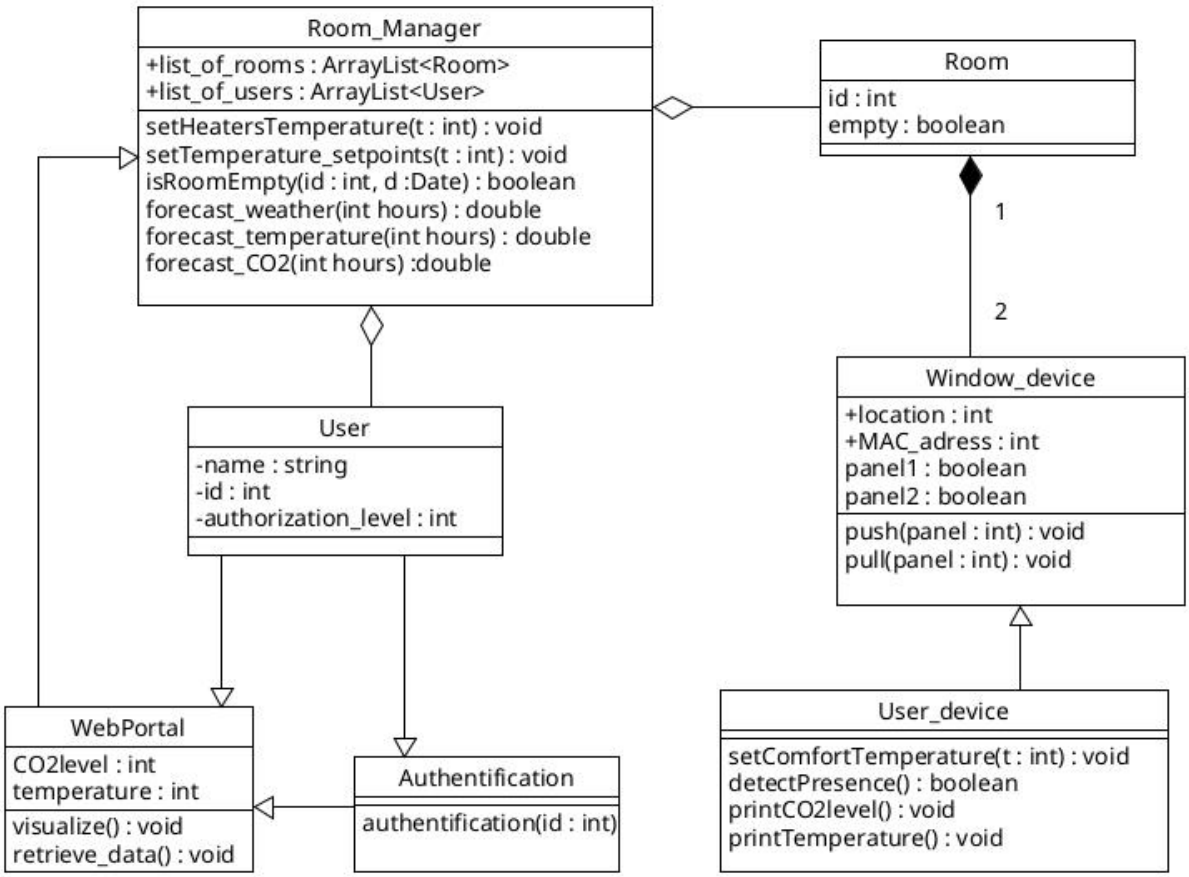

Fig.3.Illustrates Class Diagram

4. Communication Diagram

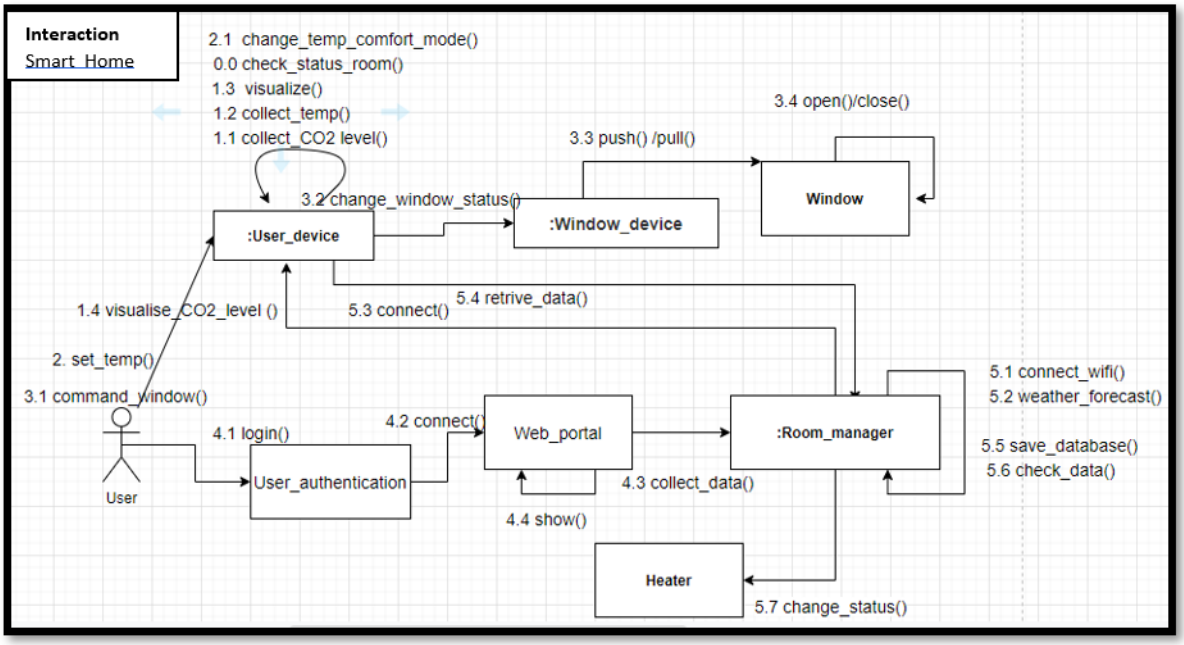

Fig.3 Illustrates Communication Diagram

4. Sequence Diagram

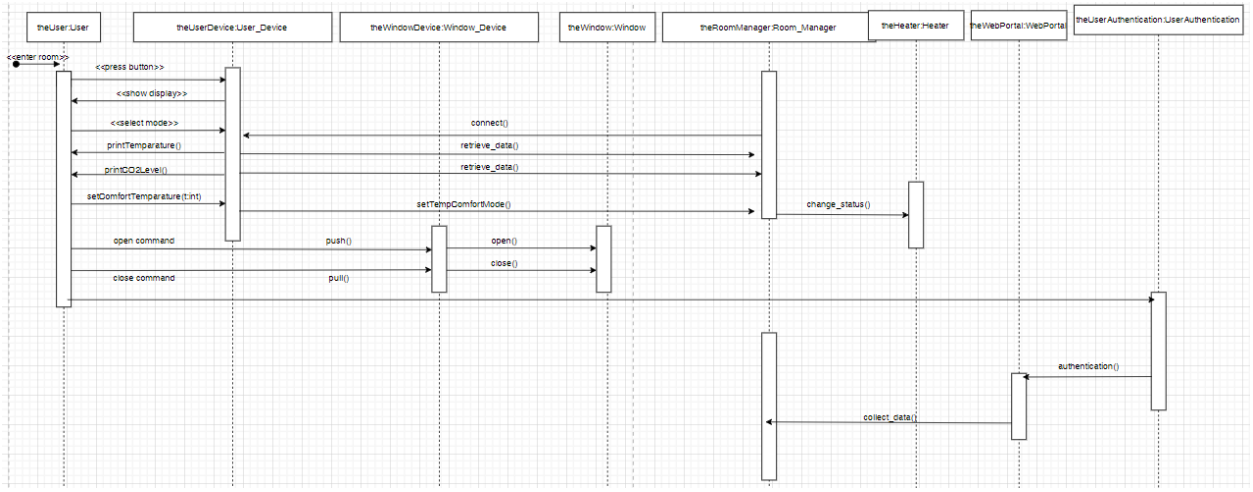

Fig.4. Illustrates Sequence Diagram