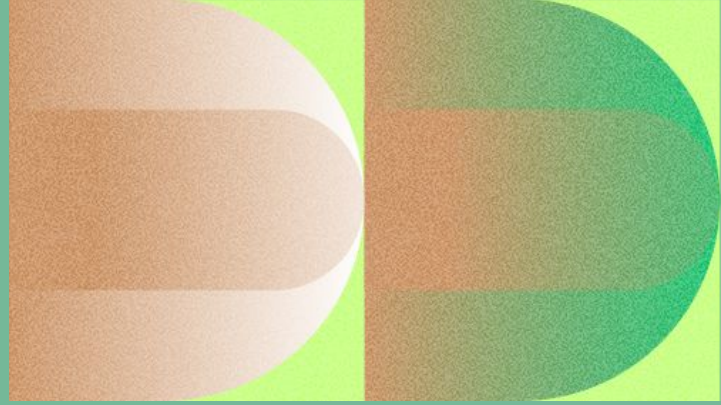
AgroDrone Patrol

Larry & Leon

Background Informations



40%

Global Crop Lost

due to pests and diseases, mostly without sufficient monitor and timely actions

$123B

Economic Lost

In Total due to corp lost with pests, diseases, and other natural factors

1k ac

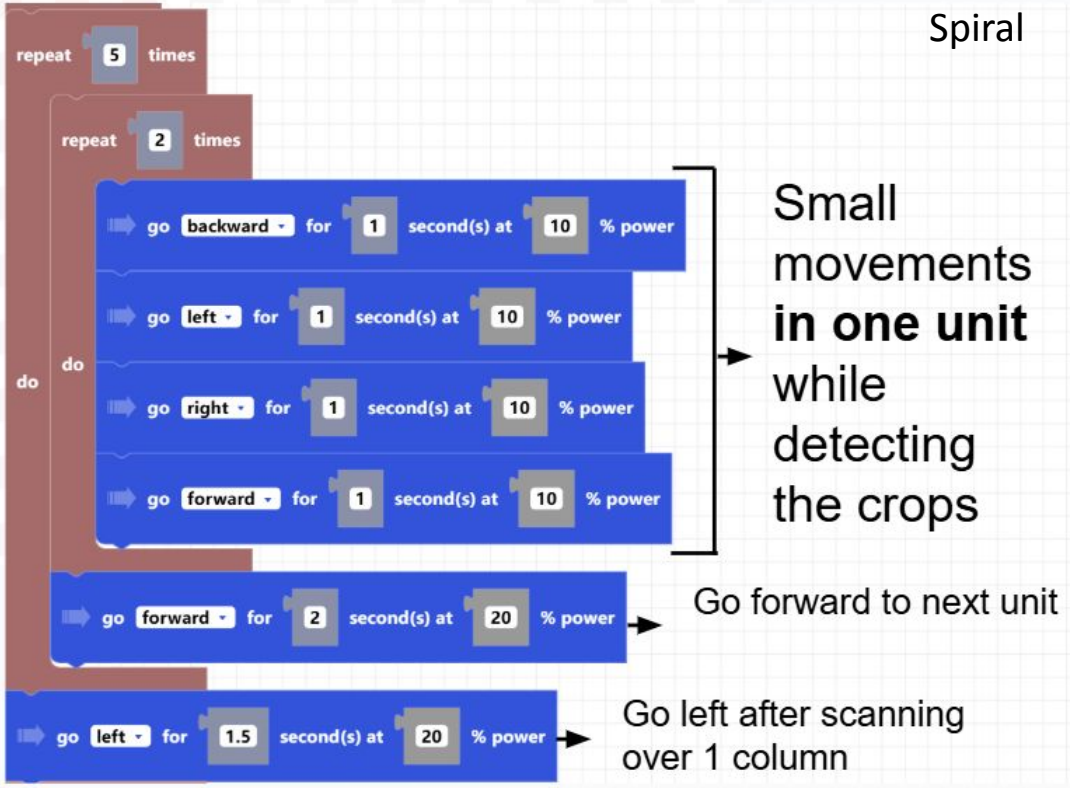
100 times faster

Than traditional human inspection about 10 acres / day.

Based on data from national institute of food and agriculture

Navigation Programs

Spiral

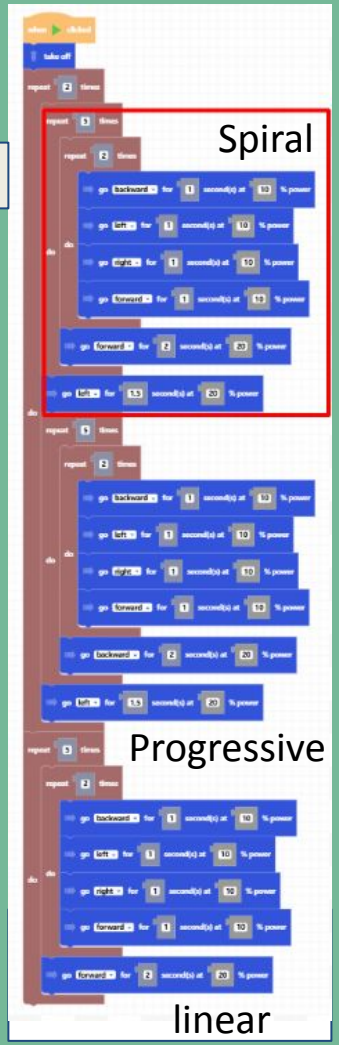


Small movements **in one unit** while detecting the crops

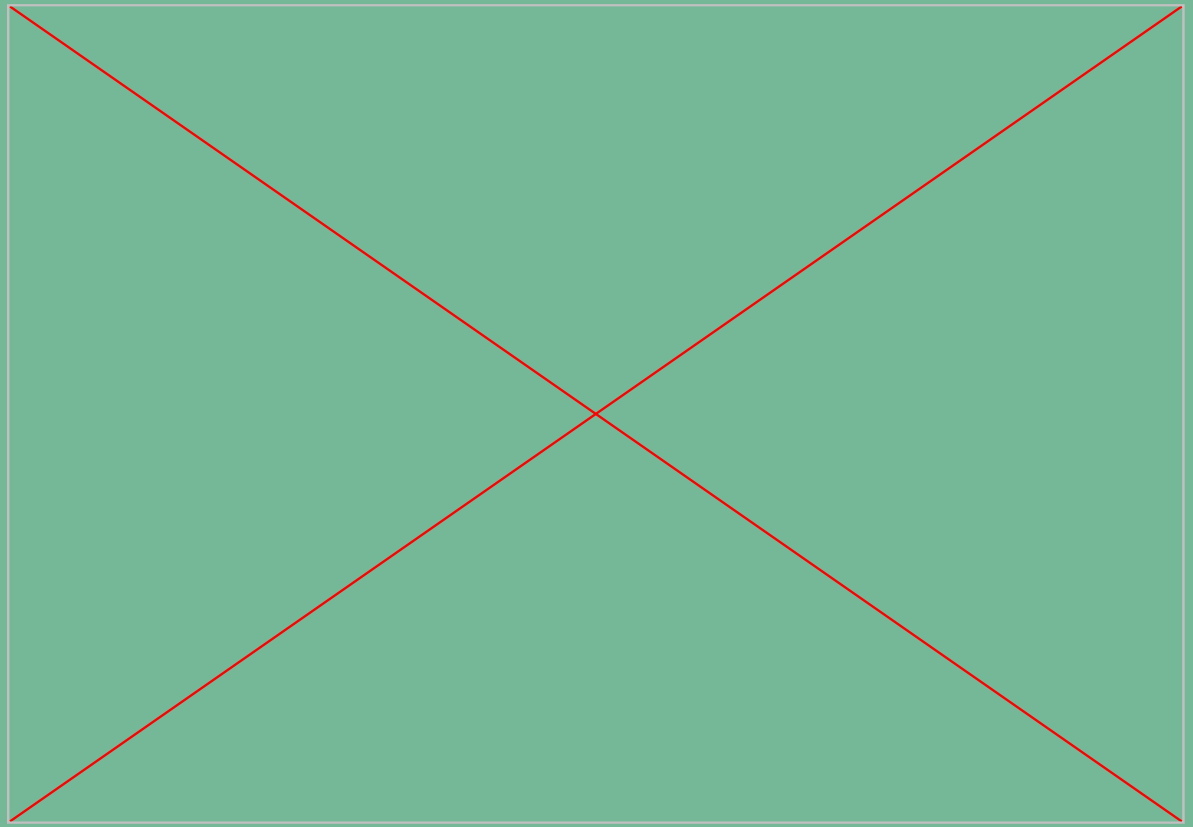
Go forward to next unit

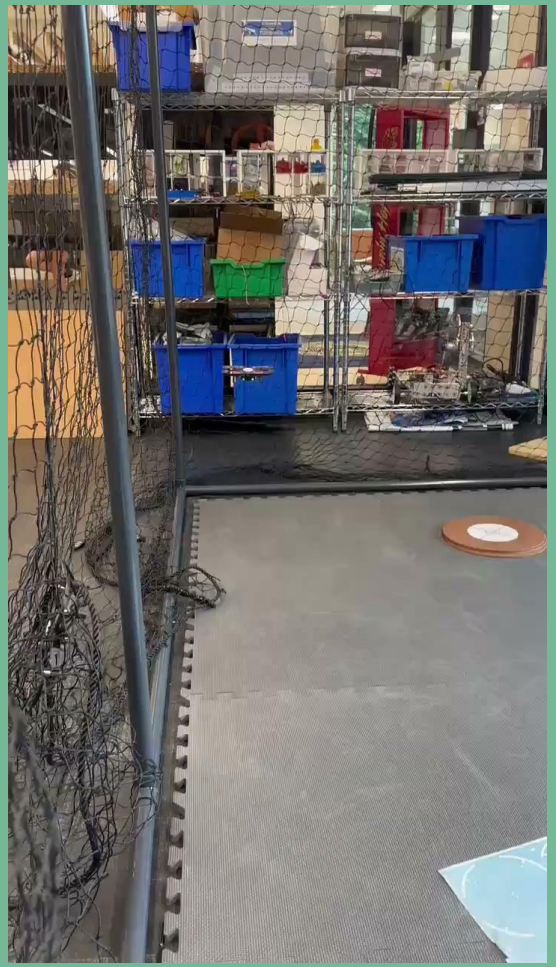
Go left after scanning over 1 column

Cycle this for **5 times** to go over all 5 columns, thus finish scanning 5*5 field



Trial & Error



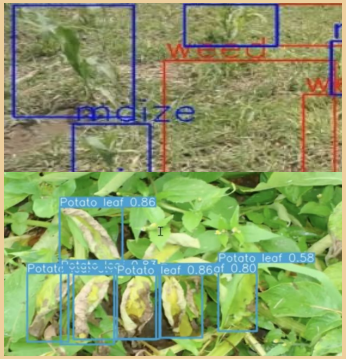


Accomplishment & Challenge

What we've done so far:
drones to go through 1 row of rubber pats with linear, progressive and spiral path planning.

Challenge:
Various Errors and Hard to adjust during the process

Detection Process

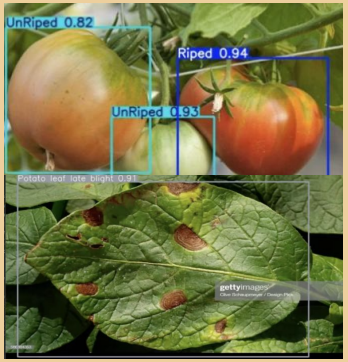


01.

Decide Type

02.

Count



03.

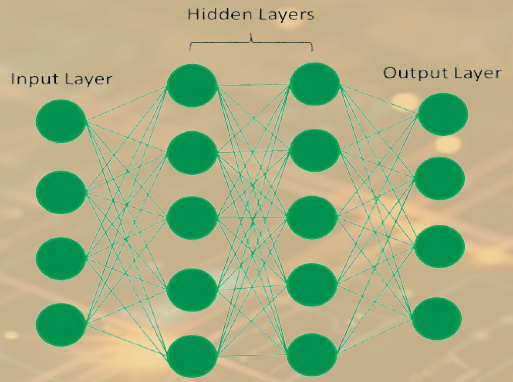
Monitor Status

04.

Identify Pests

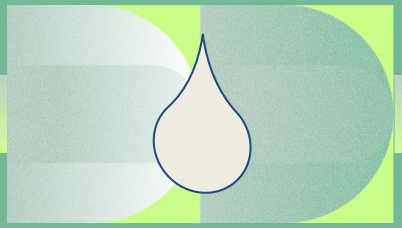
AI Layer Example

Model (⅓ step printing, 10fps = ⅓ 30fps)
- Input Layer
  - Image (1024 x 512 pixels)
- Convolutional Layer 1
  - 32 Filters
  - Activation: ReLU
    - Function: Extracts low-level features (edges, textures)
- Max Pooling Layer 1
  - Pool Size: 2x2
    - Function: Reduces dimensionality, retains important features
- Convolutional Layer 2
  - 64 Filters
  - Activation: ReLU
    - Function: Extracts higher-level features
- Max Pooling Layer 2
  - Pool Size: 2x2
    - Function: Further reduces dimensionality
- Flatten Layer
  - Function: Converts 2D matrix to 1D vector for the dense layer
- Fully Connected Layer (Dense Layer 1)
  - 512 Nodes
  - Activation: ReLU
    - Function: Captures complex patterns
- Fully Connected Layer (Dense Layer 2)
  - 256 Nodes
  - Activation: ReLU
    - Function: Further learning of features
- Output Layer
  - Nodes: Number of Classes (e.g., Healthy, Diseased)
  - Activation: Softmax
    - Function: Provides probabilities for each class
- Loss Function
  - Categorical Cross Entropy
    - Function: Measures model performance during training



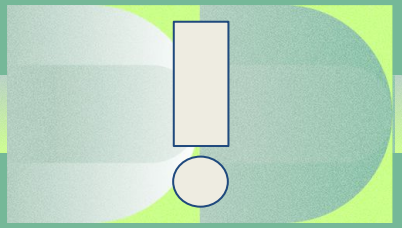
Post Detection Actions

Add



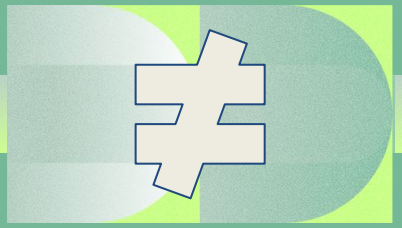
Water, fertilizer, pesticides, etc

Report



Issues to the backend (user)

Remove



Unwanted - Pests, Weeds, etc


Thank
you!