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Vision-Guided Robotic Arm Part 2

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Project Description

Completed

- Robotic arm construction
- Simple Raspberry Pi CV object detection
- Keyboard controls for arm

In Progress

- Hardware-software integration
- Inverse Kinematics

Goals for this Semester

- Finish In-Progress Tasks
- Extend functionality to include other use cases

User Experience

Scenario 1

After finishing a small project, the user activates the arm. The system scans the workplace, identifies scattered tools or materials, and relocates them to the side for cleanup.

Scenario 2

A child is finished playing with his toys on a desk, the parent activates the arm. The system scans the desk, identifies the toys (e.g. blocks, figurines), and relocates them in a bin.

Project Goals

Learn more about computer vision, inverse kinematics, and motor control.

Gain hands-on experience in programming a functional robotic platform using sensor data to react to the real world.

Extend the knowledge we've learned so far to a project that involves both hardware and software.

Technologies

ROS2

- Robot Operating System
  - Used to tie various parts of the robot together
  - Industry standard

OpenCV

- Computer Vision Library
  - Camera Interface
  - Object Detection
  - Facial Detection

NumPy

- Inverse Kinematics
  - Still researching

LeRobot

- Motor Interface Library
  - Calibrate and move motors
  - Upgrading from keyboard control

Questions?