

Autonomous Agriculture Robot

Group 4

Affan Bin Usman | Chia-Cheng Kuo | Matthew Watson





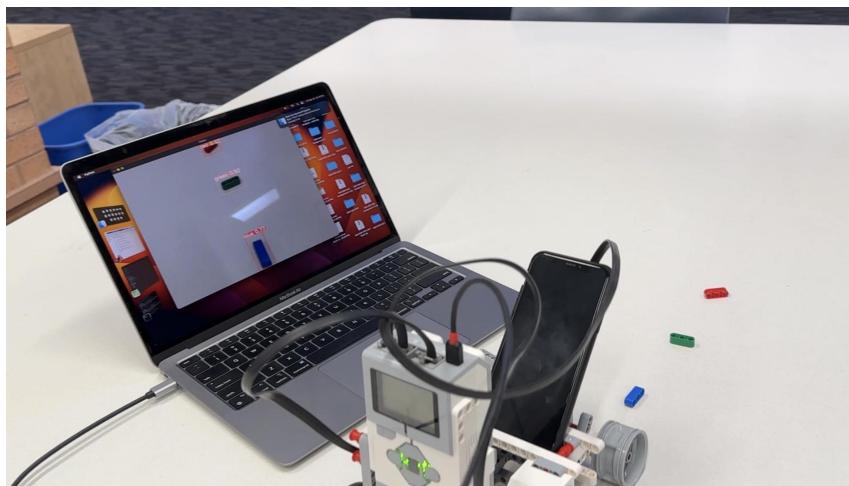
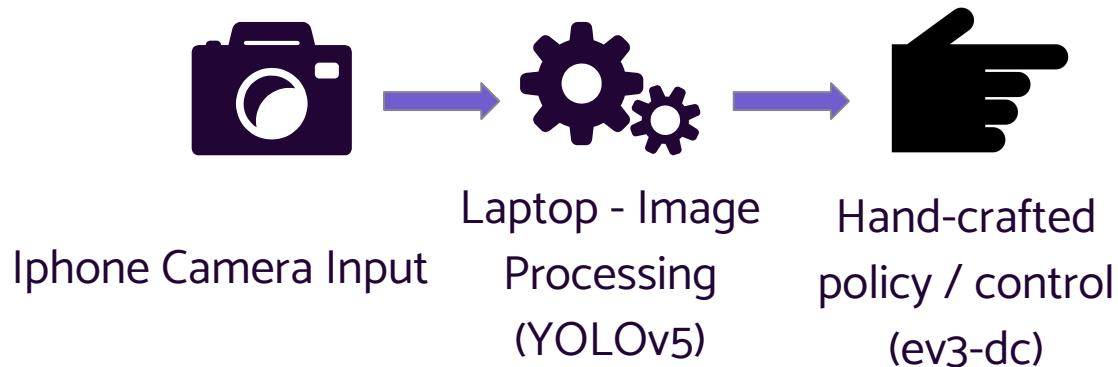
- ◆ Develop a reliable and efficient agricultural robot
- ◆ Detect & remove weeds from crops
- ◆ Reduce manual labor & impact of herbicides



HARDWARE

- ❖ LEGO EV3 Education Kit
 - ❖ ARM9 Controller
 - ❖ 300 MHz
 - ❖ RAM 64 MB
- ❖ Camera / Phone
 - ❖ iPhone Xs*
- ❖ Processing Hub
 - ❖ Laptop (MacOS)*





Training

Model

- ◆ YOLO-v5s

Dataset

- ◆ 550 images
- ◆ Labeled using Label-Studio (with Bounding box and classes)

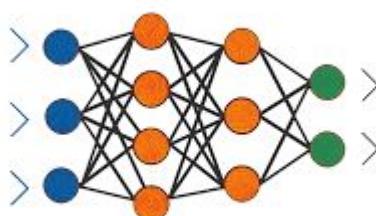
Train / Validation Split

- ◆ 80 / 20



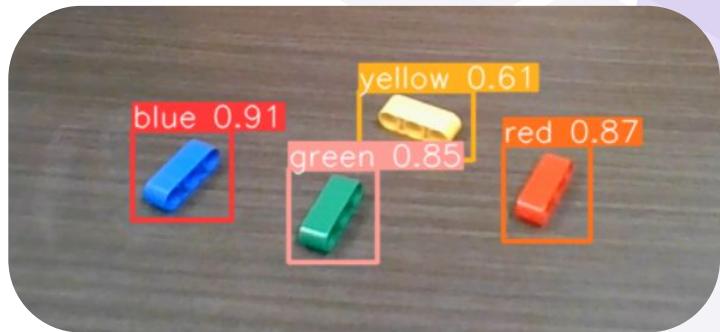


Object Detection



Iphone Camera Input

YOLO v5

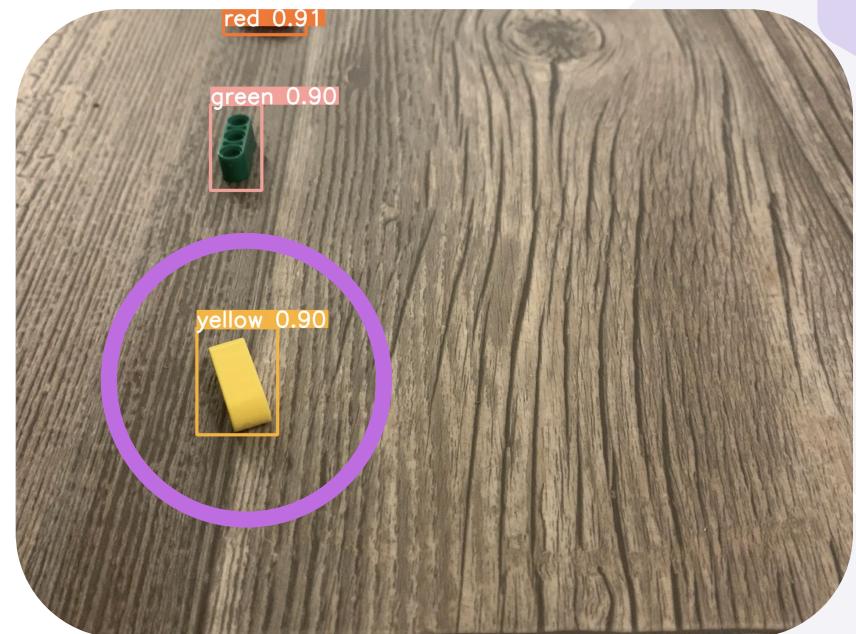


Array of bounding boxes
& class labels



“Weed” Removal Policy

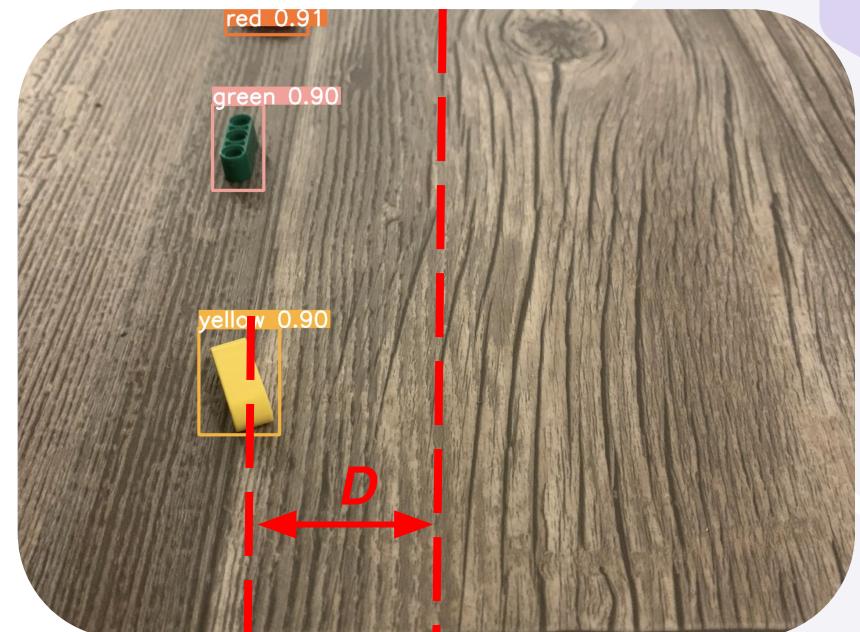
1. Identify closest “plant”
(block of any color)
 - a. If none detected enter
“explore” mode





“Weed” Removal Policy

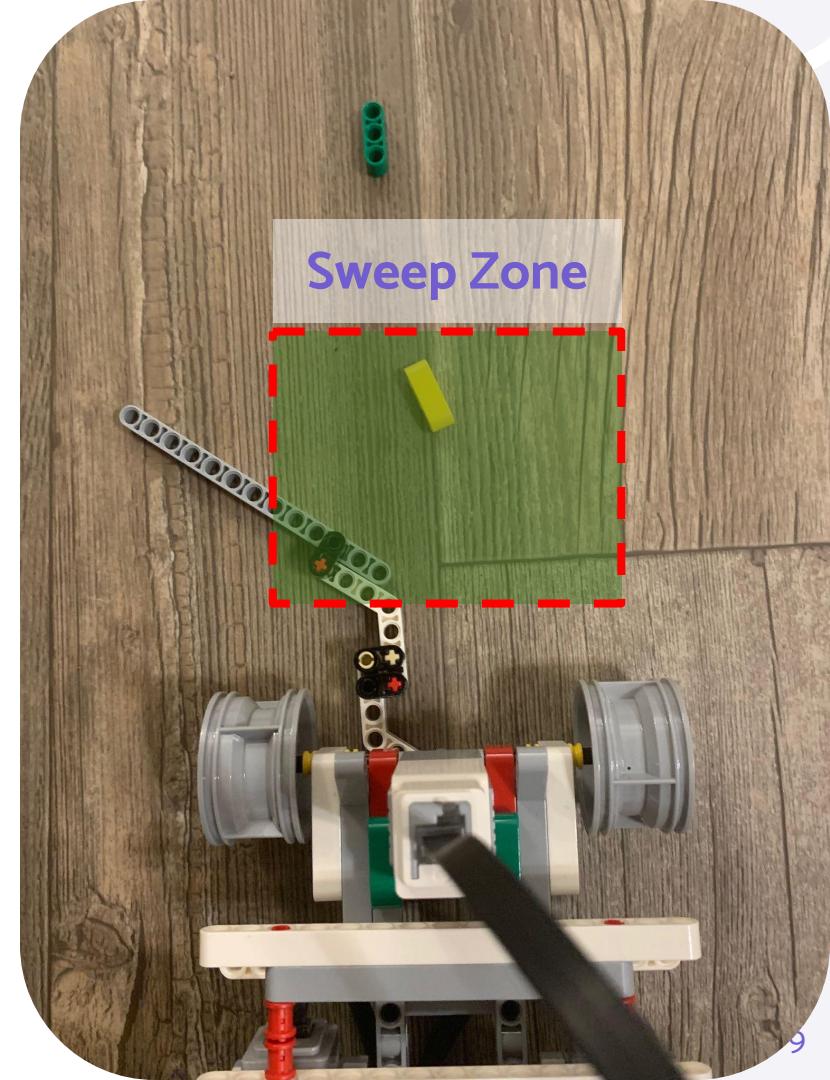
2. If plant detected, navigate to plant
 - a. Steering input proportional to error





“Weed” Removal Policy

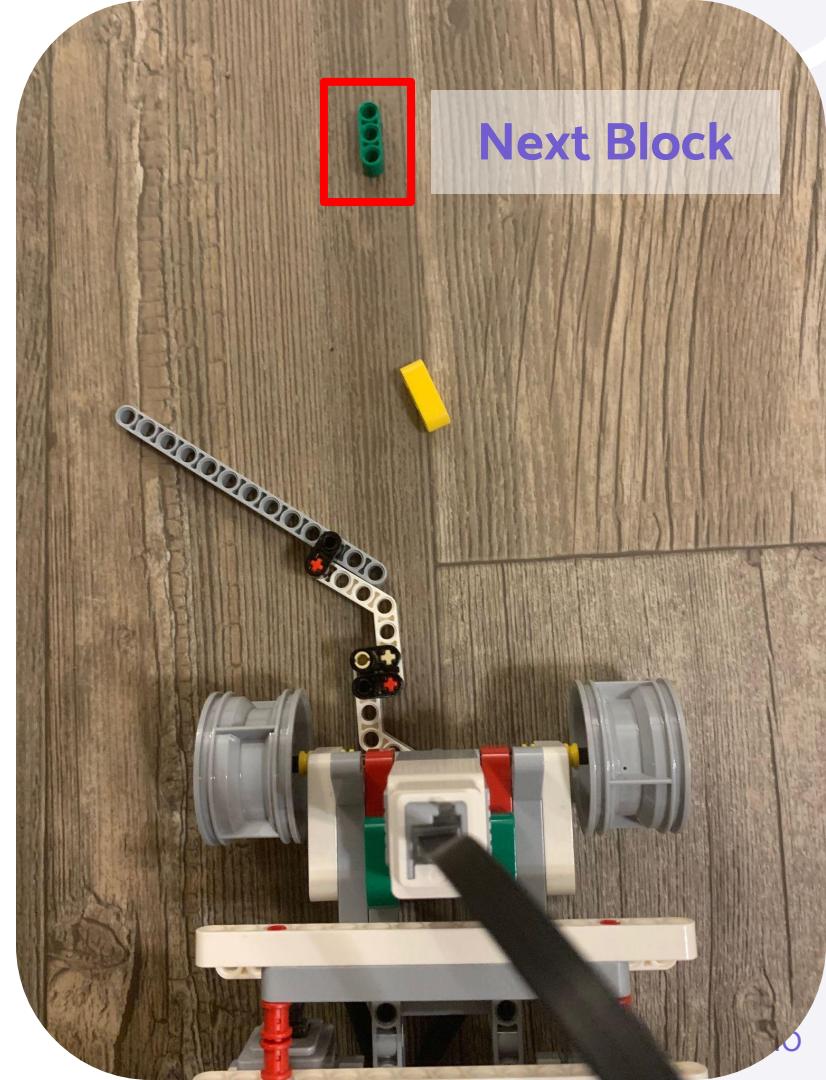
3. When block enters sweep zone, sweep if block is a “weed” (NOT green)





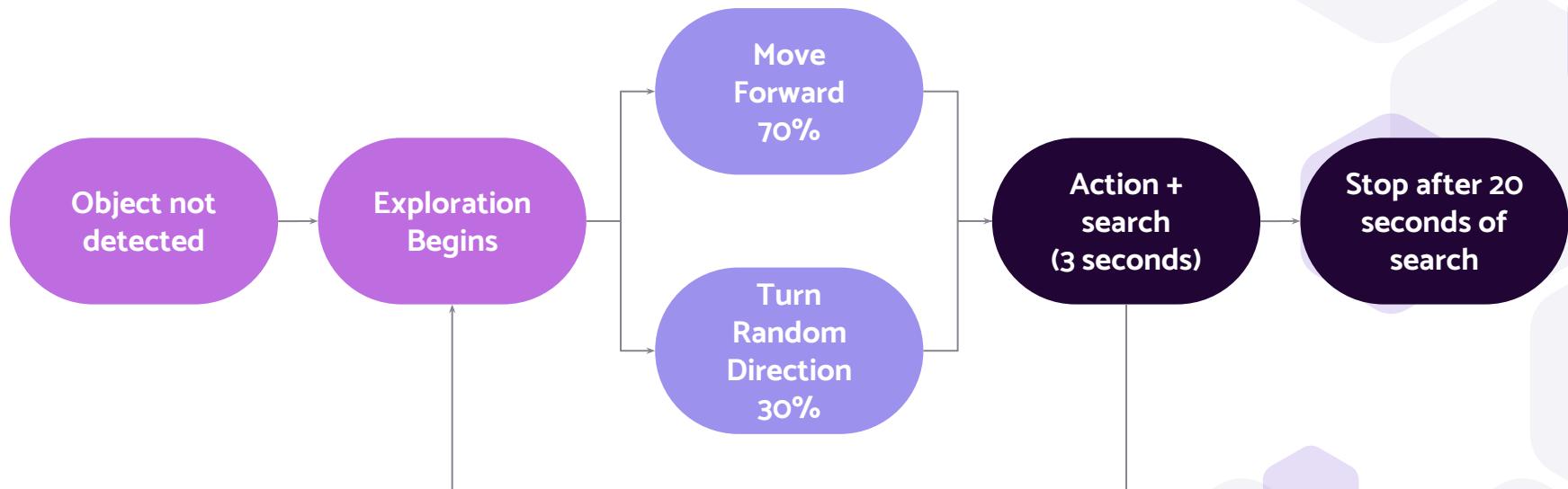
“Weed” Removal Policy

3. When block enters sweep zone, sweep if block is a “weed” (NOT green)
4. GOTO step 1

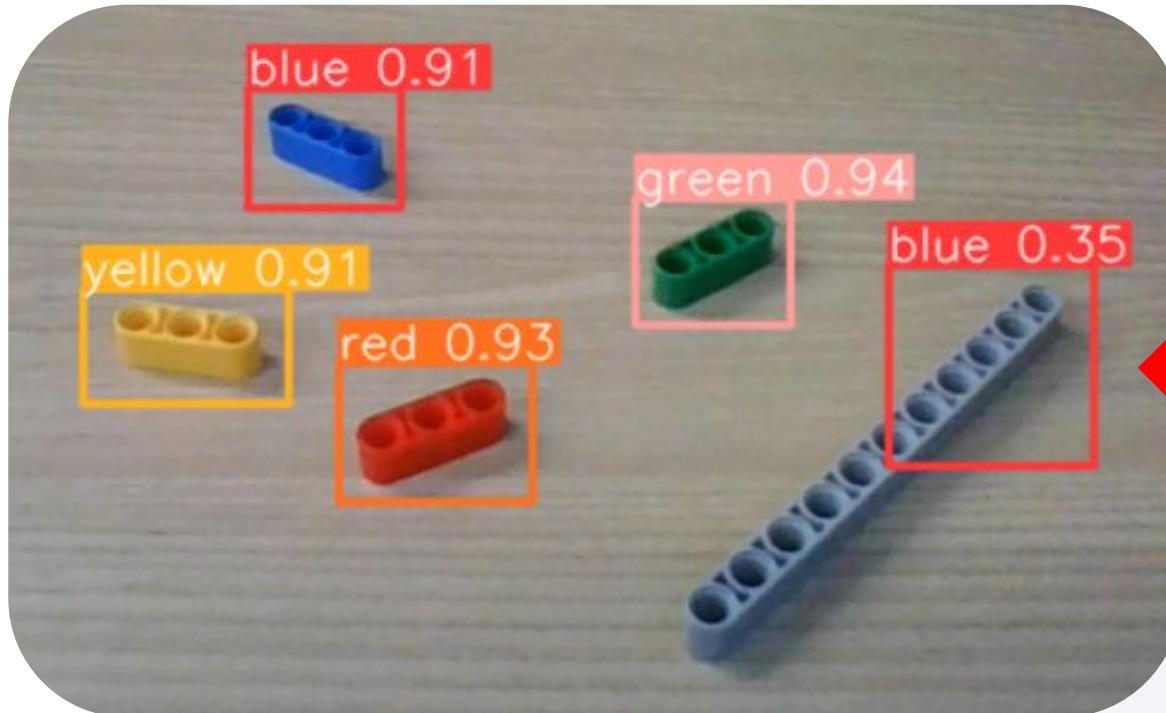




EXPLORATION



CHALLENGES

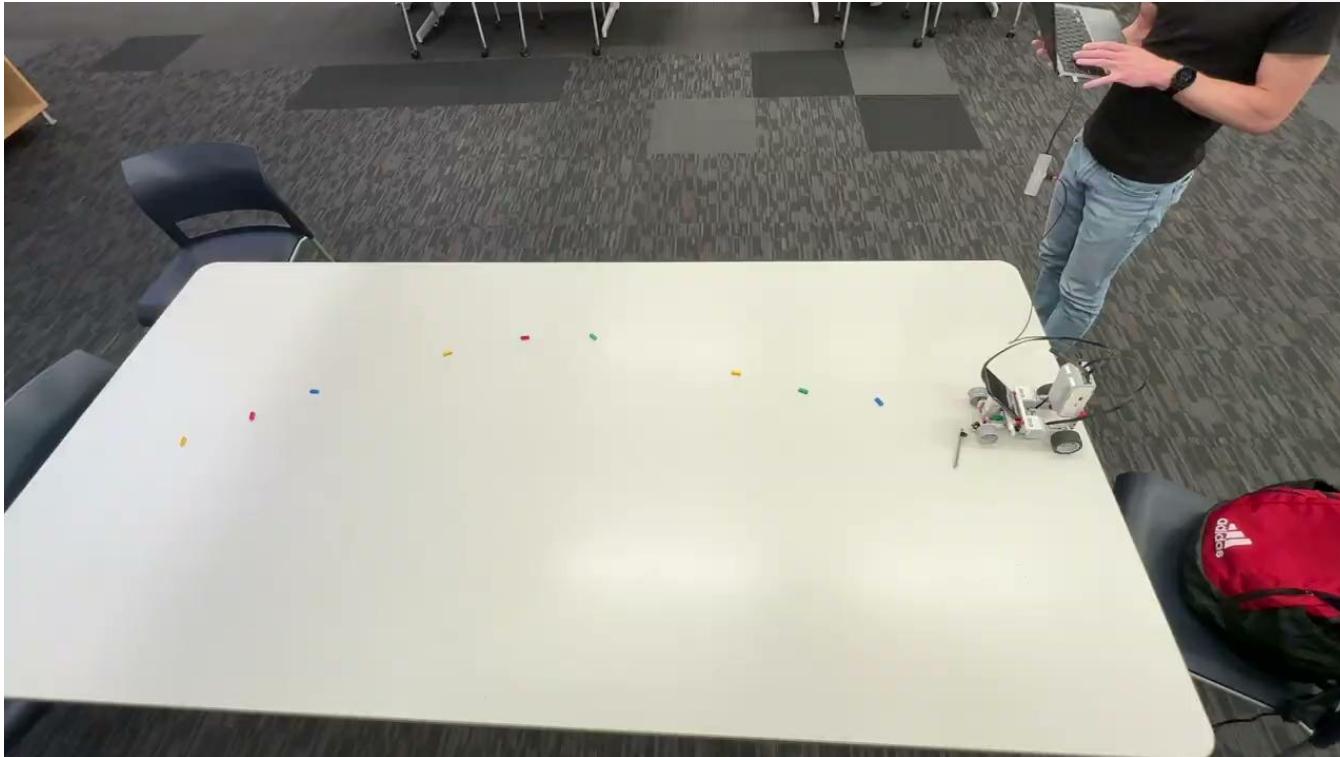


**False
Positives**





RESULTS



Thank You!



RESULTS

