Smart Robotic Arm in Unity Game Simulation

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(Website: https://github.com/lijinlunbeng/Project-RobotArm-)

Introduction:

- The robotic arm should recognize and grab specific objects on the conveyor belt.

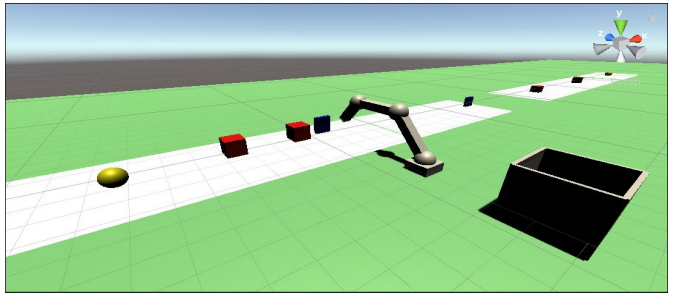
Techniques:

- We used Unity to build the game, and used our own image processing program to identify the objects.

PART I : UNITY GAME

- Enable specific modifications to many features of an object.
- Enable built-in physics algorithm of Smart Robotic Arm.
- Allow transmitting objects
- Simulated scene
- Integrate action logic of the robot
- User can choose the target objects
- Image processing algorithm separated from scripts

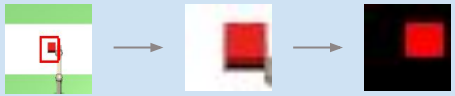
Data & Image Supply



Control Signal

PART II : IMAGE PROCESSING

- Take screenshots
- Identify objects
- Analyze RGB array pixels
- Acquire targets from UI
- Give external control to Unity



Methods

Object Identification: Image RGB array analysis and pixel calculation
Interactive Control: Accessing external files with instructions
User Interface: A control panel for the user to choose targets manually

Results

- Ability to distinguish and grab specific objects.
- System extendable for applications and future improvements
- Logs, progress tracking and prompts for debugging
- UI for choosing targets manually

Future Works

- Implement more object identification methods
- Make the game simulation more accurate and practical
- Improve robustness of the system