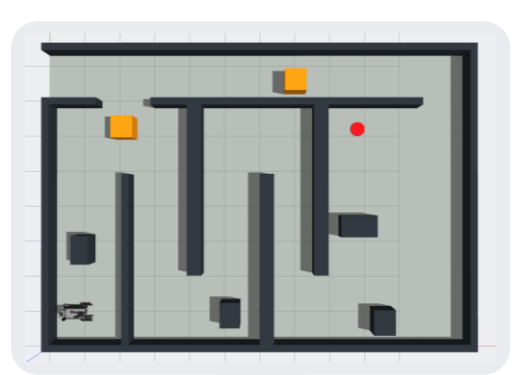
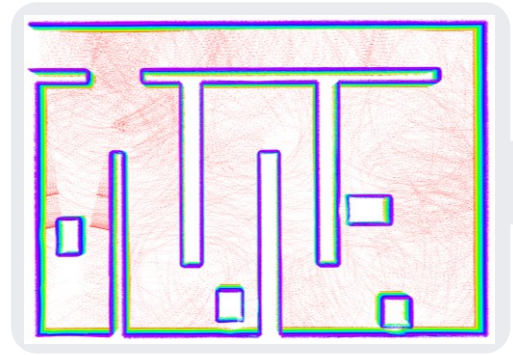




SLAM



Key
Blocking-
Obstacle
Inference

Manipulation-Feasible
Obstacle
Relocation Planning

- Geometric Feasibility
- Manipulation Feasibility
- Navigation Feasibility

Failure

Success



LLM

Dependency
Reasoning

Auxiliary
Obstacles

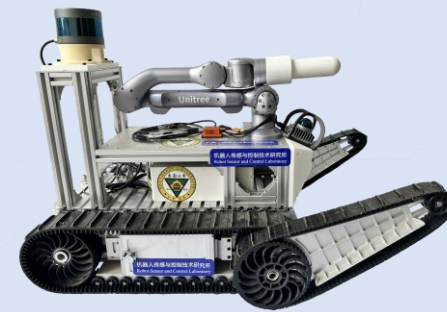
NAMO Path

Path
Planner

High-Level NAMO
Planning

Navigation-Only Path

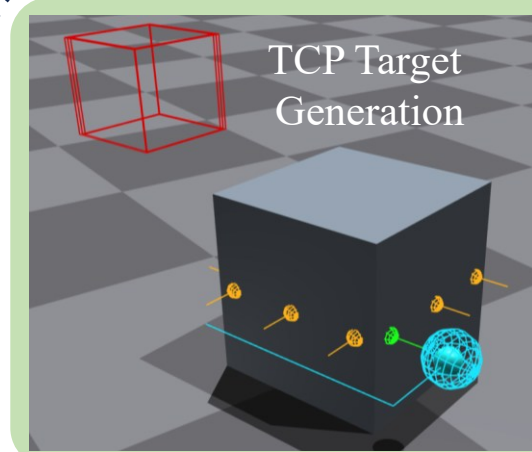
Candidate
Plan
Evaluation
& Selection



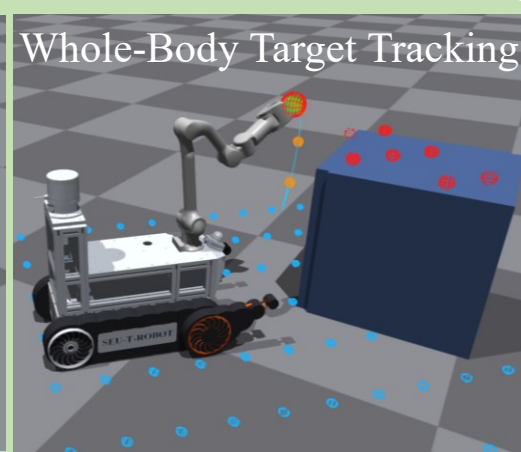
- Left/Right Track Velocities
- Arm Joint Position Targets

Interactive Controller

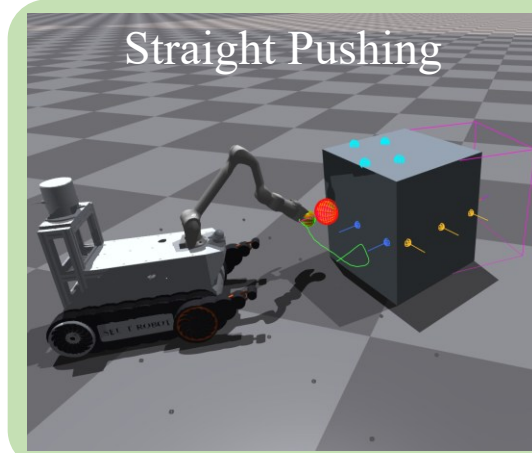
Tracking Controller



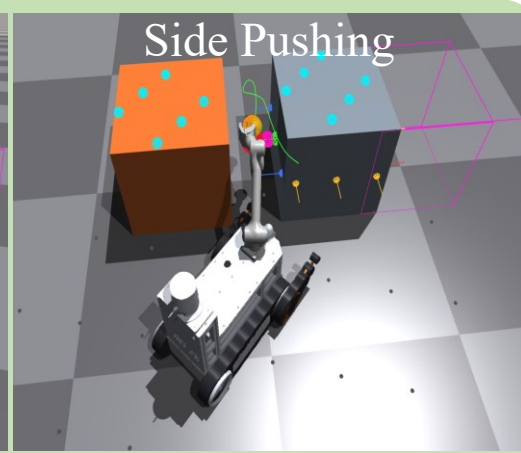
TCP Target
Generation



Whole-Body Target Tracking



Straight Pushing



Side Pushing