A Graduation Project
Submitted in Partial Fulfillment of B.Sc. Degree Requirements in Electrical and Computer Engineering
Part II

Plant Wheat Detection Using Artificial Intelligence

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OUTLINES

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- Block Diagram
- Literature Survey
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  - Advantages of Traditional learning & Deep Learning.
  - Deep Learning Algorithms
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- System Design
- Wheat Detection training
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- Time Plan
- Future Plan
- Cost Analysis
- Conclusion

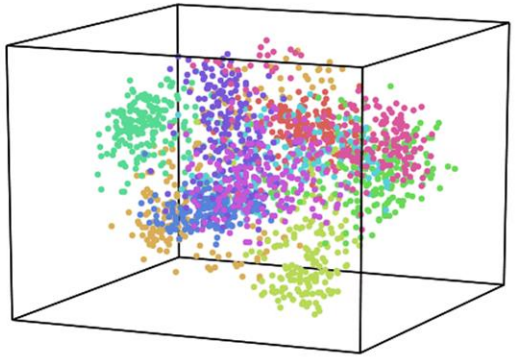
Problem Definition

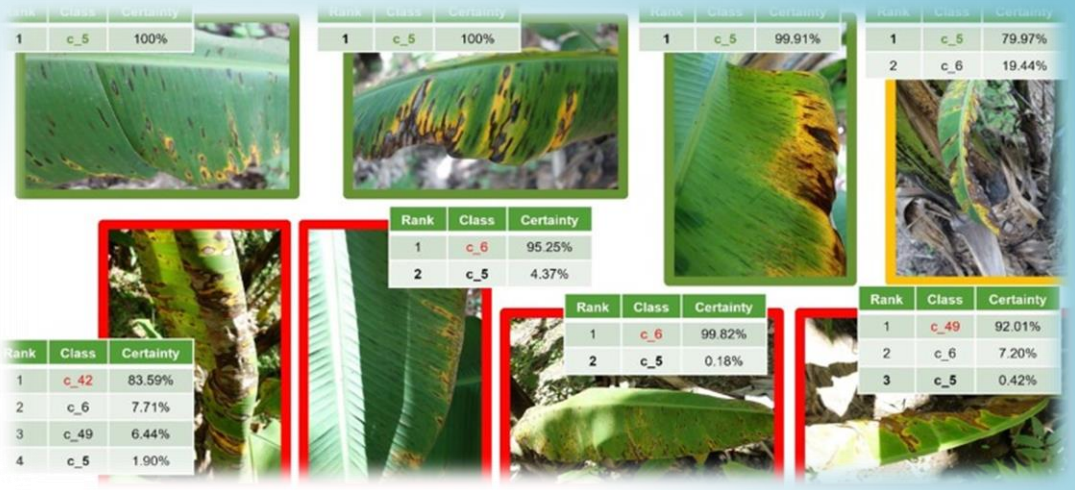
- Disease lead to reduction in quality and quantity of agricultural products

- No monitoring of health and disease on plant.

- saving 300 million people from starvation

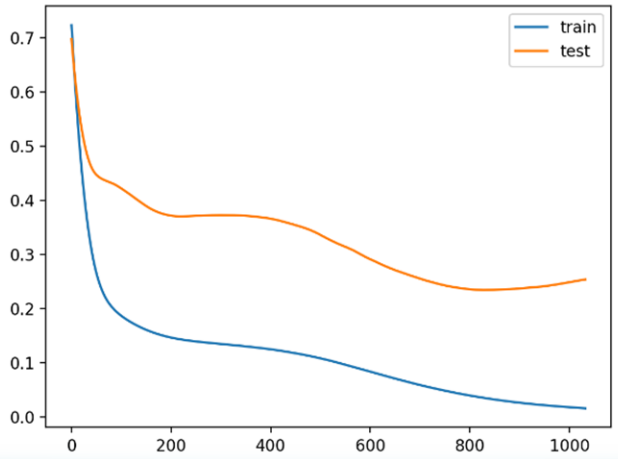
- Wheat is the most cultivated cereal crop in the world.





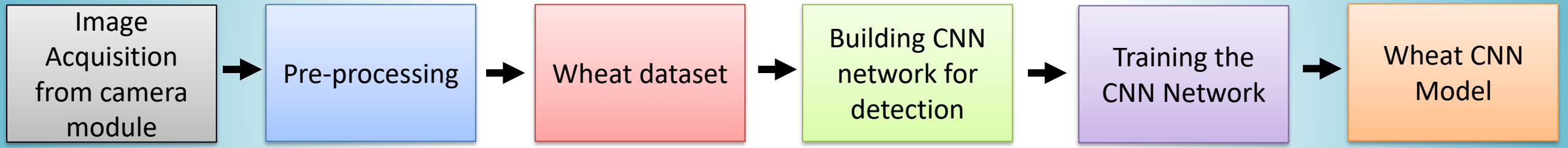
Project Objectives.

- ❑ Determine Feature Extraction techniques.
- ❑ Applying the detection of Plant Diseases.
- ❑ Train and Test initial model with labelled images
- ❑ get most accurate and appropriate result.

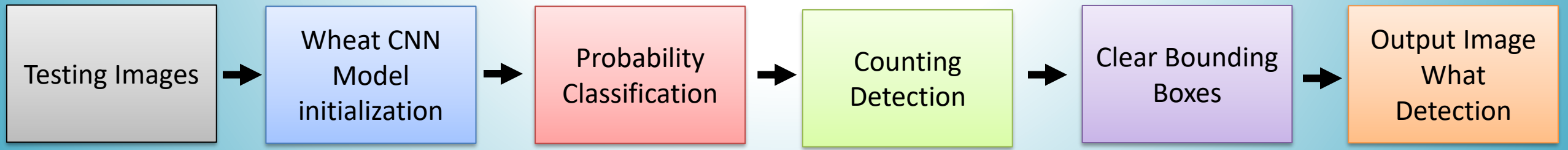


Block Diagram

Training Block Diagram



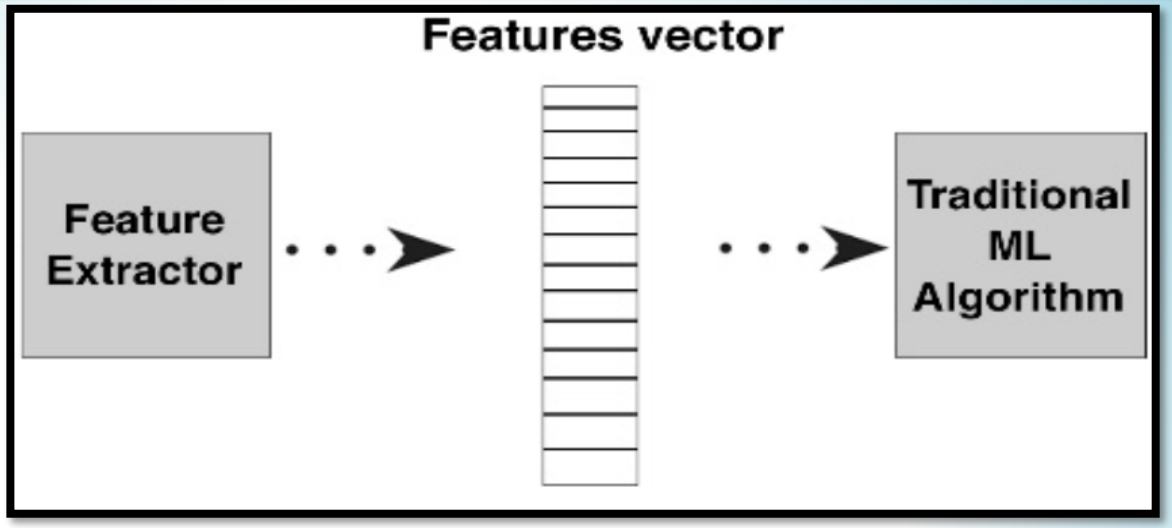
Detection Block Diagram



Literature Survey:- Traditional learning VS Deep Learning.

Traditional Machine Learning Flow.

Input



Output

Deep Learning Flow.

Input

Deep Learning Algorithm

Output

Literature Survey:- Advantages of Traditional learning & Deep Learning.

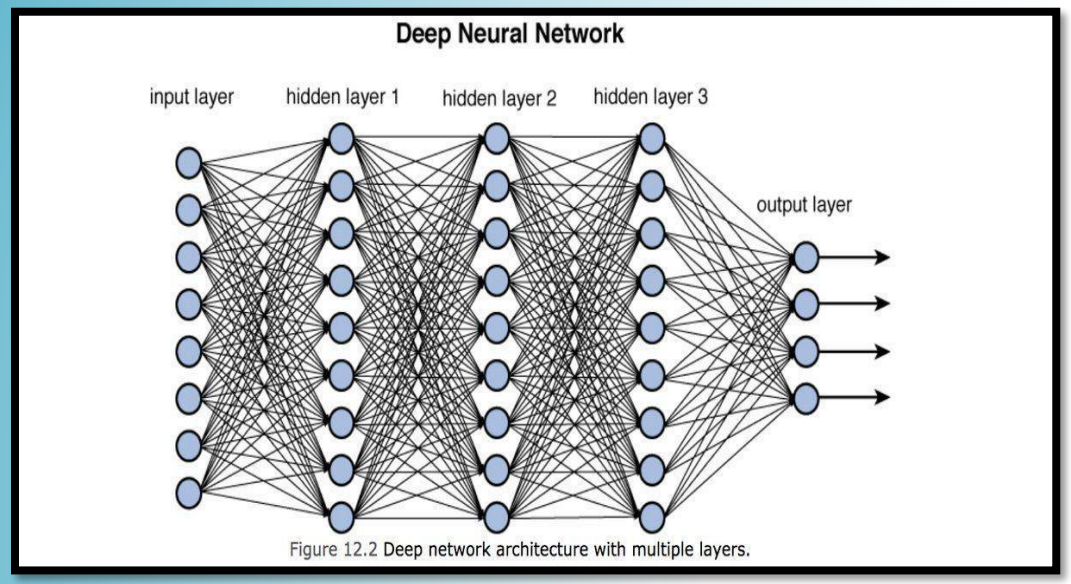
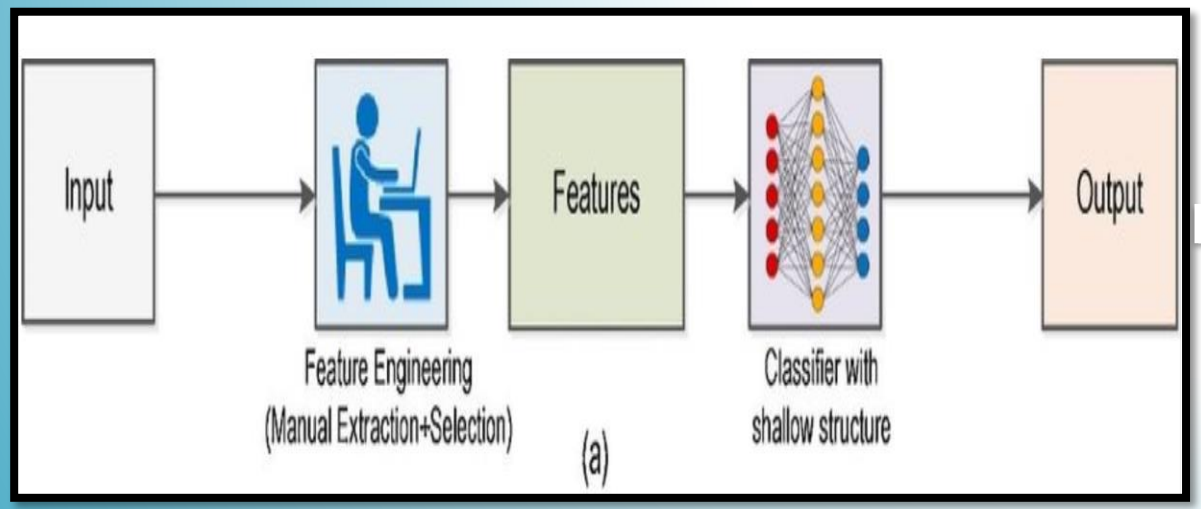


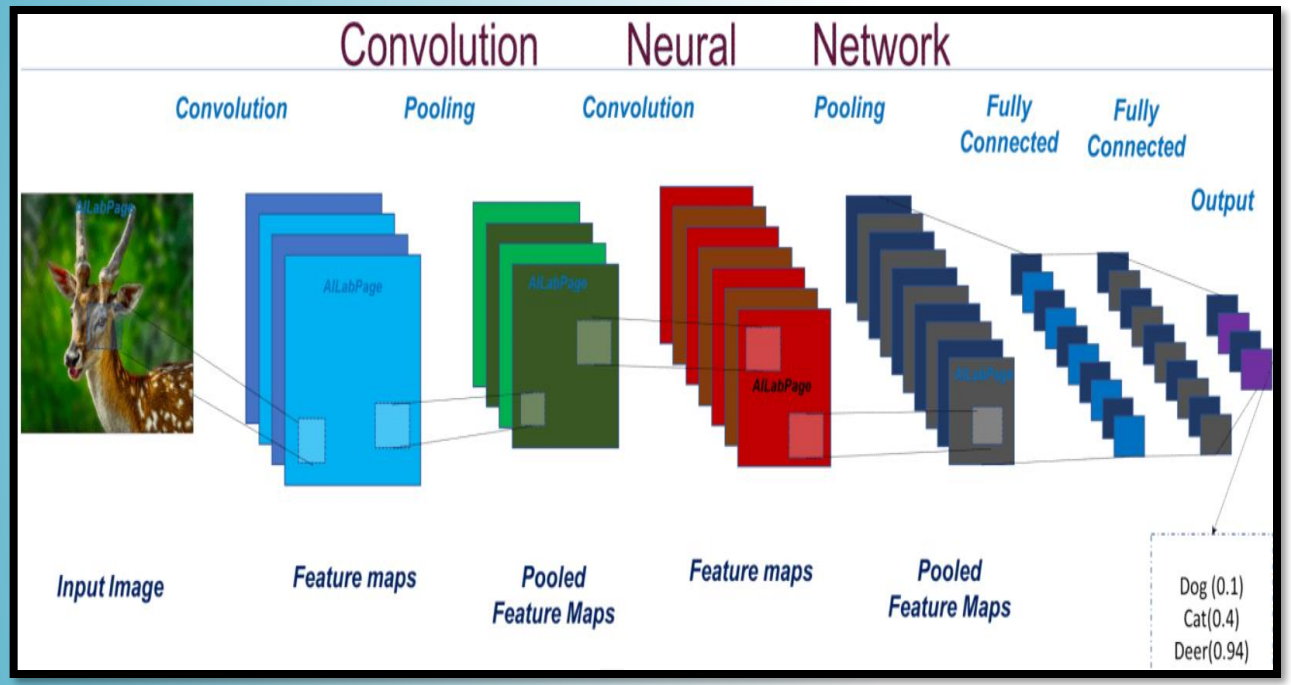
Figure 12.2 Deep network architecture with multiple layers.

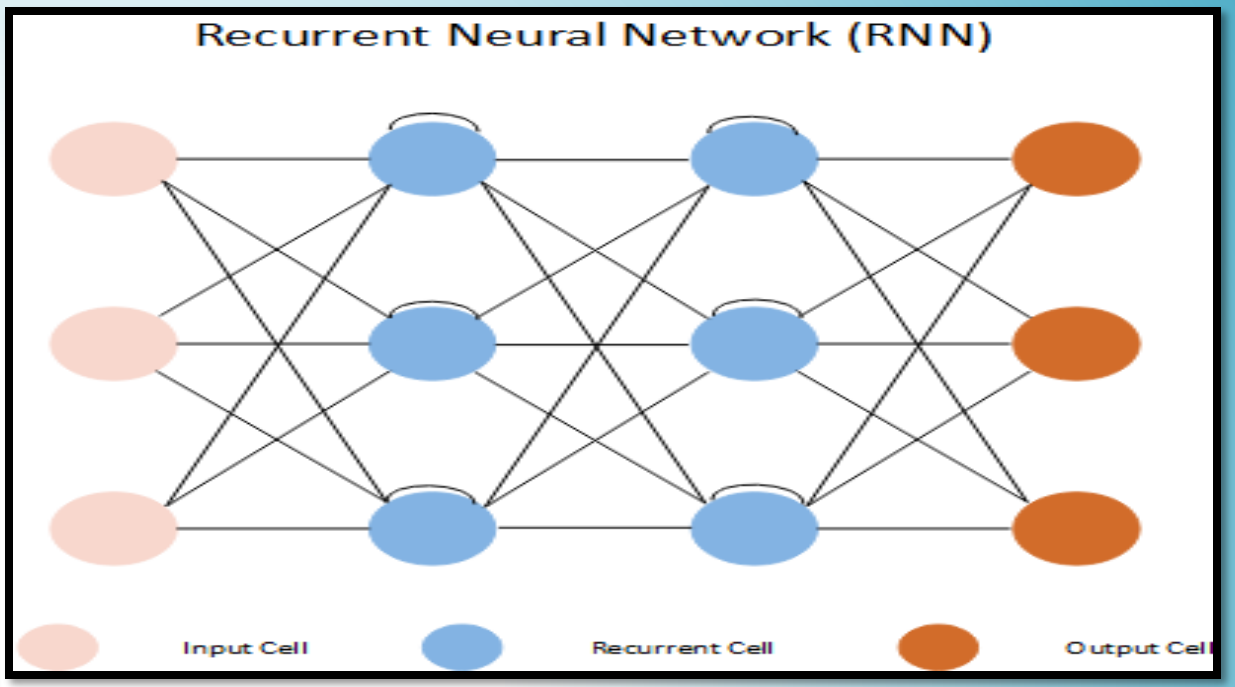
- Robust.
- Generalizable.
- Scalable.
- Reusability

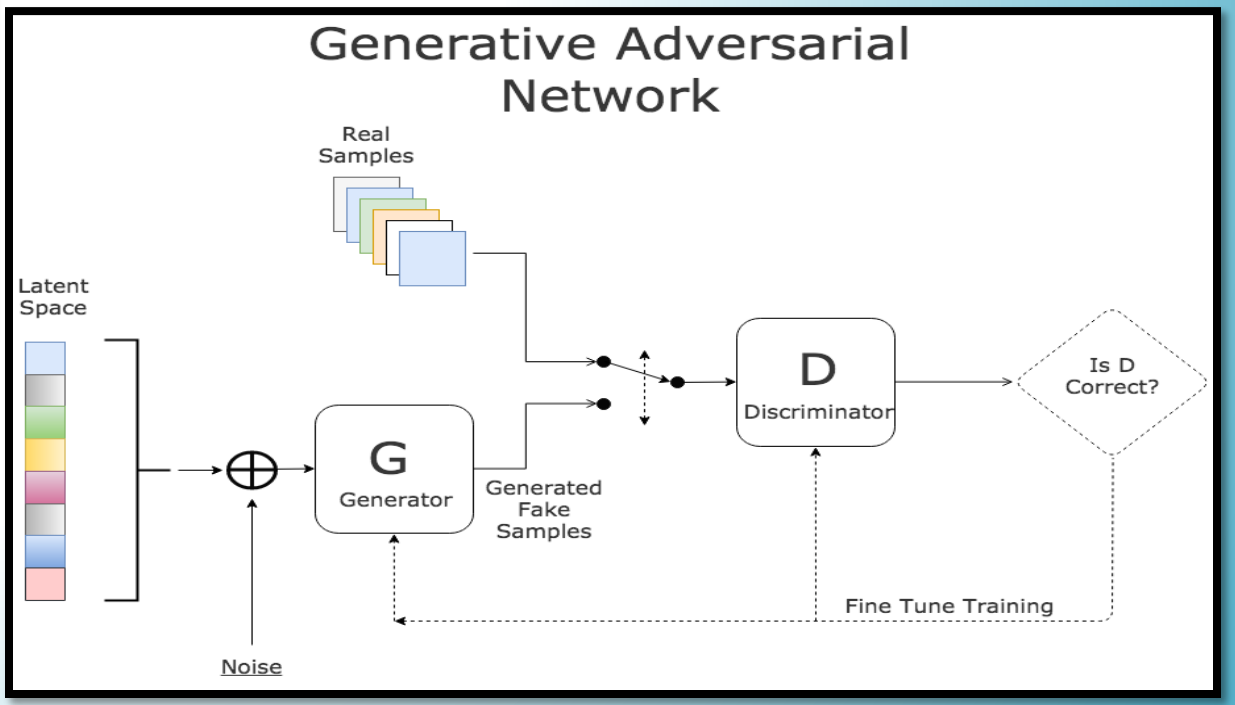


- lower processing power.
- Small amount of data .
- Easy to debug
- Less training time

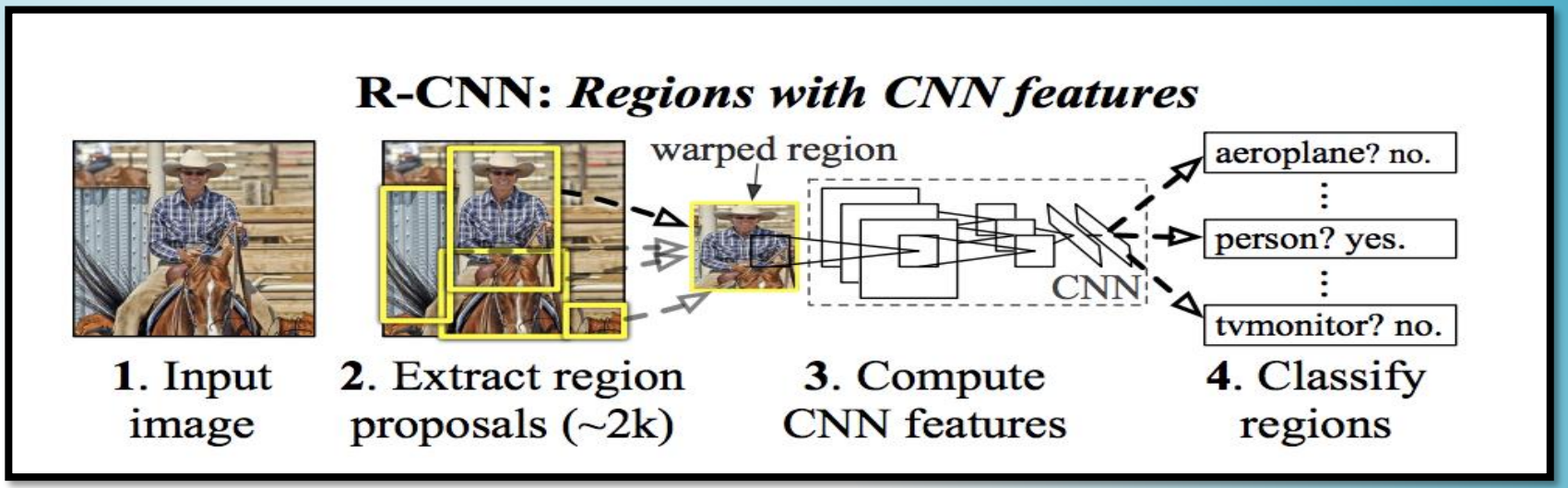
Literature Survey:- Deep Learning Algorithms



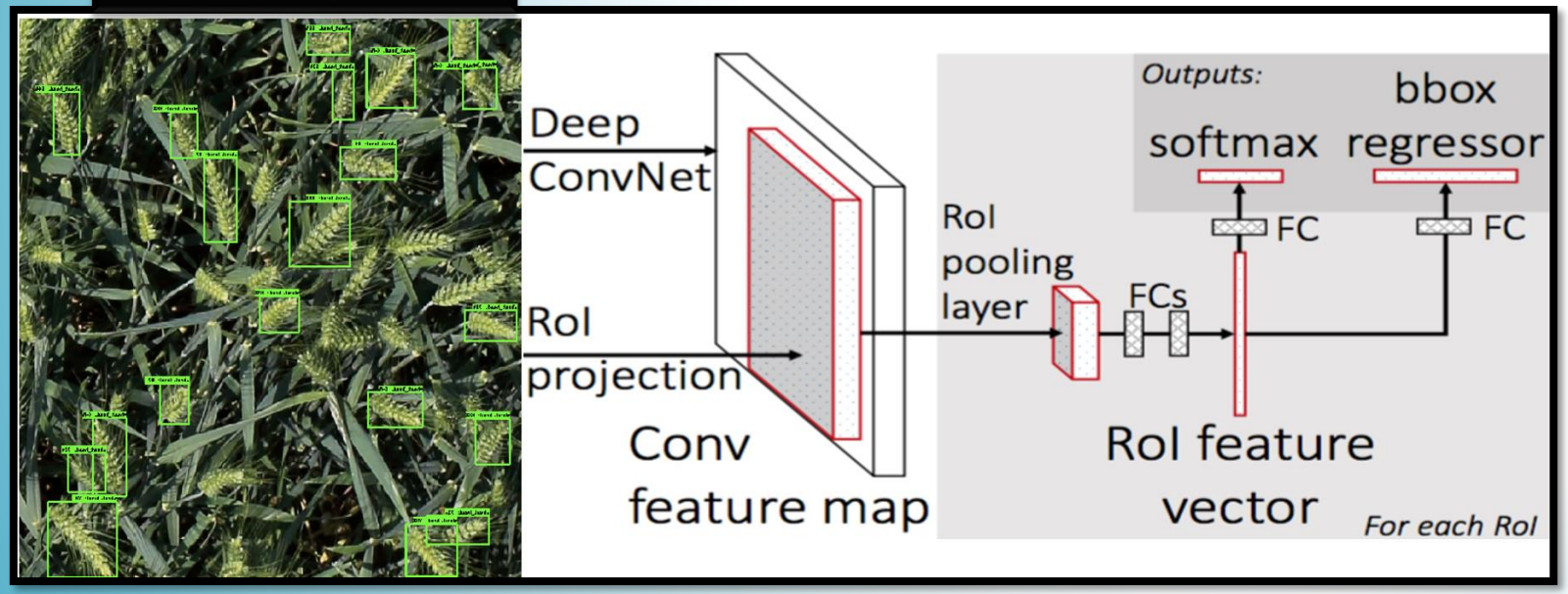


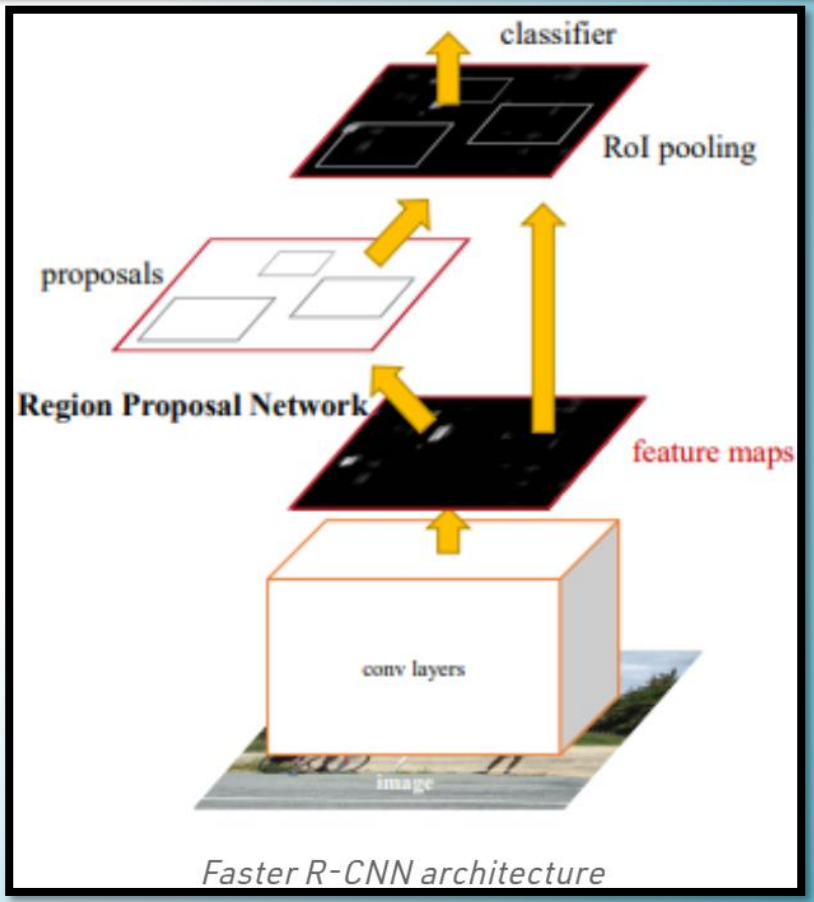


Object Detection Architectures using CNN.

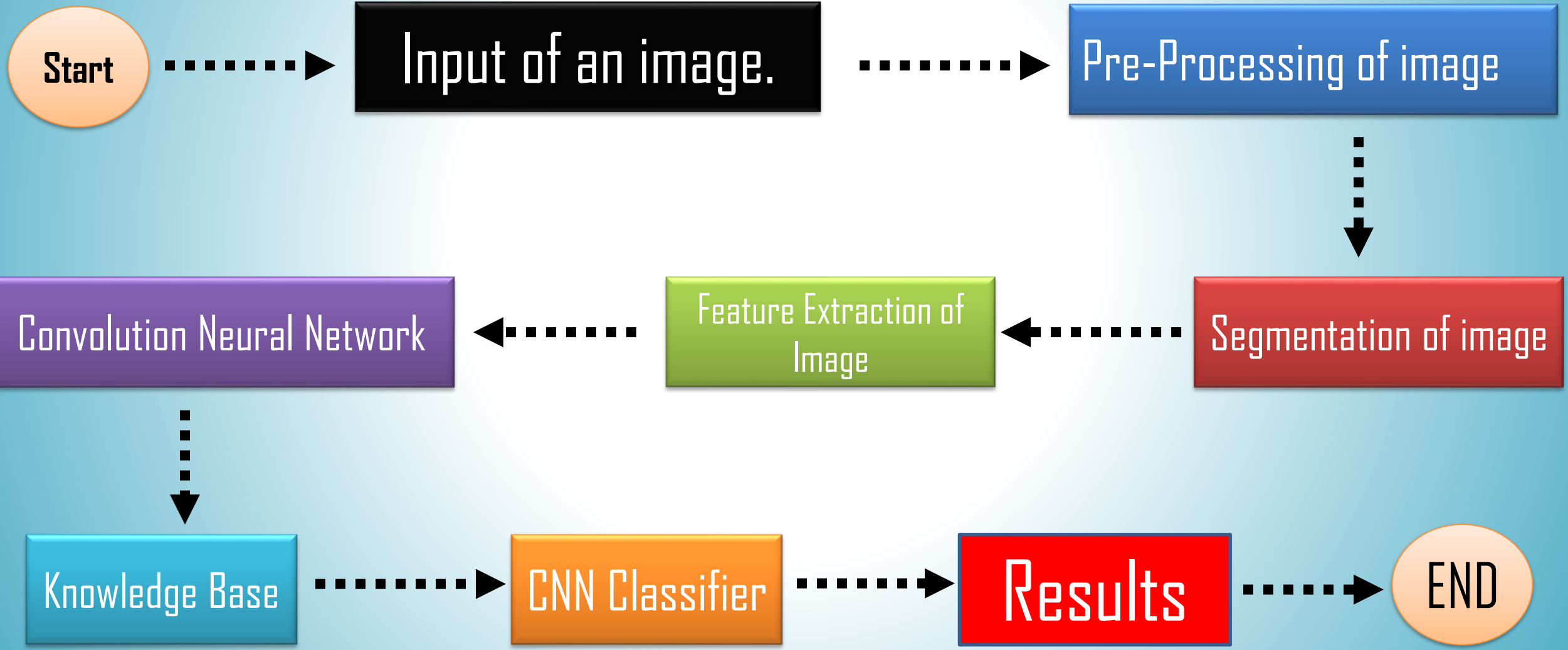


Fast R-CNN





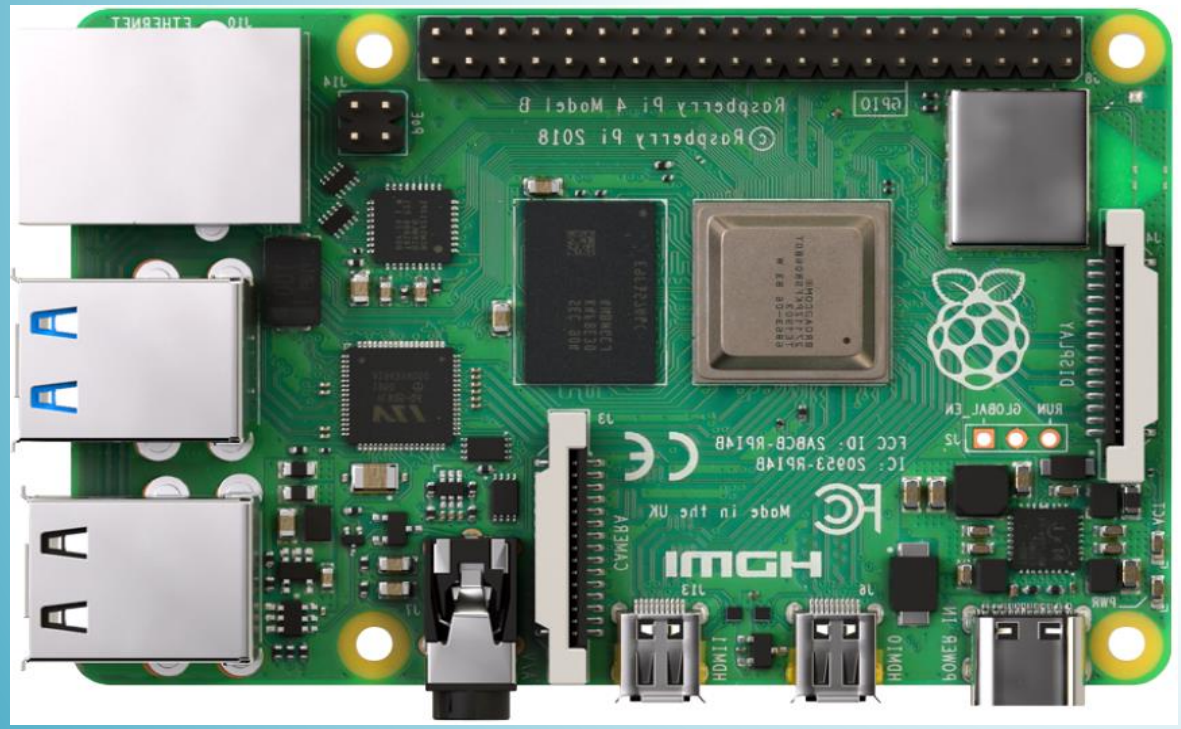
Flow Chart

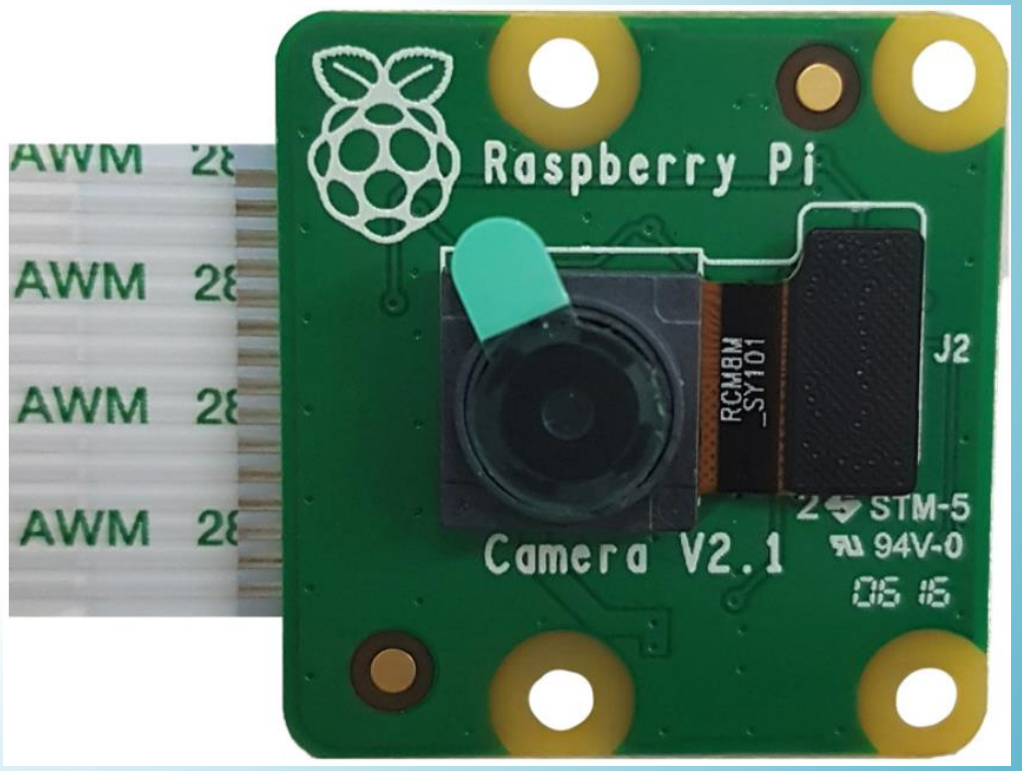

Start
Input of an image.
Pre-Processing of image
Segmentation of image
Feature Extraction of Image
Convolution Neural Network
Knowledge Base
CNN Classifier
Results
END

System Components

Raspberry Pi4

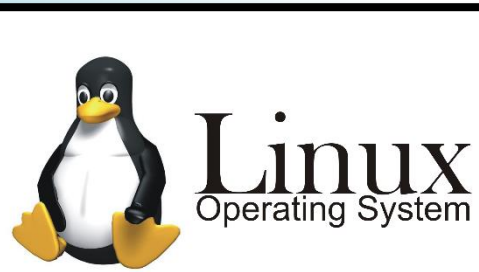
CAMERA MODULE V2



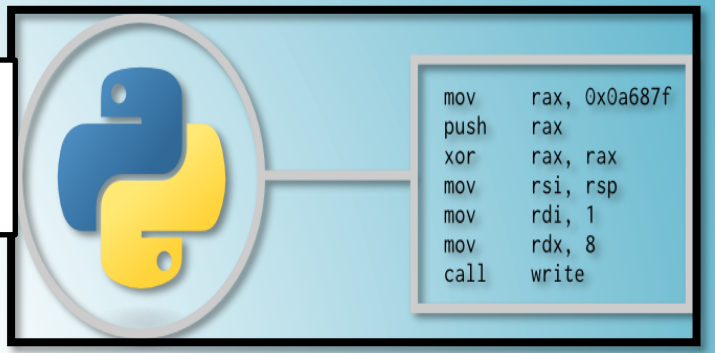


Software :-

Linux OS



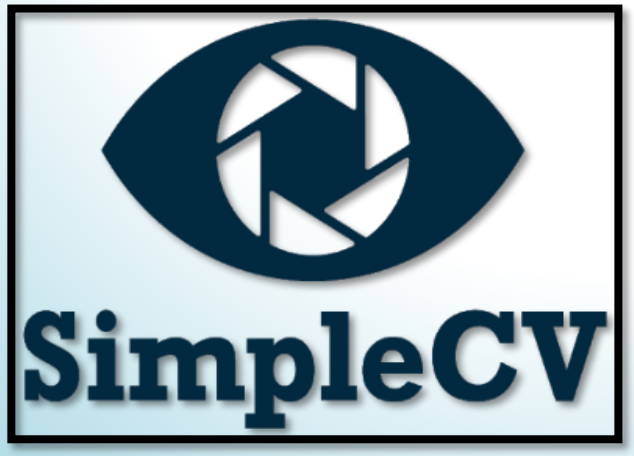
Python C



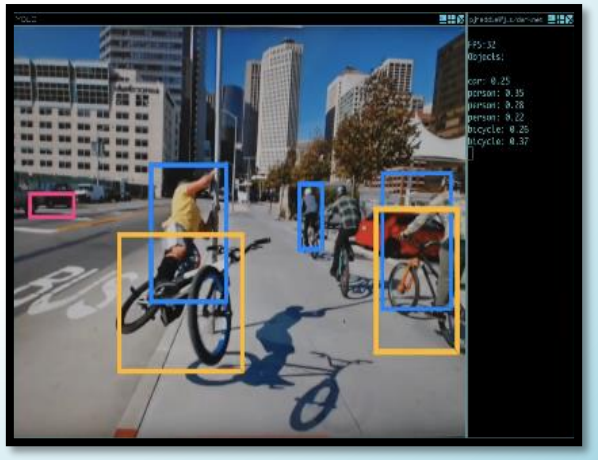
Computer Vision Programs

OpenCV

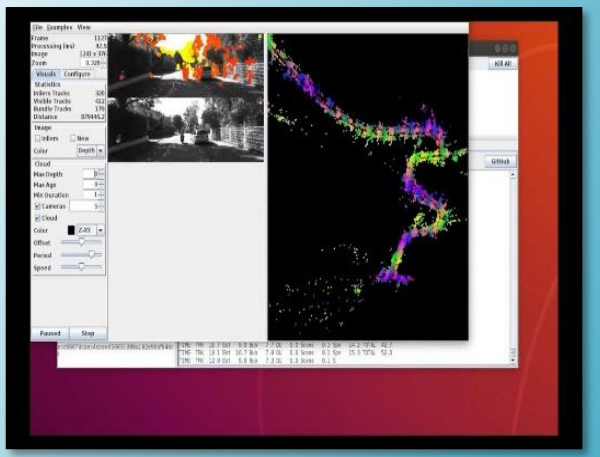
SimpleCV



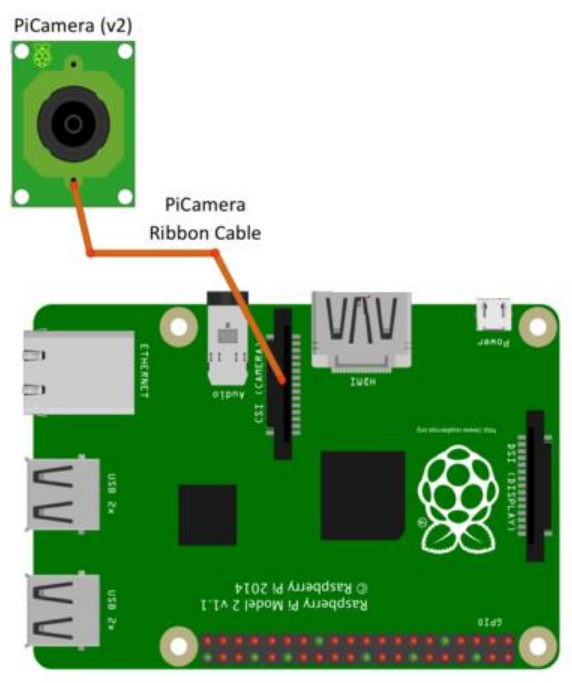
YOLO

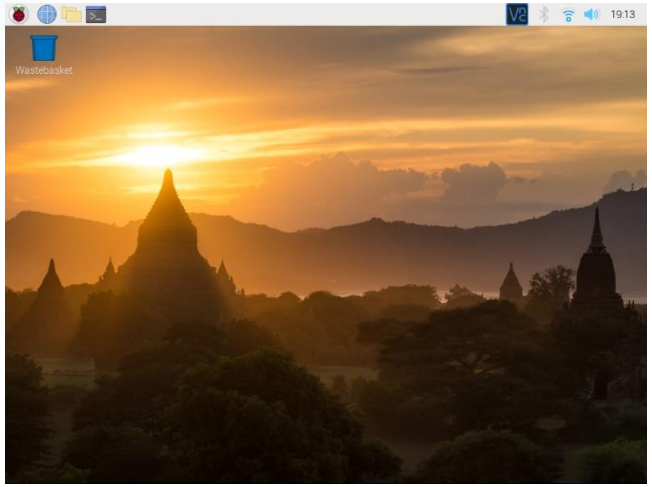


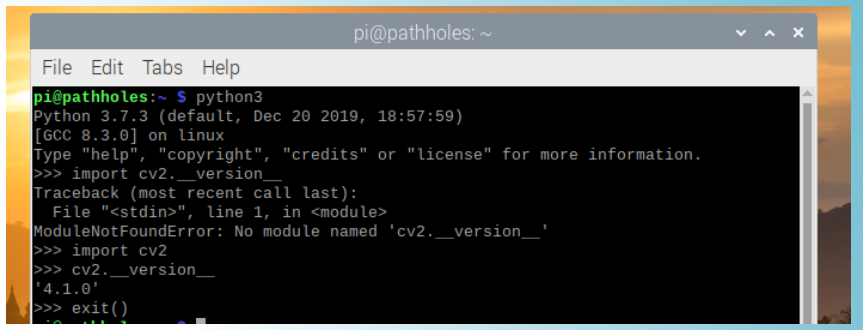
BoofCV

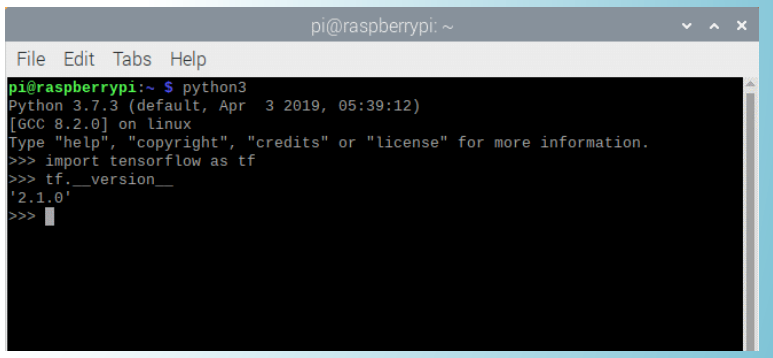


System Design:-

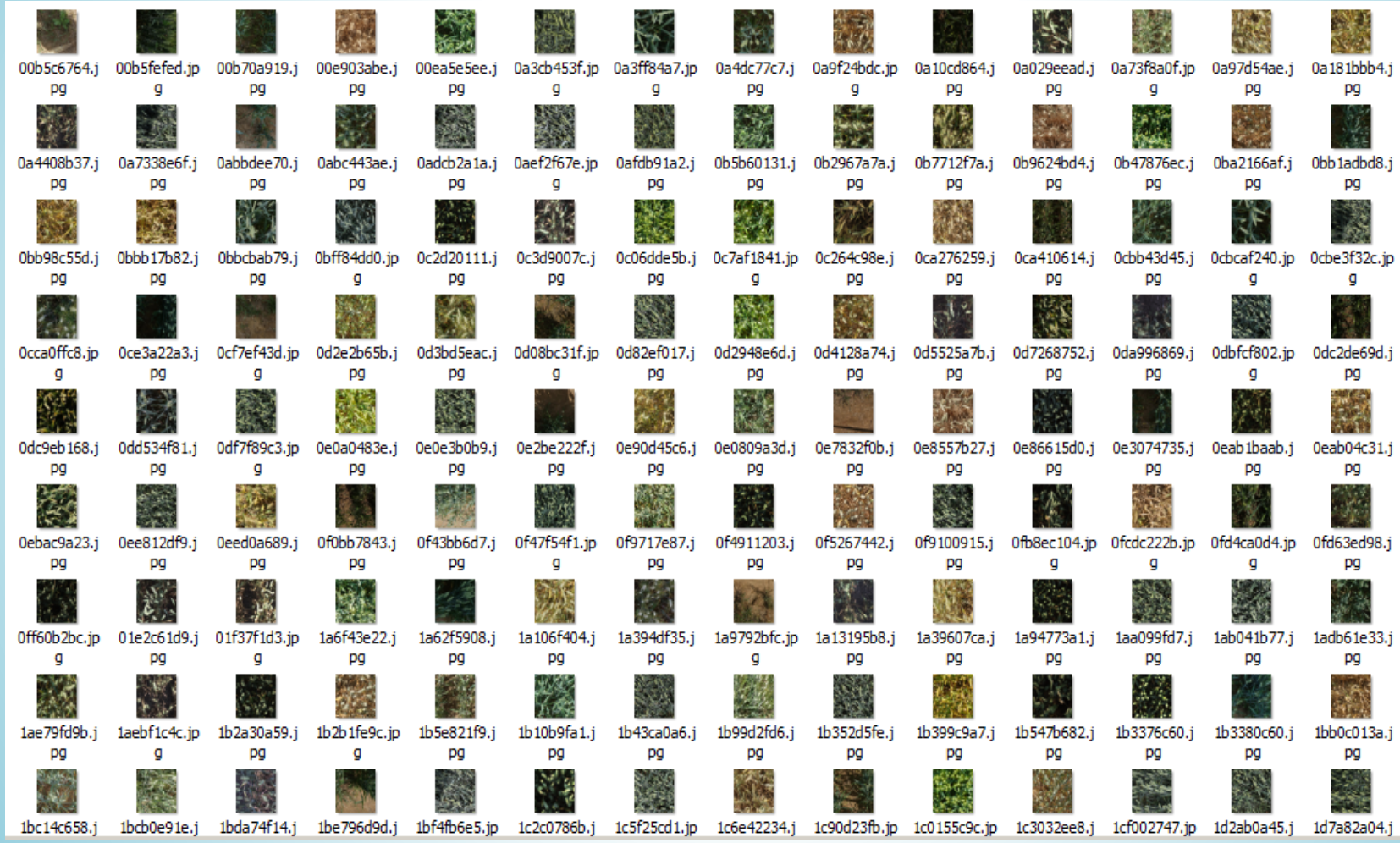




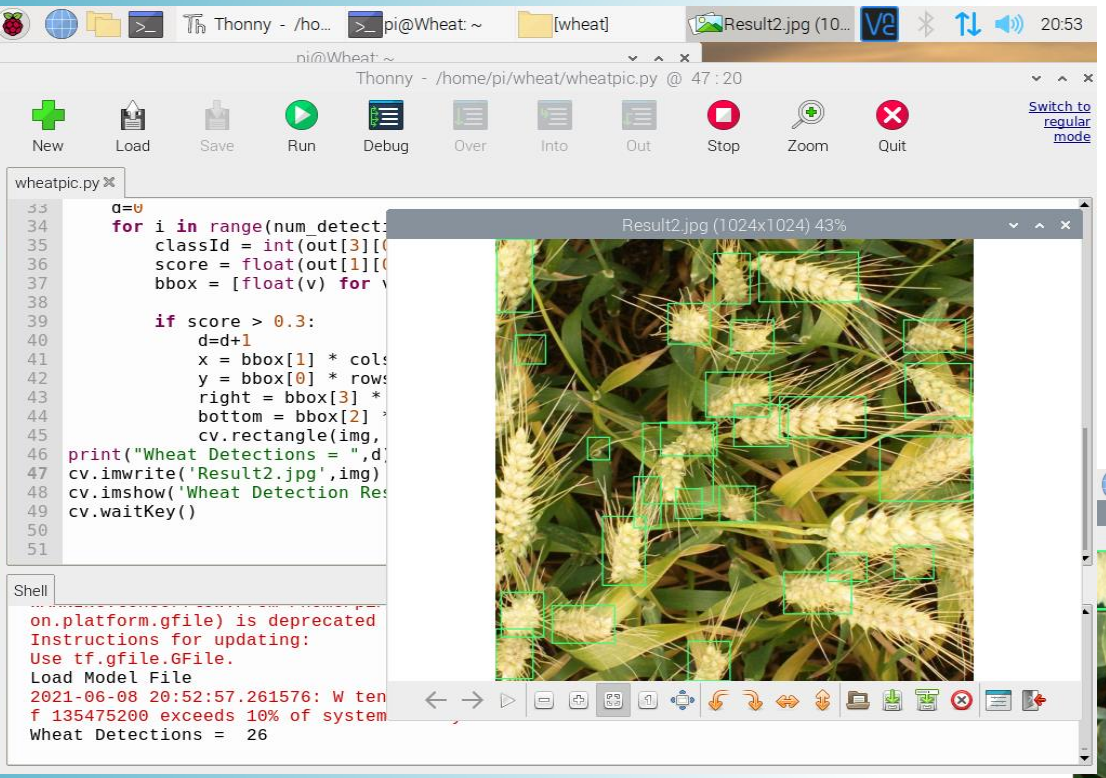


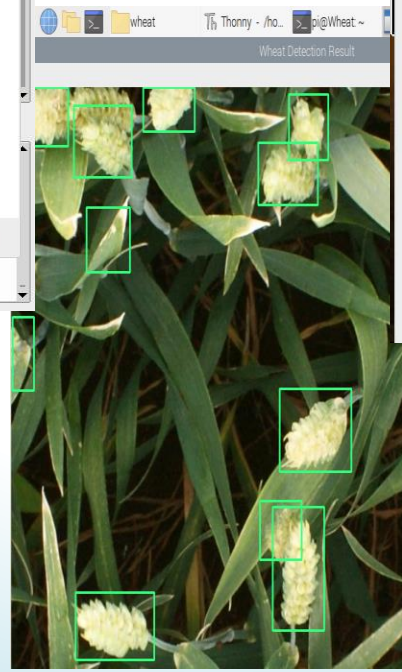


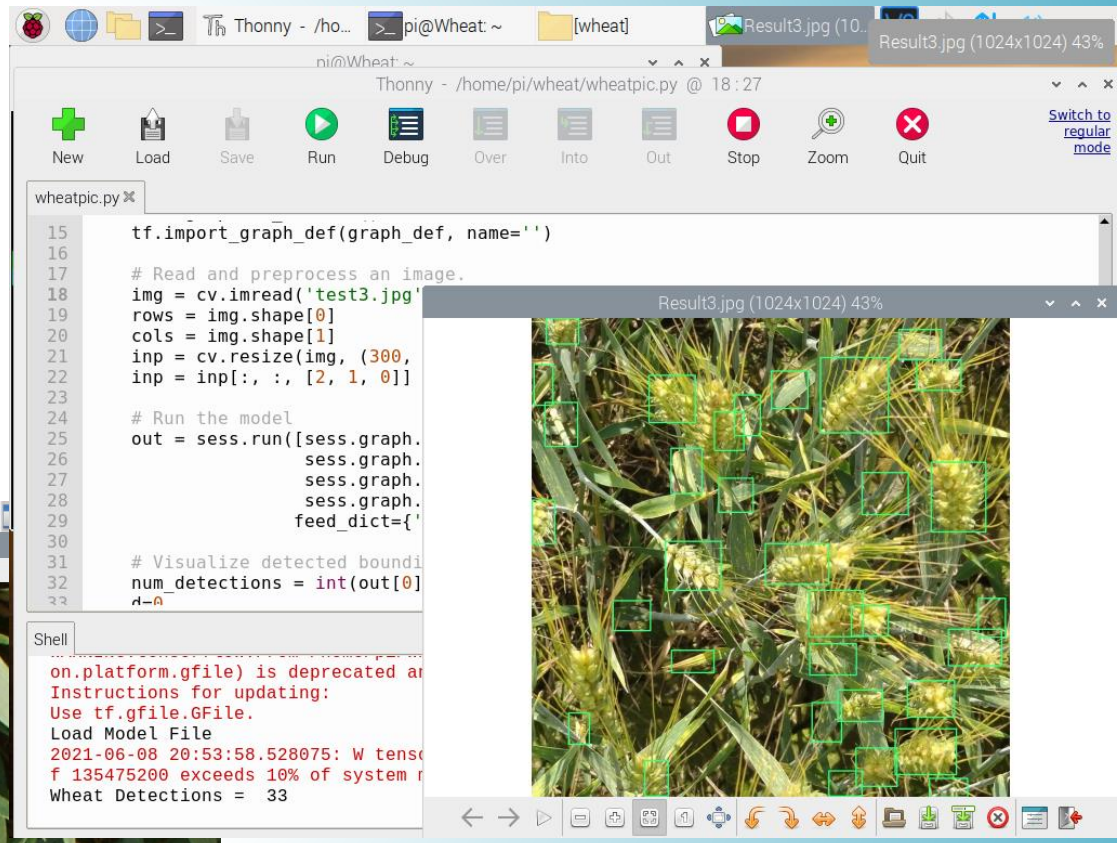
Wheat Spike Training Set



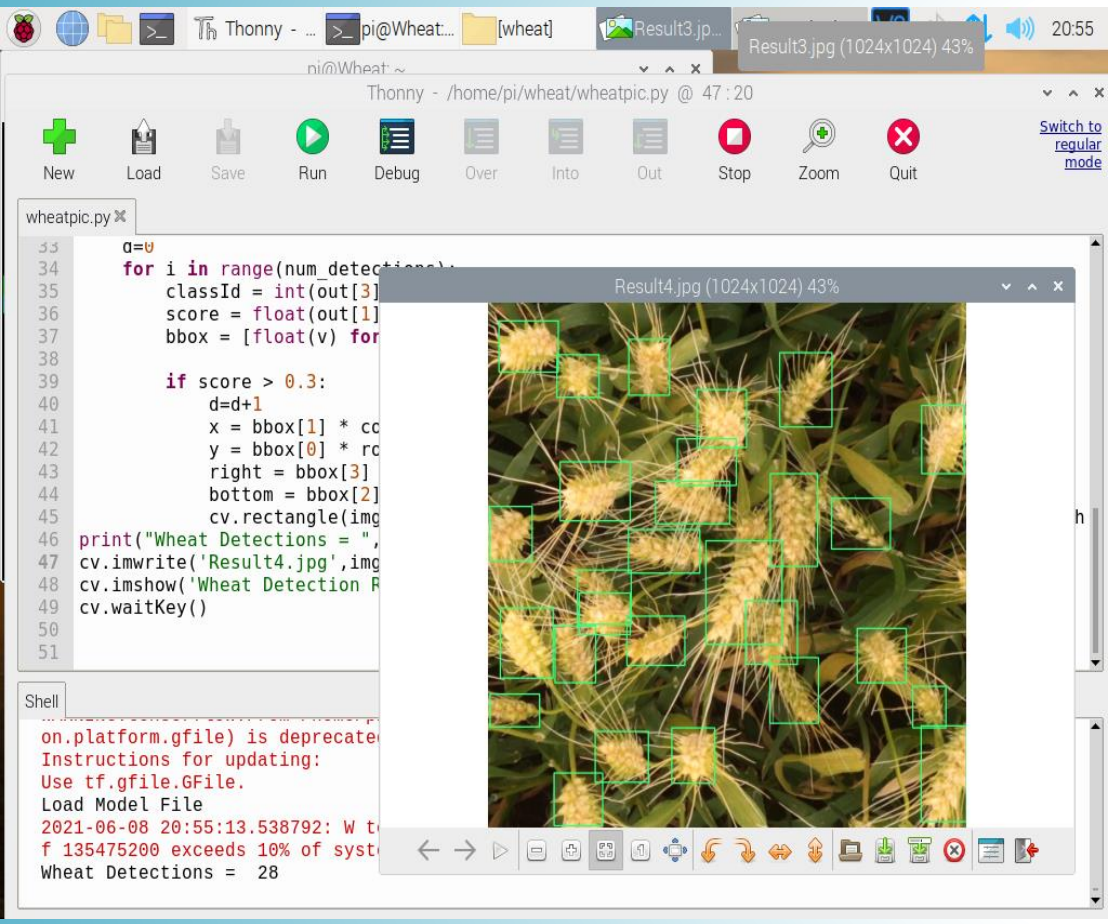
Wheat Spike Detection

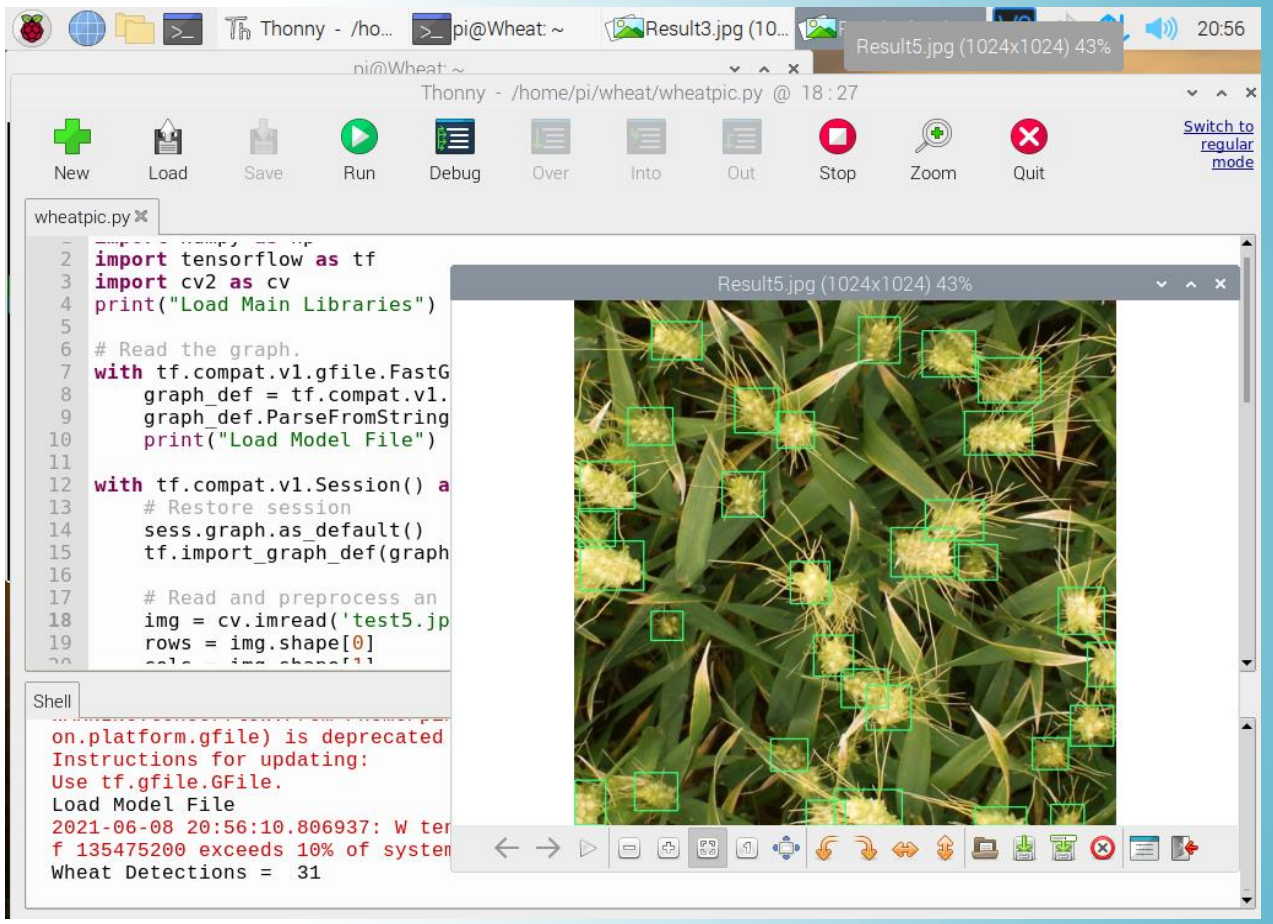




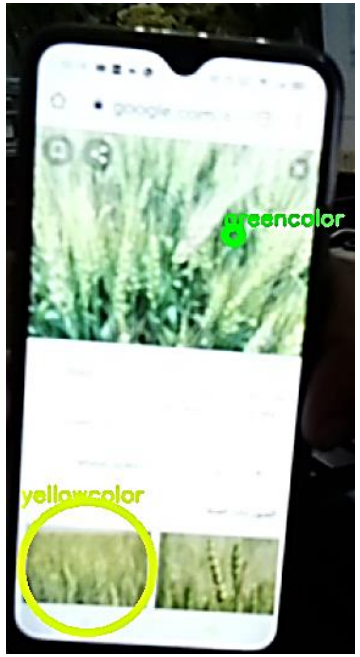


Wheat Spike Detection

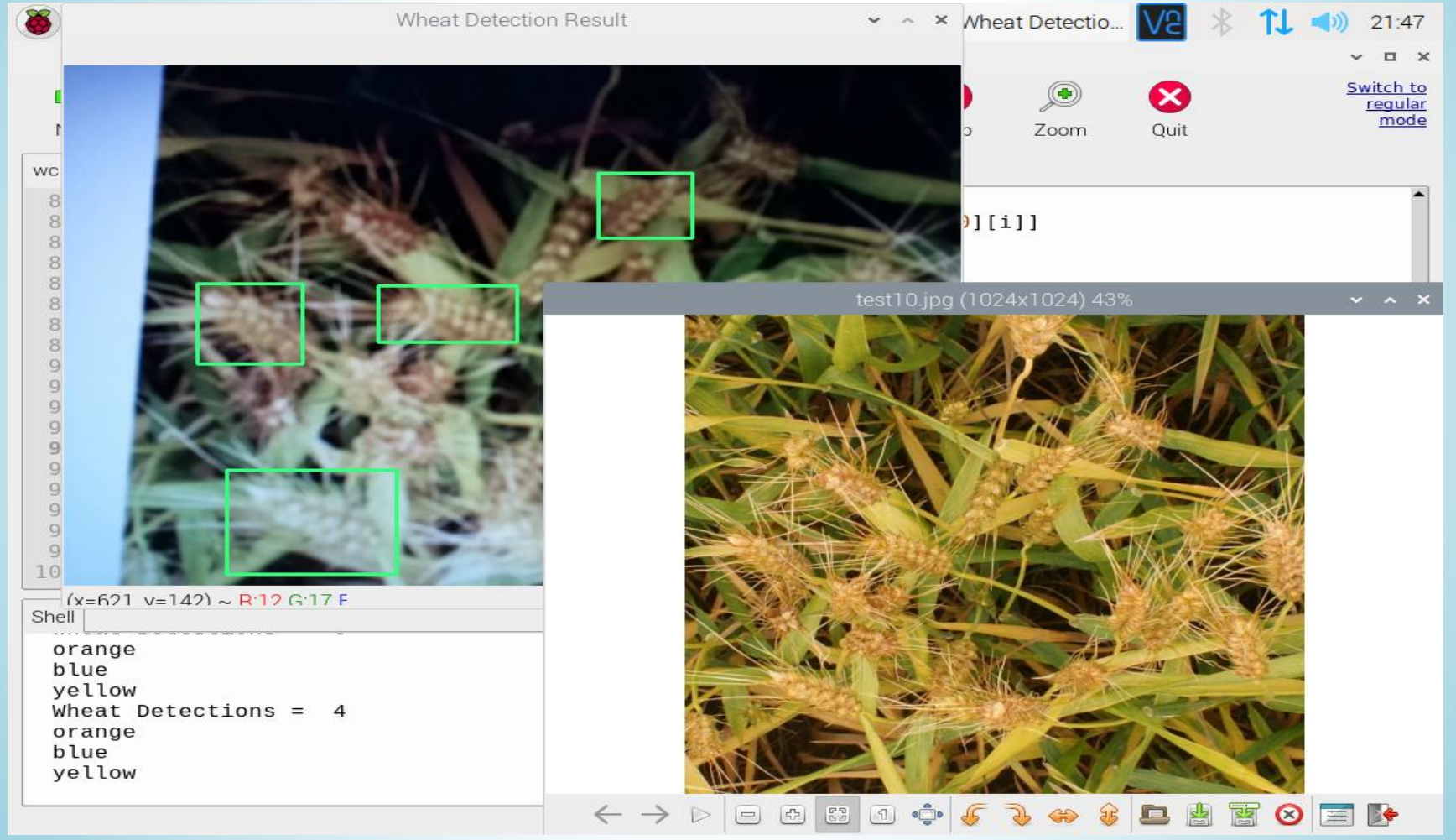




Color Detection



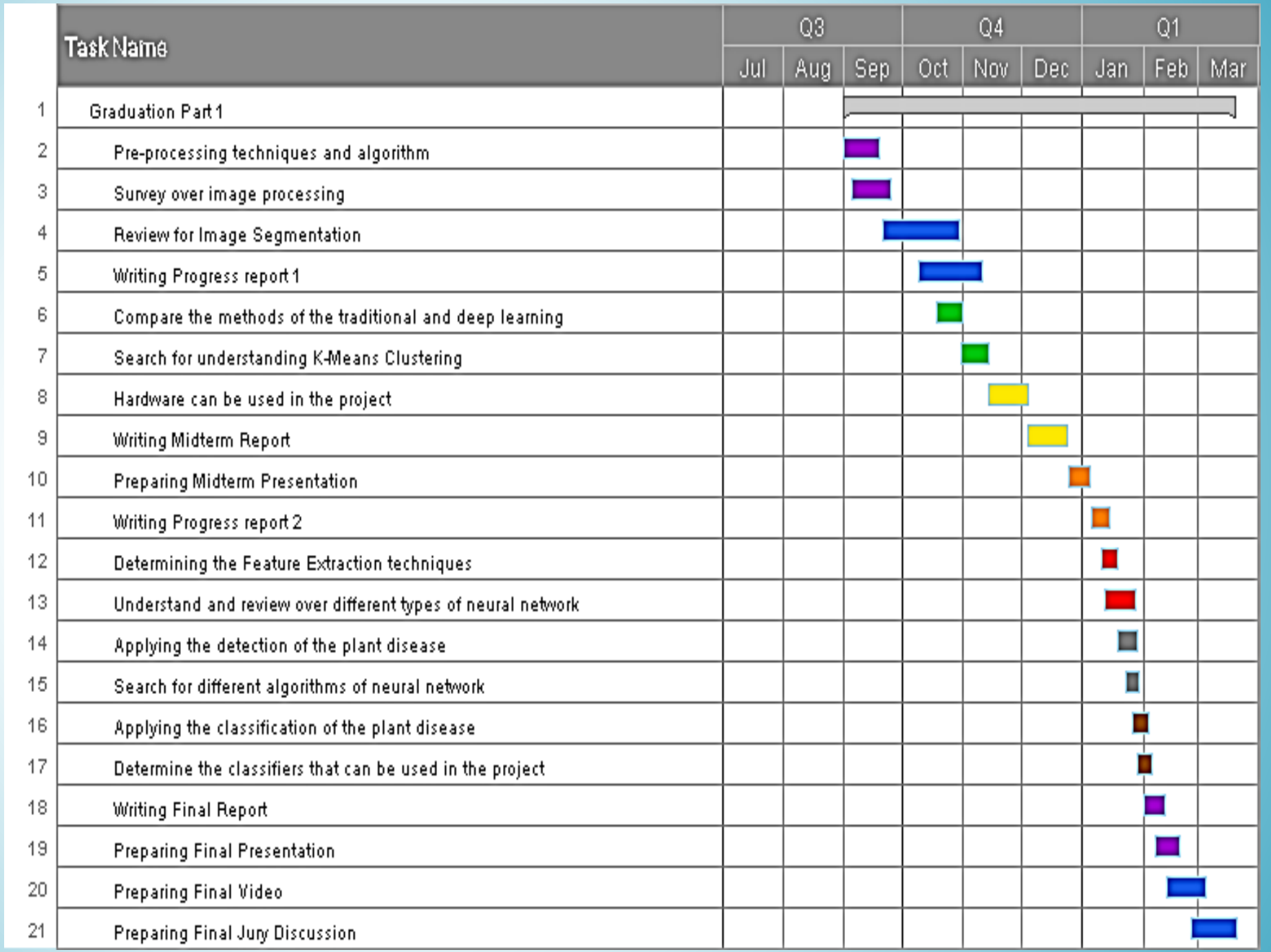
wheat spike stream



Time Plan

Task No.	Task Holder	Task Description	Exact Execution Time
	Mahmoud	Buying Components	2 weeks
	Marco	Testing Components	2 weeks
	Mahmoud	Operating System installation over the Raspberry pi board	2 weeks
	Marco	Operating the camera module over the Raspberry Pi	2 weeks
	Mahmoud Marco	Progress Report one	2 weeks
	Mahmoud	Training the wheat objects	1 week
	Marco	Detecting the wheat objects	1 week
1.	Mahmoud	Counting the wheat detected	1 week
1.	Marco	Color detection method	1 week
1.	Mahmoud Marco	Progress Report Two	2 weeks
1.	Mahmoud	Increase the performance speed and time	2 weeks
1.	Marco	Increase the accuracy of video stream detection	2 weeks
1.	Mahmoud	Project assembly	2 weeks
1.	Marco	Project Testing	2 weeks
1.	Mahmoud Marco	Final Preparation	2 weeks

Time Plan


Task Name
Q3
Q4
Q1
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
1 Graduation Part 1
2 Pre-processing techniques and algorithm
3 Survey over image processing
4 Review for Image Segmentation
5 Writing Progress report 1
6 Compare the methods of the traditional and deep learning
7 Search for understanding K-Means Clustering
8 Hardware can be used in the project
9 Writing Midterm Report
10 Preparing Midterm Presentation
11 Writing Progress report 2
12 Determining the Feature Extraction techniques
13 Understand and review over different types of neural network
14 Applying the detection of the plant disease
15 Search for different algorithms of neural network
16 Applying the classification of the plant disease
17 Determine the classifiers that can be used in the project
18 Writing Final Report
19 Preparing Final Presentation
20 Preparing Final Video
21 Preparing Final Jury Discussion

Future Work

- Increasing the wheat spike database and increasing its accuracy.
- Adding a wheat leaf disease to evaluate the wheat disease types
- Increase the accuracy of detection over live stream.
- Decrease the detection time using faster algorithms for wheat spike detection.
- Classify the type of wheat spike.

Cost Analysis

Item	Cost
Raspberry Pi 4	2000 L.E.
Camera Module	800 L.E.
Total	2800 LE

Conclusion

- Improving accuracy up to 86 % .
- Increasing response speed around 300 ms .
- Implement the Hardware & Software of project .


Thank
you!!


ANY
QUESTIONS?