**Global Challenges facing Reinforcement Learning in Building control**

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Global warming has in the past being directly attributed to the increase of greenhouse gases and CO2 in the atmosphere. Over the past few decades, there have been an increase in the number of buildings construction projects being undertaken. Buildings consume 40% of global energy and emit 30% of greenhouse gas emissions, while also increasing CO2 emissions by 50–90%. This effectively means that majority of the emissions are from buildings. To mitigate this, there need to be a way of monitoring these gases within individual buildings and informing authorities in case a building violates the defined optimum values. This requires a solution integrated to the buildings themselves that helps take the best action based on the state and levels of C02 detected. For peak performance, the solution should perform a round the clock monitoring of the building environment and provide a notification incase there is some anomalies. Reinforcement learning can play a big part by picking the best action based on the current environment and observations space. We chose to implement reinforcement learning in C02 as it will help in raising alarms in case the amount of CO2 emitted in or by a building go beyond the recommended values.

The workings of the reinforcement algorithm will be as follows: first we will define its environment and parameters and the rewards for an action taken, then we will initialize the environment by giving it some random observations, we will then train the model by using neural networks and some of the algorithms defined in stable\_baselines3. The model will then be saved and evaluated based on the total rewards.

We hope that our proposed system model will help in early identification of dangerous fluctuations of C02 levels which would be useful in various use cases including underground construction and identification of factories violating the stated emission guidelines.

In conclusion, we aim to use reinforcement learning to help in detection of CO2 leaks which could help in saving lives in case of gas leaks and also help individual homes and factories comply with the state regulations.

**References**

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