Candidate Assignment: HVAC Data Processing and PPO Model Training

Objective:

Your task is to analyze the provided HVAC dataset in the CSV format. You will use the dataset to train a Proximal Policy Optimization (PPO) model using the Stable Baselines3 or PyTorch libraries. Finally, you will be producing a continuous action of feature "Valve" ranges in between 0-100.

Provided Data:

The dataset contains HVAC-related sensor readings, including various environmental and operational parameters. Additionally, you are provided with an outside weather condition dataset as well. Key features include:

The dataset includes sensor readings from an HVAC system. The key features are:

- **Time and Date (ts):** The exact moment each reading was recorded. Useful for identifying patterns over time.
- **Valve Control Values:** The target action to be predicted. This represents the position of a valve that controls how much heating or cooling is applied.
- **Occupancy Level (Occp):** Shows occupancy in zone (1: occupancy available, 0: not available)
- **Humidity Levels (RaHumidity)**: The amount of moisture in the air. Proper humidity control improves comfort. (Inside building humidity)
- **Temperature Sensors (RaTemp, SaTemp):**
  - **RaTemp**: Measures the temperature of air returning to the system. (Inside building
  - temp.)
  - **SaTemp:** Measures the temperature of air being supplied to the space. (Inside building temp.)
- **Energy Consumption (Thermal Energy)**: How much energy the system uses. Optimizing this helps save energy and costs.
- **Weather Data:**
  - **main.temp:** The outside ambient temperature of the building.
  - **wind.speed:** The wind conditions around the building.

- ○ **clouds.all:** The cloud covering percentage around the building (how much sunlight is blocked).
  - ○ **main.humidity:** The humidity conditions around the building.
- The data may contain missing values, outliers, or noise that require proper preprocessing before model training.

Task Breakdown:
1. Data Preprocessing and analysis for your understanding
2. Initiating OpenAI Gymnasium environment and preparing your own customized environment.
3. Write your own customized reward strategy.
4. Initiate PPO model either from a stable baseline or pytorch or write your own custom thing.
5. Train PPO Model
6. Evaluate PPO performance over the time.
7. Finally, prepare a report and discuss the predicted action and how we can improve the results?

Submission Guidelines:
- Ensure the ***report is included*** in the repository.
- Submit the project as a ***GitHub repository or a compressed folder (.zip)***.
- Submit your ***Python notebook***, clearly adding details of each step performed.

Deadline: FiveWorking Days

For any clarifications, feel free to ask. Good luck!