

# **SMART PESTICIDE SPRAYING IN AGRICULTURE**

Sena ALTINTAŞ sena.altintas@marun.edu.tr

Serenay DEMIR serenaydemir@marun.edu.tr

Mehmet Akif AKKAYA akifakkaya@marun.edu.tr

Asst. Prof. Fatma CORUT ERGIN

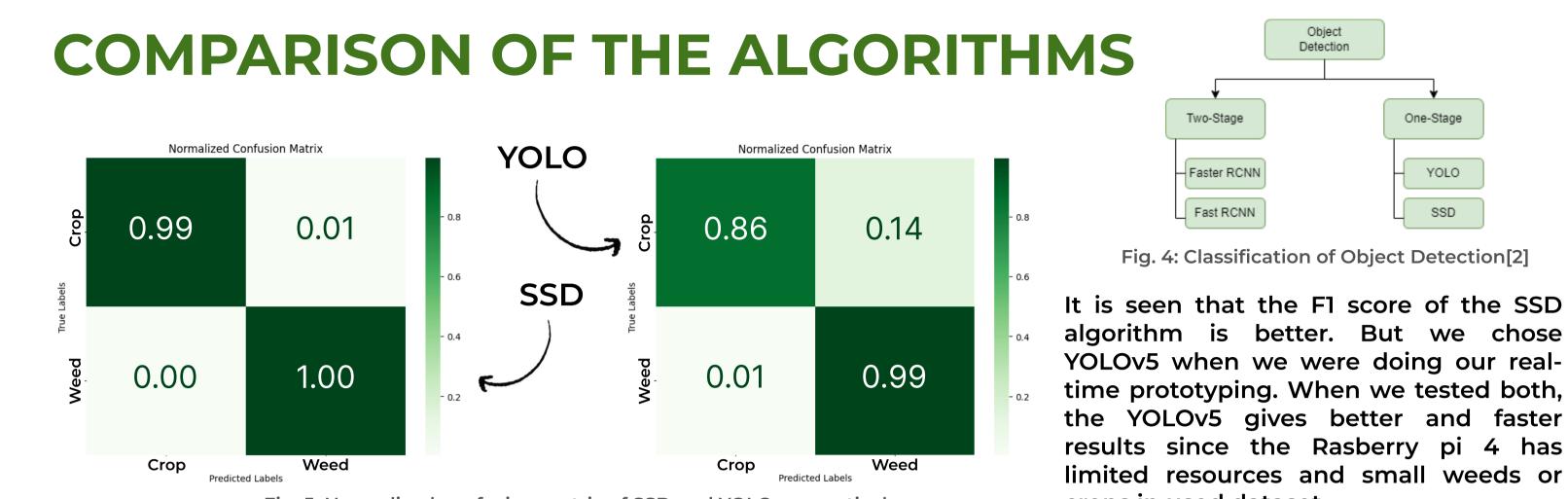


## **INTRODUCTION**

#### **THE PROBLEM AND MAIN GOAL**

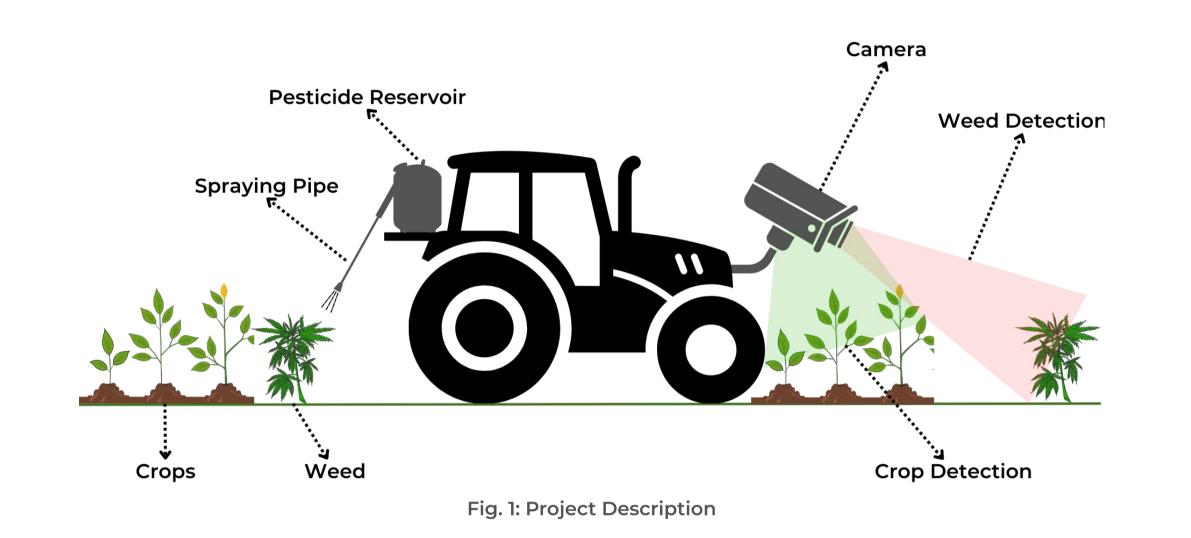
Weeds give damage to crops like sunflowers and reducing their productivity.

Current control methods of weed are generally physical or chemical that used pesticide for entire farm field. These methods have a number of negative effects on both humans and the environment.



Our aim in this project is to eradicate weeds that reduce crop productivity to provide maximum efficiency by using software automatically; not in a manual, costly or environmentally harmful way.

We develop a system that exactly finding targets and sprays only the detected weeds in the field.



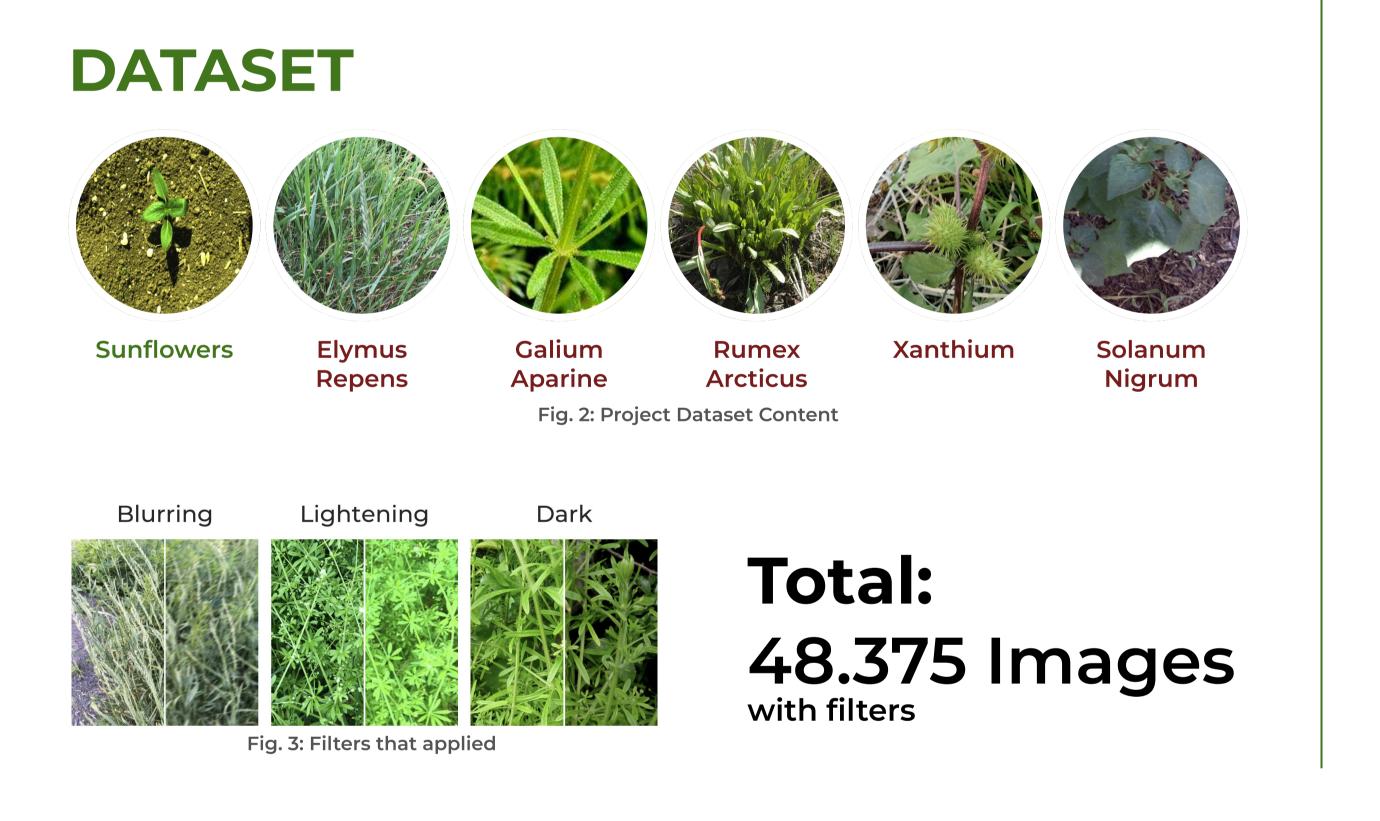


Fig. 5: Normalized confusion matrix of SSD and YOLO, respectively

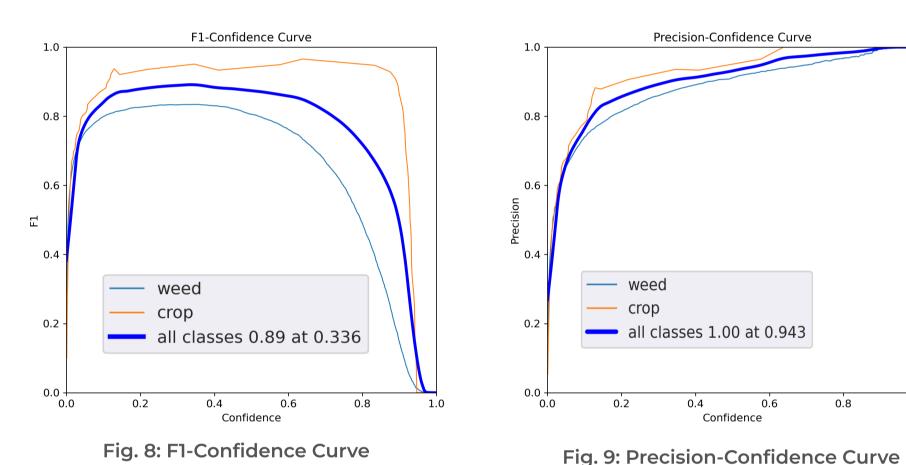
the YOLOv5 gives better and faster results since the Rasberry pi 4 has limited resources and small weeds or crops in used dataset.

## **OBJECT DETECTION WITH YOLO AND RESULTS**

YOLO is a single-step object detection algorithm that based on fully CNN to process an image.

YOLO splits an input image into an S×S grid. Each cell responsible for detecting object when grid contains center of object.

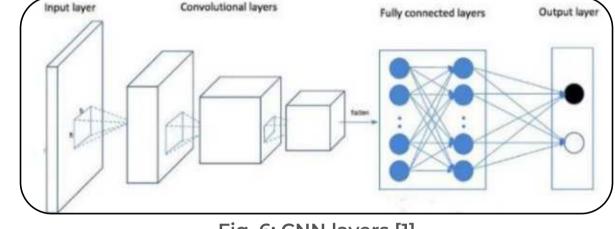
Each grid cell estimates the B bounding boxes and their confidence scores.



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Captures (27)





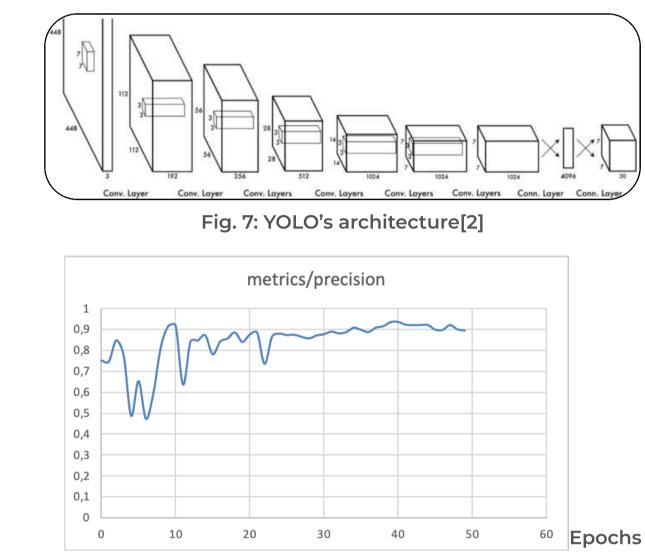
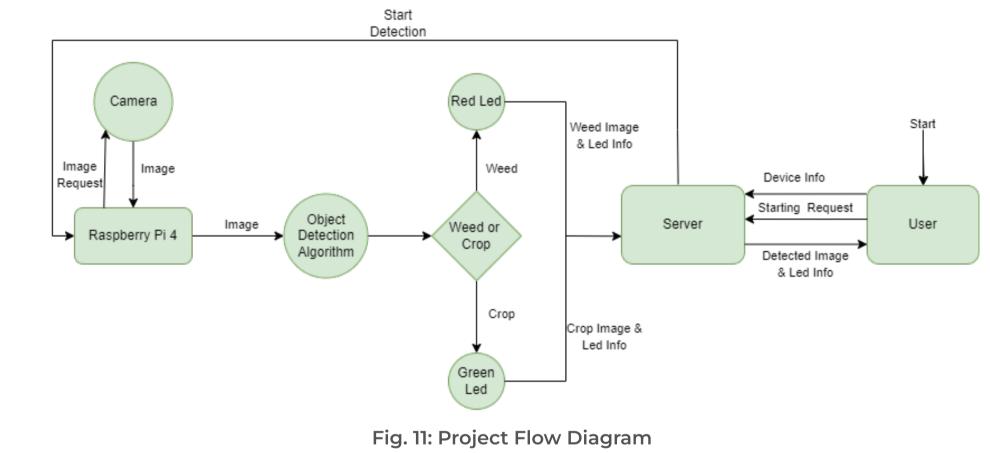


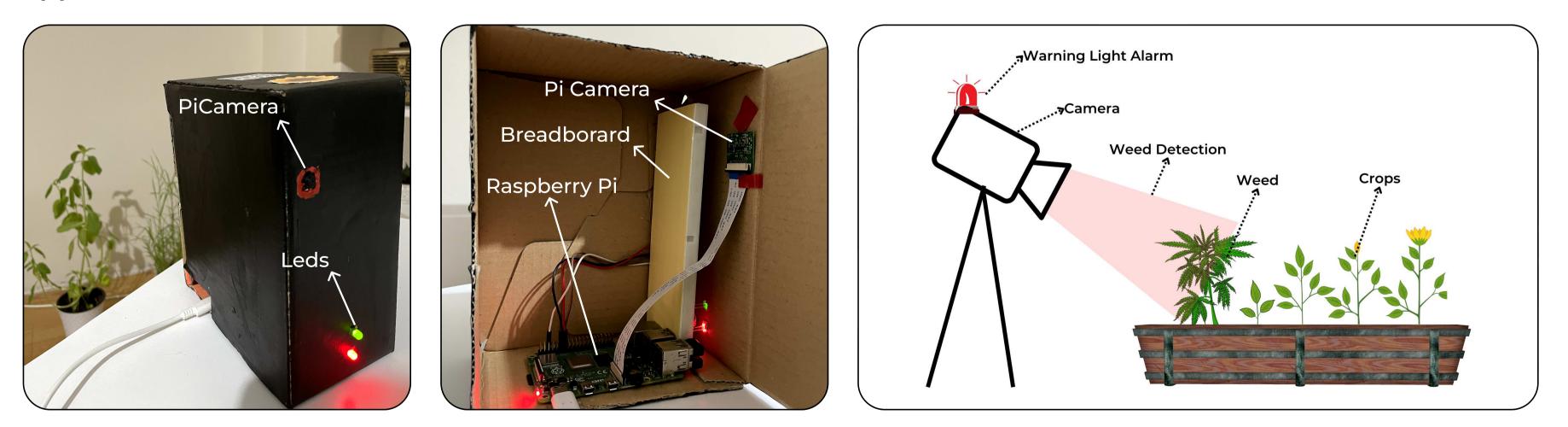
Fig. 10: Precision-Epoch Chart

#### FLOW DIAGRAM



## PROTOTYPE

We prepared a prototype using Raspberry Pi 4B, Pi camera and bread board. We made this prototype interactive with our application by connecting it to the internet. The detection process is started by scanning the QR code on the device. The user can follow the detection process with snapshots from the application.



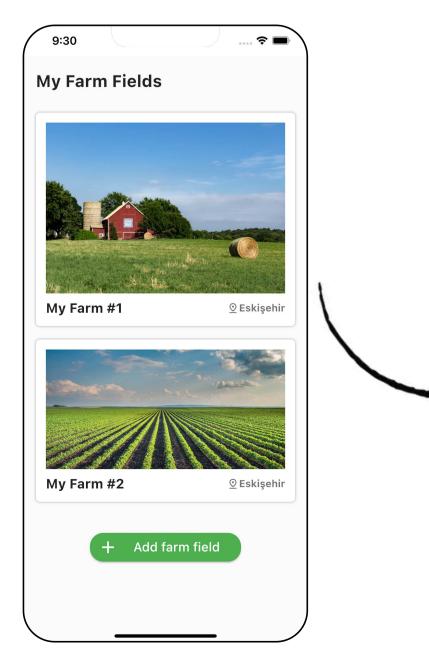
## **CONCLUSION**

In prototype testing process, we used weeds and sunflower from our chosen region to test the closeness of our project to the actual result.

We achieved a result close to our aim and goal that we stated during the project, through the dataset we created, the model we trained and the tests we made.

As a future work, we can develop our project and turn it into a real life project with the support of some investors and agricultural people we communicate with in that chosen region.

## **TECHNOLOGIES**



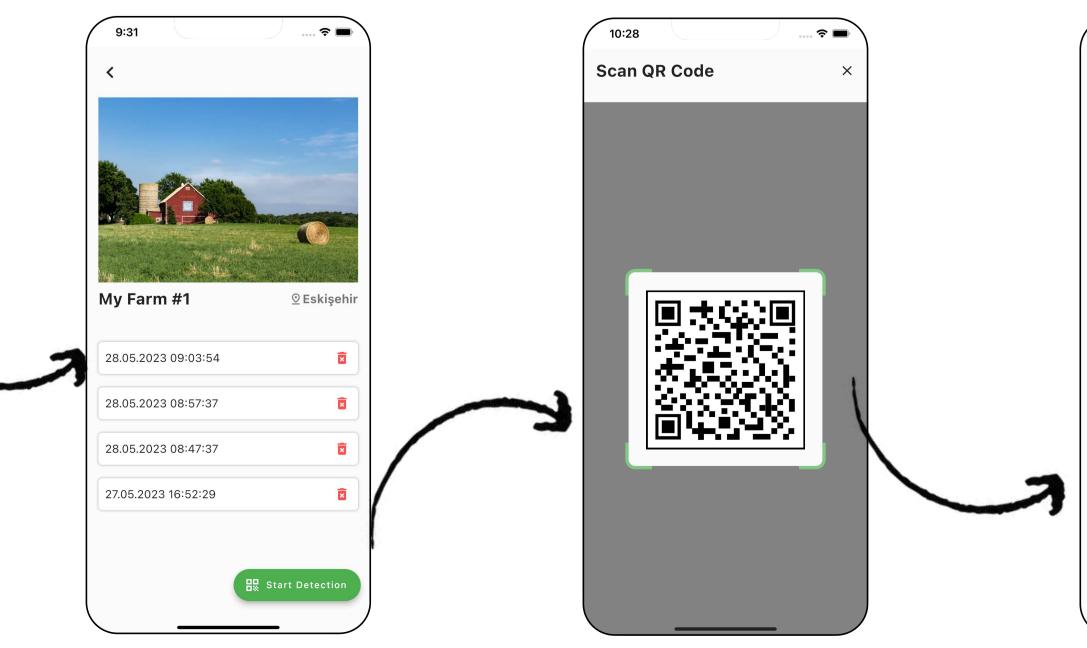
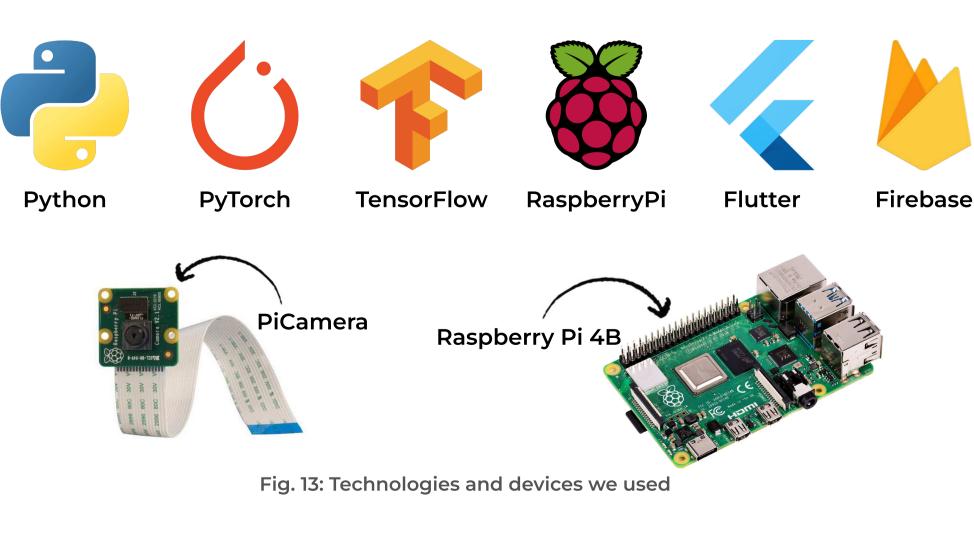


Fig. 12: Prototype and mobile application



### REFERENCES

- [1] Manan Parekh, (Jul 16, 2019). A Brief Guide to Convolutional Neural Network (CNN) https://medium.com/nybles/a-brief-guide-to-convolutional-neural-networkcnn-642f47e88ed4.[Accessed on: November4 ,2022]
- [2] Rohit Kundu, (January 17, 2023). YOLO: Algorithm for Object Detection Explained https://www.v7labs.com/blog/yolo-object-detection.[Accessed on: April 16,2023]