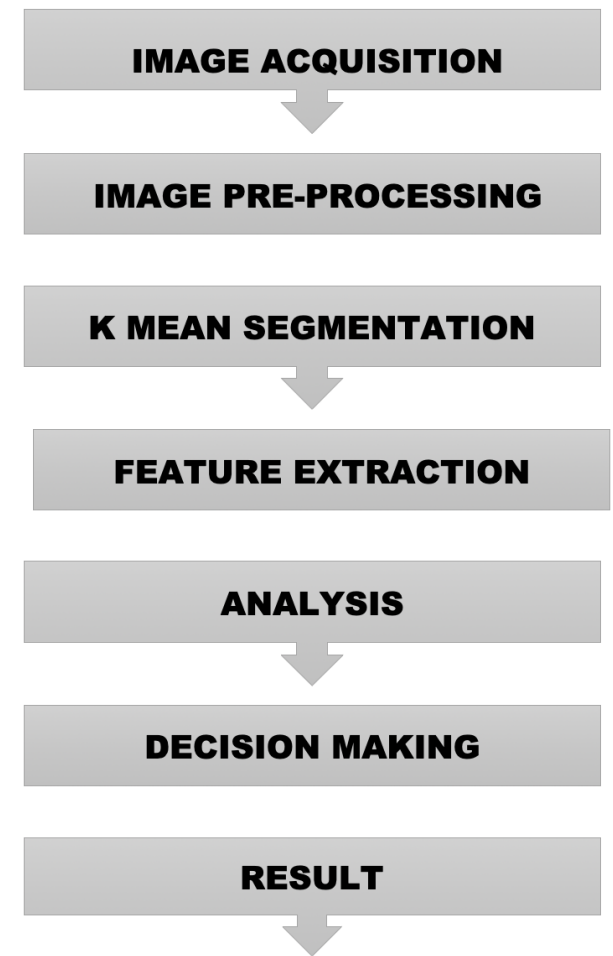# Detection and Prediction of Plant Health.

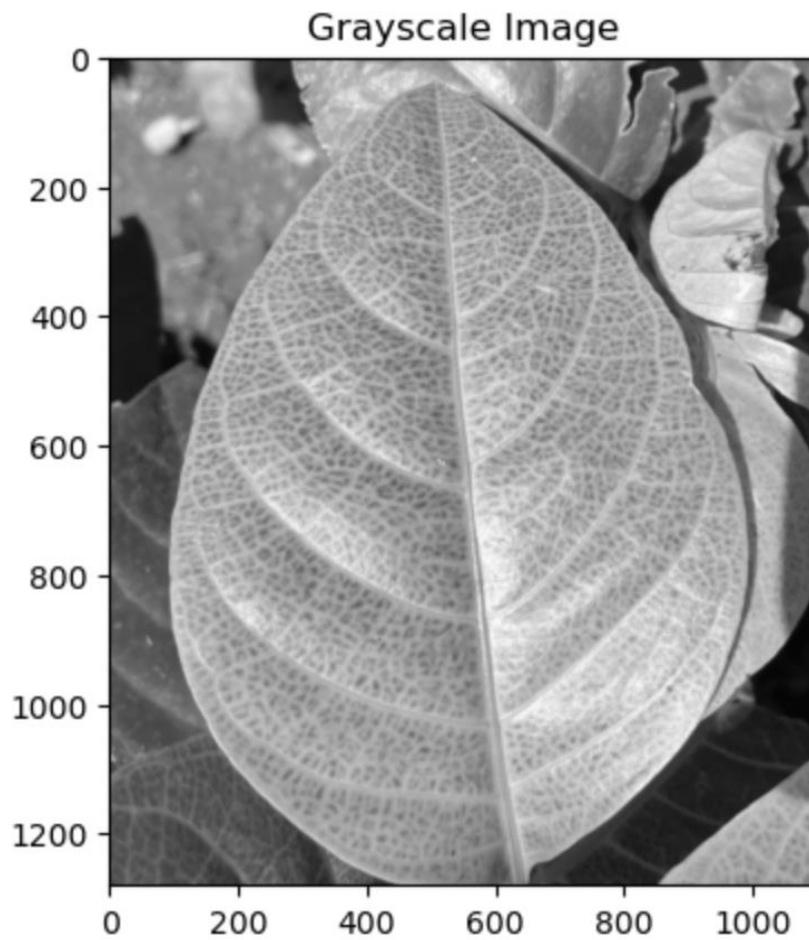IMAGE ACQUISITION

↓

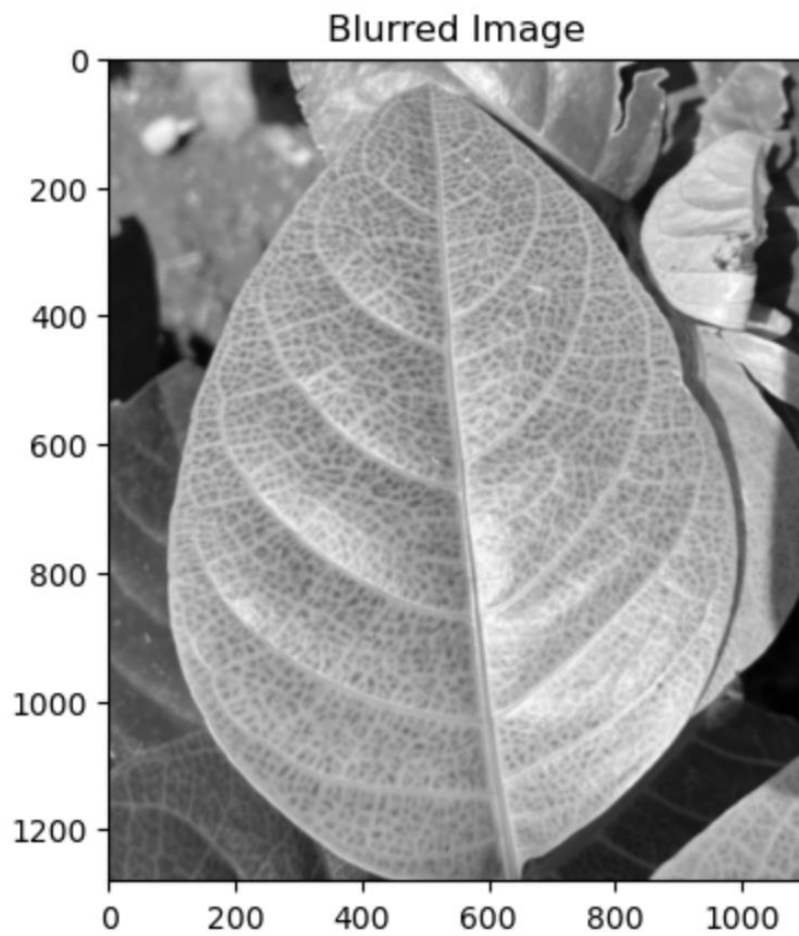IMAGE PRE-PROCESSING

K MEAN SEGMENTATION

↓

FEATURE EXTRACTION

ANALYSIS

↓

DECISION MAKING

RESULT

↓

Step_1: Image Acquisition
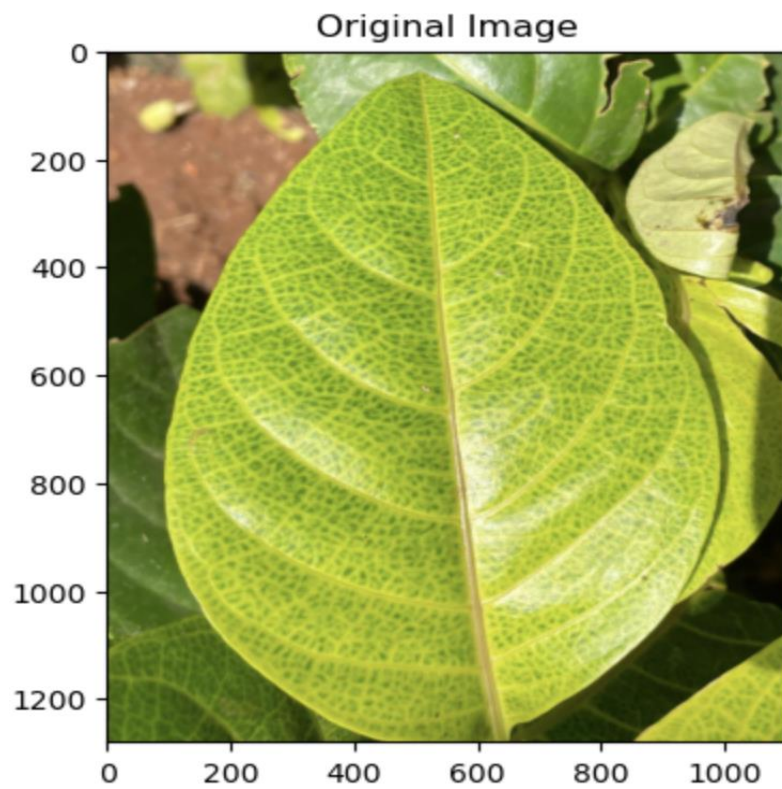
Original Image

→ It is the original image.

Step_2: Image Pre-processing

Grayscale Image
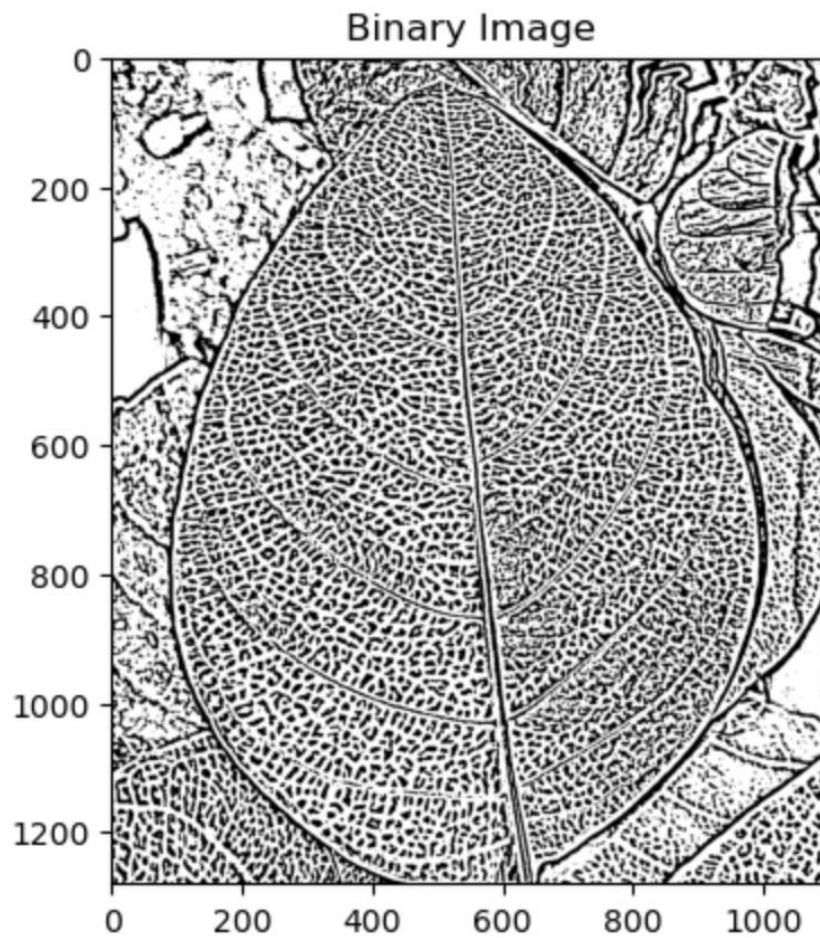
→ The original image is converted to grayscale image, for simplification and dimensionally reduction.
→ By this it makes easier to process and analyse.

Blurred Image

→ The original image is converted to blurred image, for removing high-frequency details.

→ By this image helps to reduce the noise impact of the elements.

Binary Image

→ The original image is converted to binary image, for segmenting the image and separate objects from the background based on their intensity or brightness values.

Step_3: K-mean Segmentation

Original Image with Contour
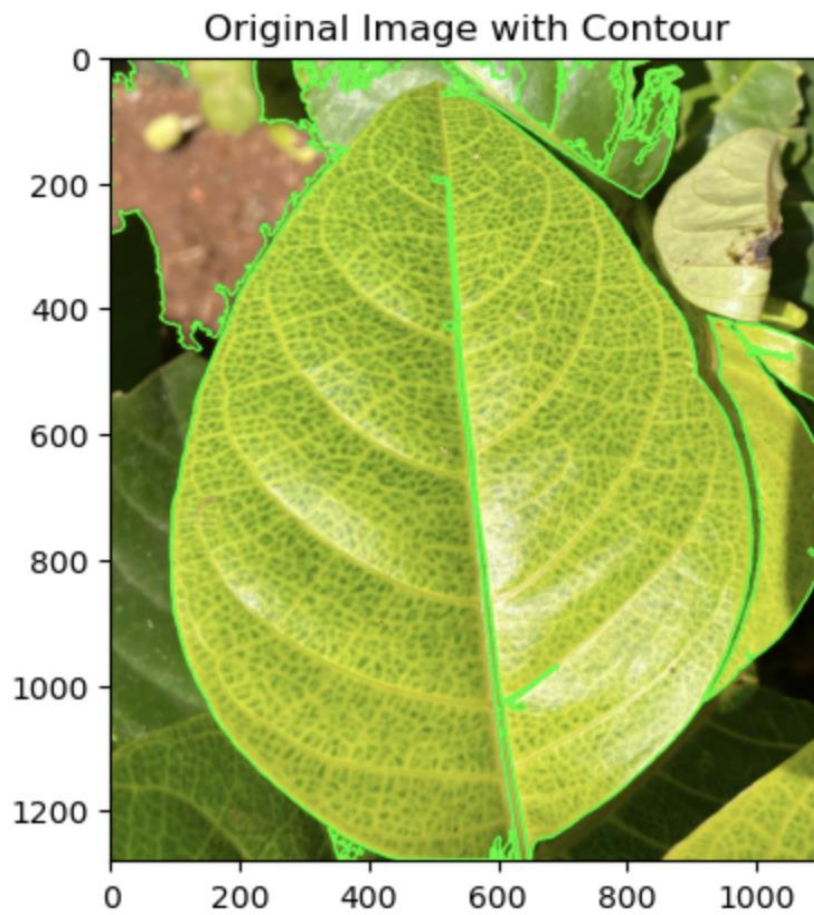
→ The original image is converted to original image with contour.

→ It detects and segmentation, shape analysis, edge detection.
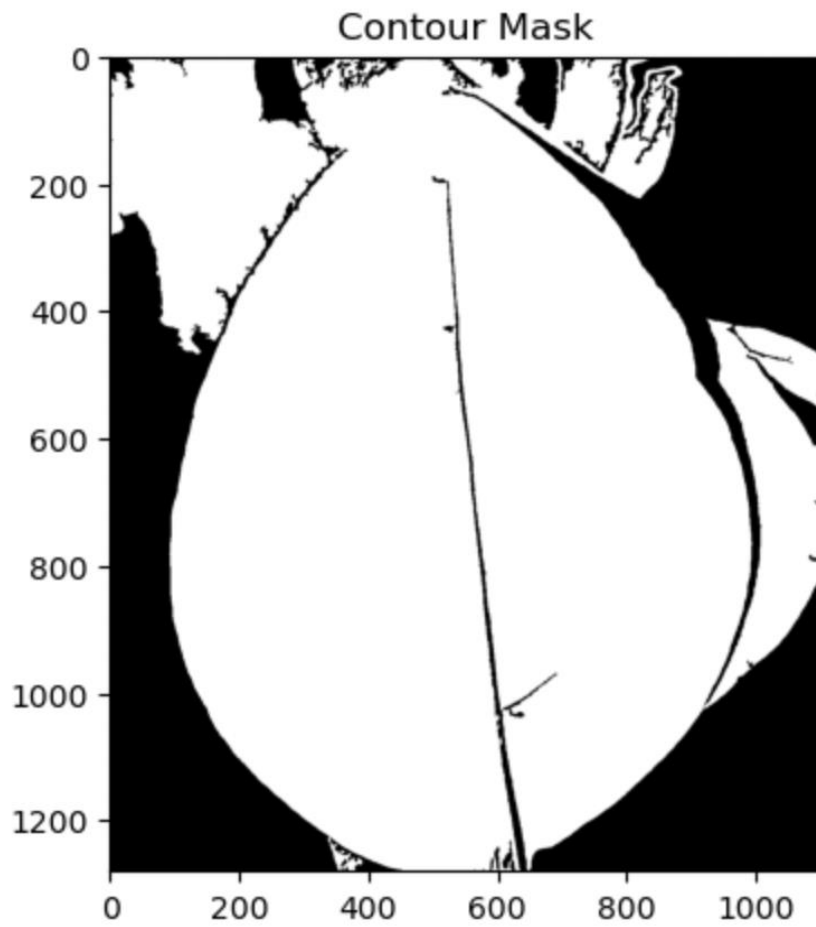
Contour Mask

→ The original image is converted to contour mask.

→ It extracts image and segments, Image editing and manipulation with visualization.

Original Image with Contour and Features
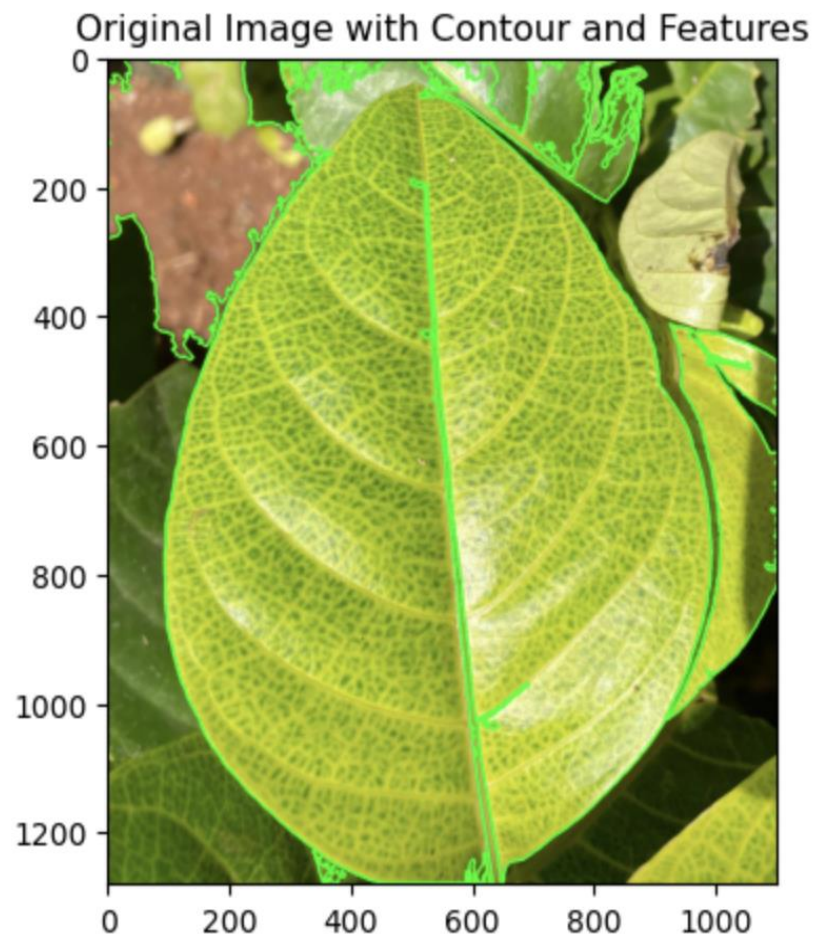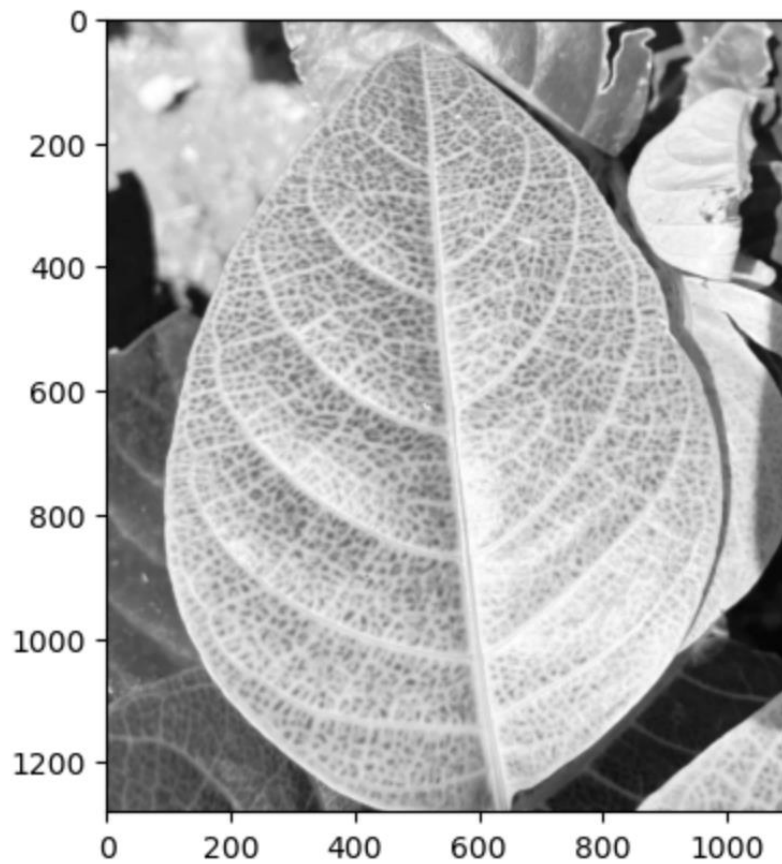
→ The original image is converted into original with contour and features.

→ It analyses shape, feature and extracts it.
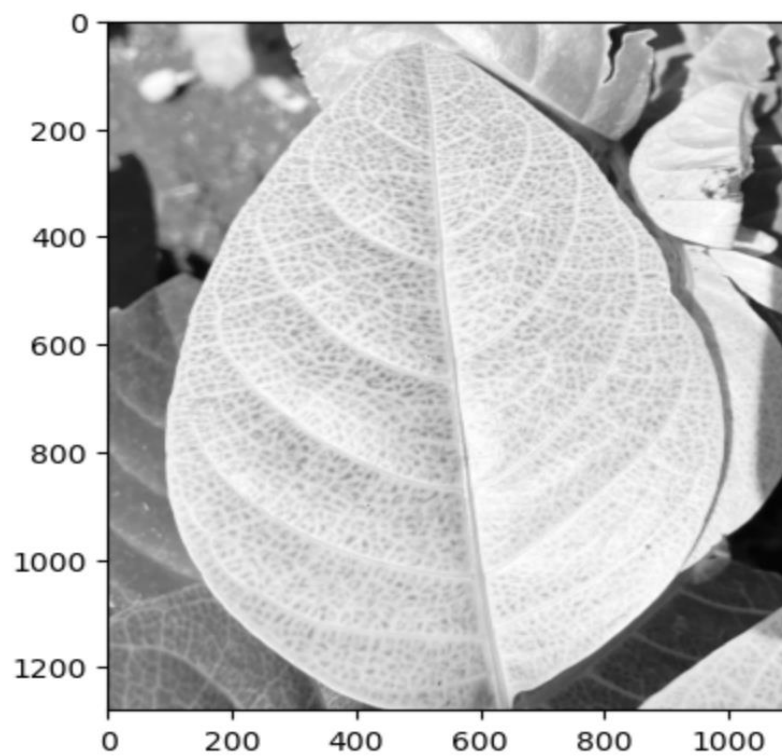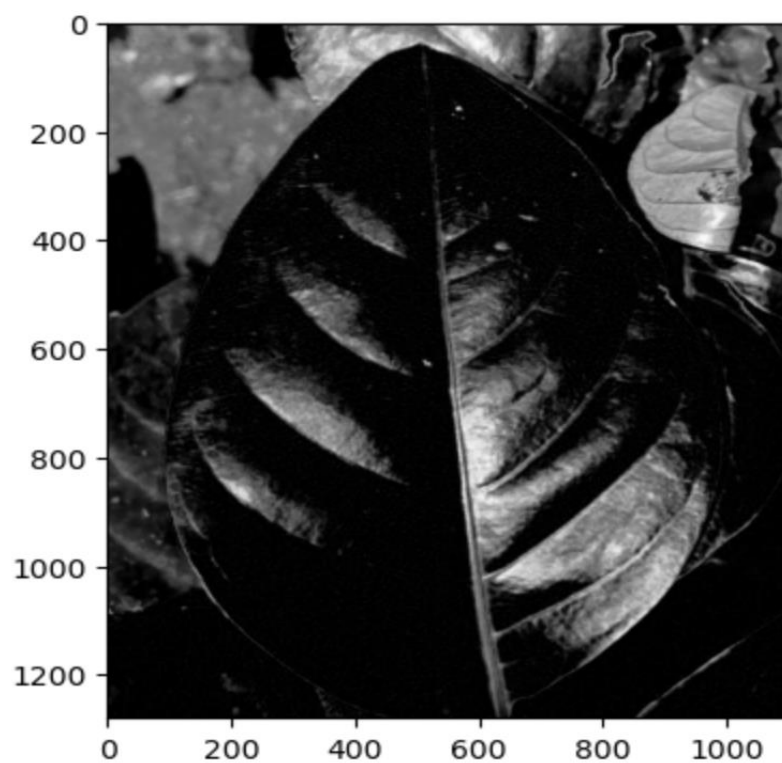
Step_4: Feature Extraction

- Red Channel

→ The original image is converted into red channel, for analysis of red-based features.

→ Colour space transformation and experimental purposes.

• Green Channel

→ The original image is converted into green channel, for colour information emphasis.
→ Contrast enhancement.
• Blue Channel

→ The original image is converted into blue channel, for emphasizing specific features.
→ Application-specific requirements and colour-based requirements.

Step_5: Analysis

```
Features: [-0.85819257  0.43854759 -0.24551553  1.9576593  -2.25278775  2.26135352
  0.08838438  0.37368121 -0.54368938]

Leaf Area: 239821.85 cm^2
Leaf Perimeter: 2449.37 cm
Leaf Shape (Circularity): 0.50
Leaf Color: L*=23.67%, a*=-1.17, b*=-0.12
Leaf Color Standard Deviation: Std(L*)=8.77%, Std(a*)=7.28, Std(b*)=9.87
Chlorophyll Percentage: 2188.66%
Vitamin Percentage: 4975.96%
Leaf Texture: 0.20
Color (RGB): R=60.37, G=126.83, B=127.88
Std(R)=22.36, Std(G)=7.28, Std(B)=9.87
```
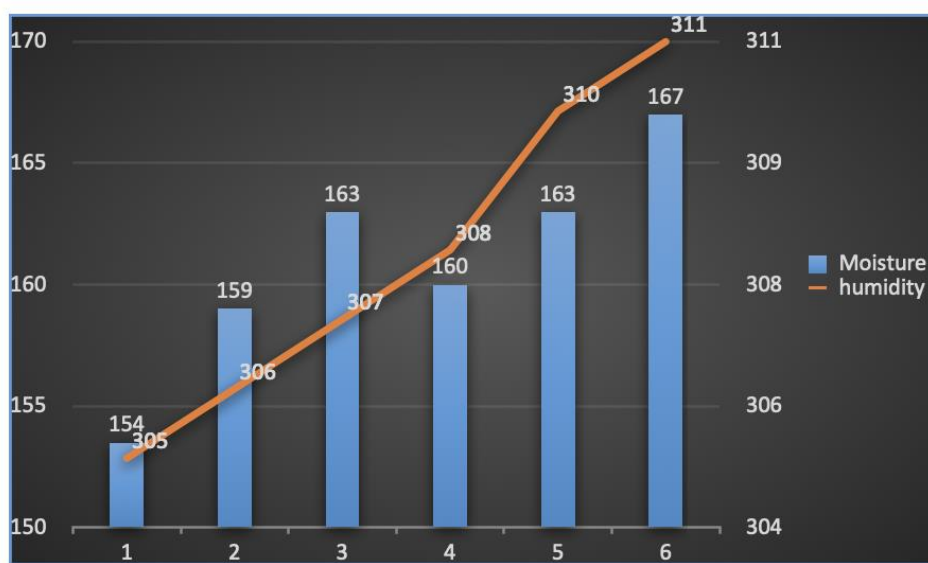
Step_6: Result of Single leaf

The leaf is healthy

Result of Model:

```
Mean Squared Error: 8.039737819425332
Root Mean Squared Error: 2.8354431433949316
R-squared Error: 0.6265738362328013
accuracy of model 89.12
```

Data visualisation of humidity and moisture:

→ It tells about relation between moisture and humidity.

→ The orange line represents humidity and blue line represents about moisture.
→ The range of humidity is 300-315 and range of moisture is 150-170.