Trash-Can for lazy people

Group 2

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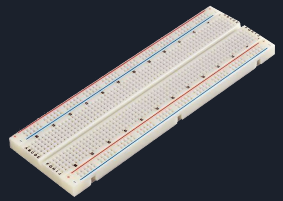
Project Description

This project utilizes the Wio Terminal to classify between cans and plastic bottles, to properly separate into different bins

Hardware

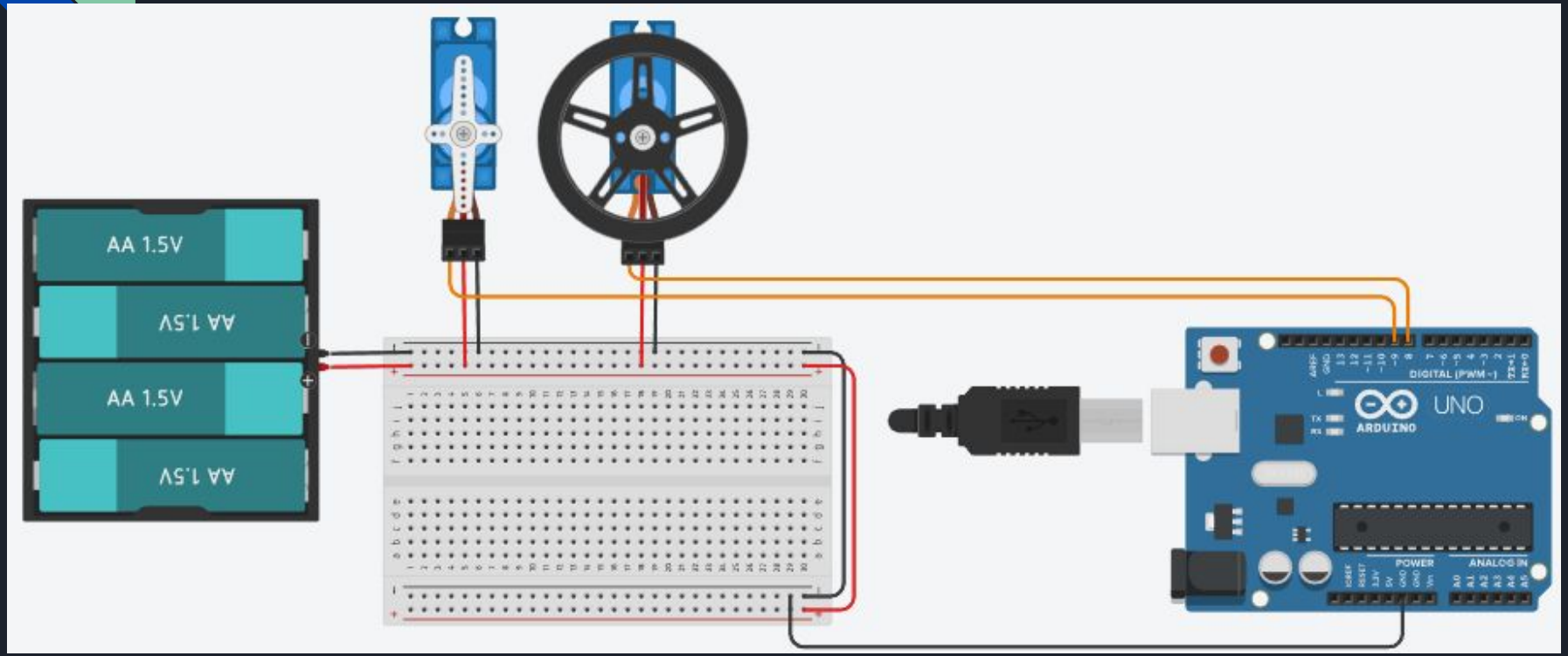
- Arduino Uno
- 2 ServoMotors (MG 996R)
- Notebook Camera
- Breadboard



Software

- Arduino IDE
- Roboflow YOLOv8

Circuit


AA 1.5V
AA 1.5V
AA 1.5V
AA 1.5V
UNO
ARDUINO
DIGITAL (PWM~)
POWER
ANALOG IN

Training With YOLOv8

Preprocessing

Resize Stretch to 640×640	Edit
Grayscale	Edit
Auto-Adjust Contrast Using Contrast Stretching	Edit

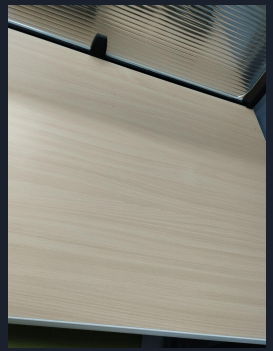
Data Augmentation

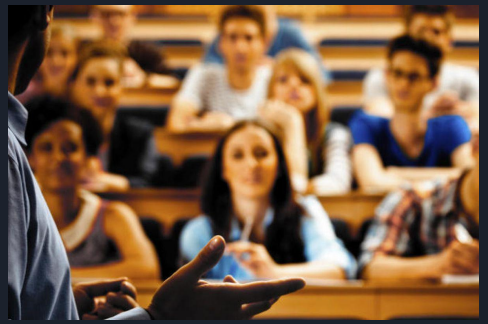
- Rotation
- Crop(35%max zoom)
- Grayscale (7%)
- Saturation (-10 , 10)
- Brightness (-39, 39)
- Blur
- Noise
- Exposure
- Shear

Training With YOLOv8

Others Implementation

While training the model, it is also crucial to use some photographs as a background so that the model can improve its performance by recognizing the surroundings and correctly classifying the object.





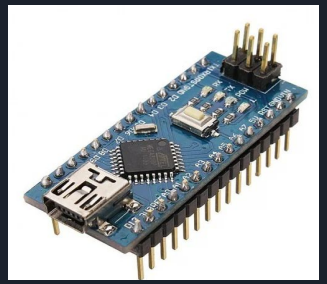
Functional System working

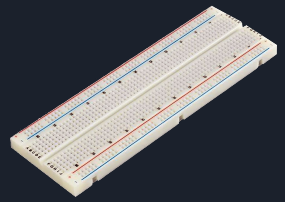
- Trash is inserted
- Using machine learning model determines trash kind(current classification between bottles and cans)
- System modifies base rotation to determined beam
- Then system release trash and close door again

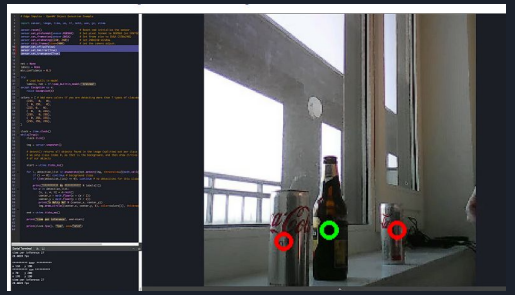
Functional System working

Improvements from mid demo

- Object recognition implemented (Data augmentation included)
- We improved the door system so it could open whether is in the can trash beam or in the bottle trash beam







Thanks for your Attention!