Smart Building Control Combining Model-based and Model-Free Approaches

Reinforcement learning and model predictive control are promising model-free and model-based optimal control approaches for dynamic systems. However, there are still many challenges when they are applied to real-world systems (e.g., buildings) due to their model-free/model-based features. A model predictive control guided reinforcement learning scheme will be developed merging their strengths to overcome the challenges.

The project aims to develop a novel control and optimization scheme combining deep reinforcement learning and model predictive control for smart control of building systems including cooling, heating, ventilation and lighting.

The project tasks include: (1) Setup a live testbed in buildings on Cornell campus, (2) develop a scheme combining model-based and model-free approaches and apply it to the live testbed.

Maximum students: 5