Waste Collection and Sorting System

Team 18

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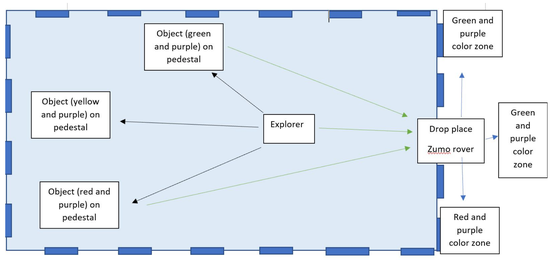
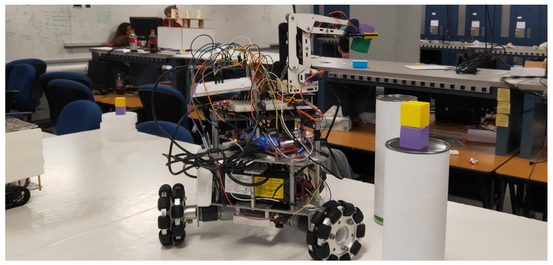
Project Overview

- Four major parts are
  - Sensors
  - Triangular rover
  - Arm
  - Zumo rover
- Rover searches for objects and drop zone.
- Inside drop zone, zumo rover sorts objects depending on their colors.





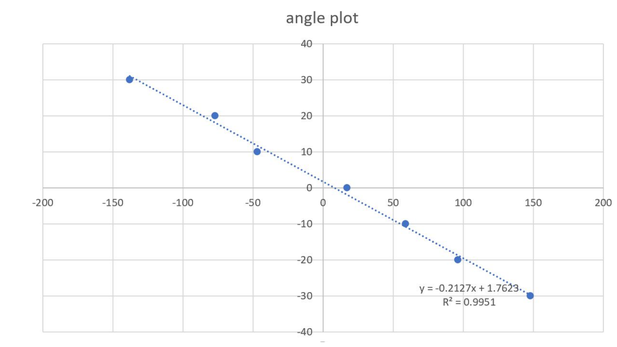
Interesting Aspects

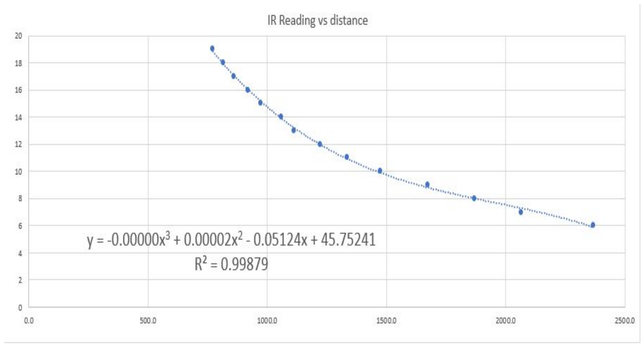
Navigation

- Pixy cam:
  - Identify target blocks
  - Calculate angles
- Rover:
  - Rotate clockwise when no object.
  - P-control for angles continuously.
- Edge case:
  - Rover stops position itself when pixy cam lose the sight of the targeted object.
  - Rover backs up and rotate 180 degree after drop.

Robotic Arm

- Arm:
  - Pick up and hold the object
  - Drop the object
- Edge case:
  - IR sensor on the arm can line up with target object
  - Arm can calculate the distance of object between the arm

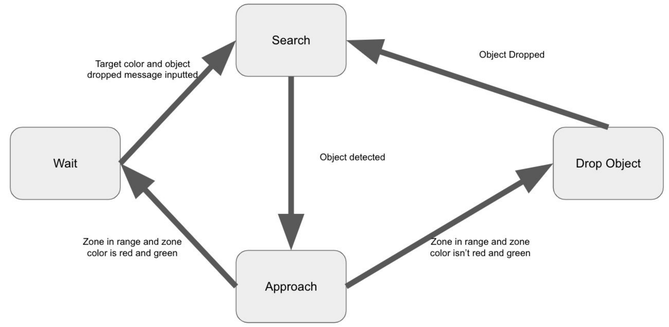




Zumo rover

Comprised of

- Zumo Rover
- IR Sensor
- Servo
- Pixy Cam2



States

- WAIT
  - Wait for color and dropped state messages from sensors and arm
- SEARCH
  - Rotate clockwise
- APPROACH
  - Move straight to zone
- DROP
  - Servo pushed object off rover

Sensors:

- Ultrasonic sensor Maxsonar-EZ1
  - Used for long range distance measurement.
  - Serial (UART) input.
  - Self-built inverter is applied
- IR sensor
  - 10 - 80 cm range for short distance.
  - Provide a comfort distance for the arm.
  - A lookup table is created for ADC input