Green-Aware Edge Computing for Robotics

Toyota

TOYOTA

Goal

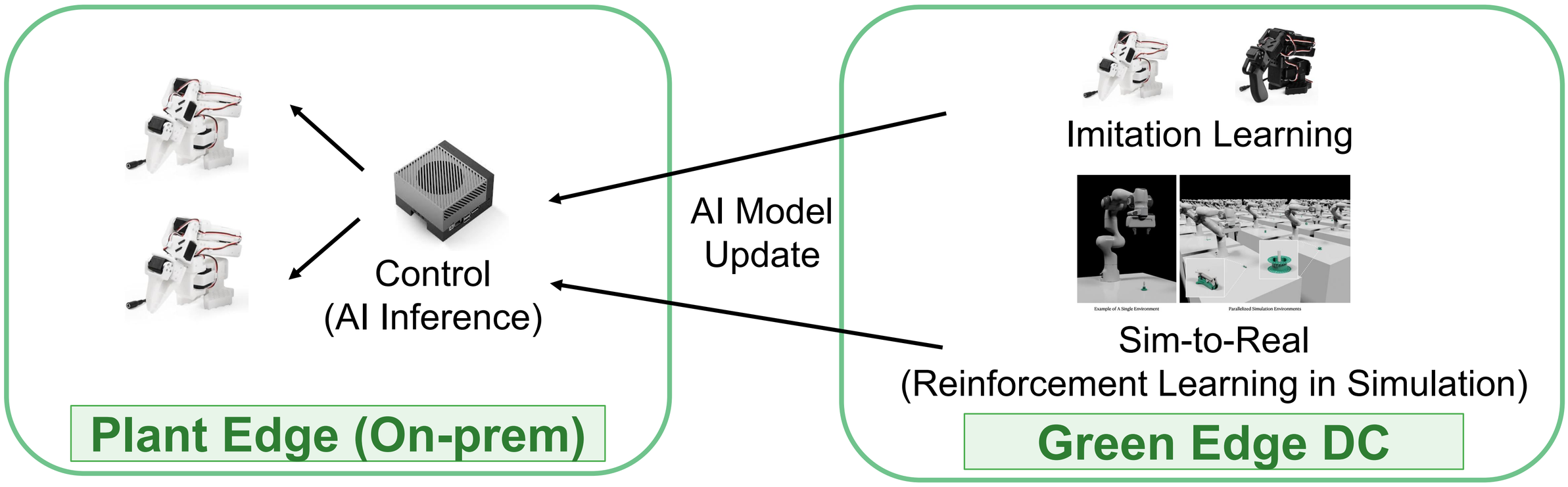
Reducing the carbon footprint of vehicle production is a critical challenge

While AI for robotics is expected to enhance manufacturing, its training requires power-intensive GPU clusters

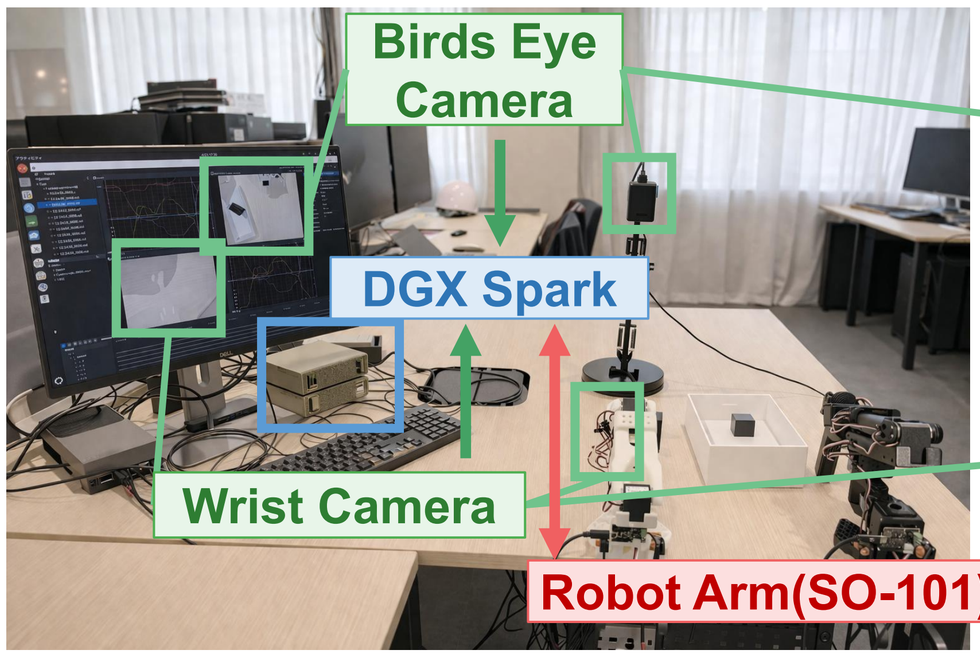
→By prioritizing green energy-powered DCs for manufacturing AI training, we can significantly reduce overall carbon emissions.

Demo Overview

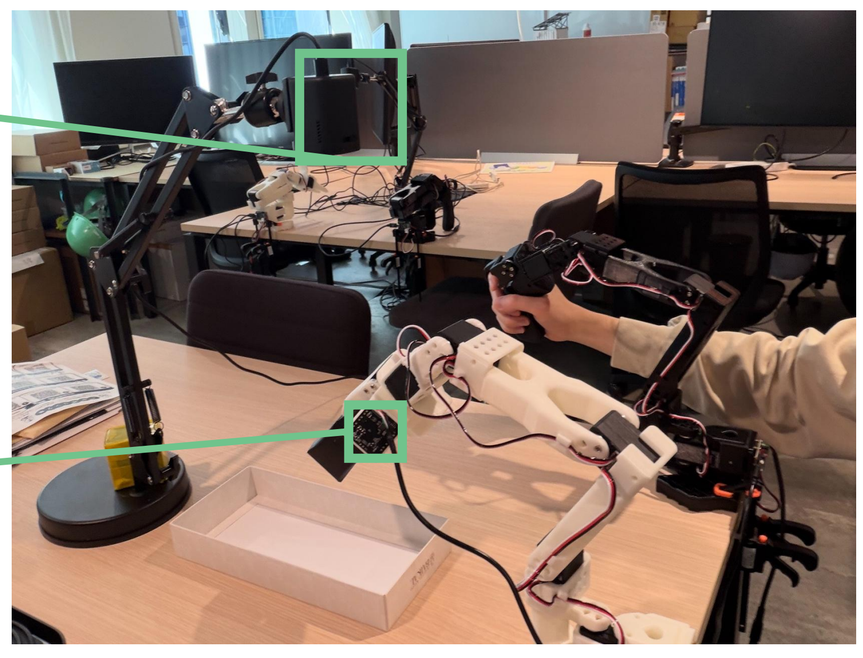
- Robot arms are controlled by AI running on GPU devices
- The robot arm AI is trained on GPU servers in data centers powered by green energy
  - Imitation learning based on human demonstrations
  - Reinforcement learning through large-scale trials in simulated physical environments



Enabling Technology



Experimental Setup Overview

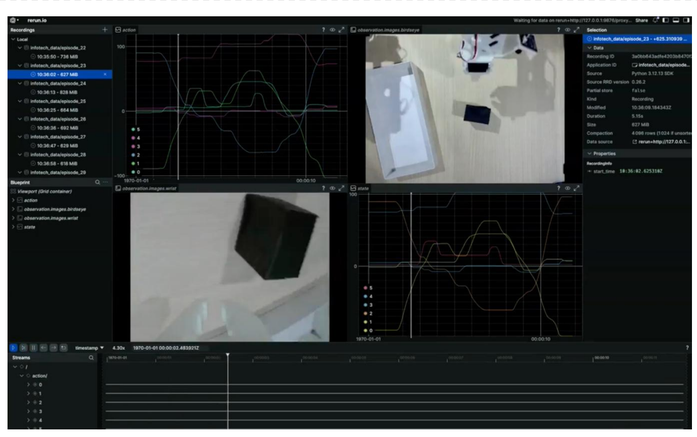


Recording Box-Grasping Episodes

Imitation Learning:
Collecting training episodes by manually guiding the leader arm

Robot Arm [SO-101]:
Open-source low-cost 6-DoF robot arm

LeRobot
Open-source Python framework for Physical AI



Training dashboard:
ACT model training on NVIDIA DGX Spark