Tea clone classification from images

30x100 Scanned images, 30 classes (100 images in each class)

80-20 train-test data split,

Classifier used: Basic MultiLayer CNN

Down sampled images to 224X224 to reduce computational load

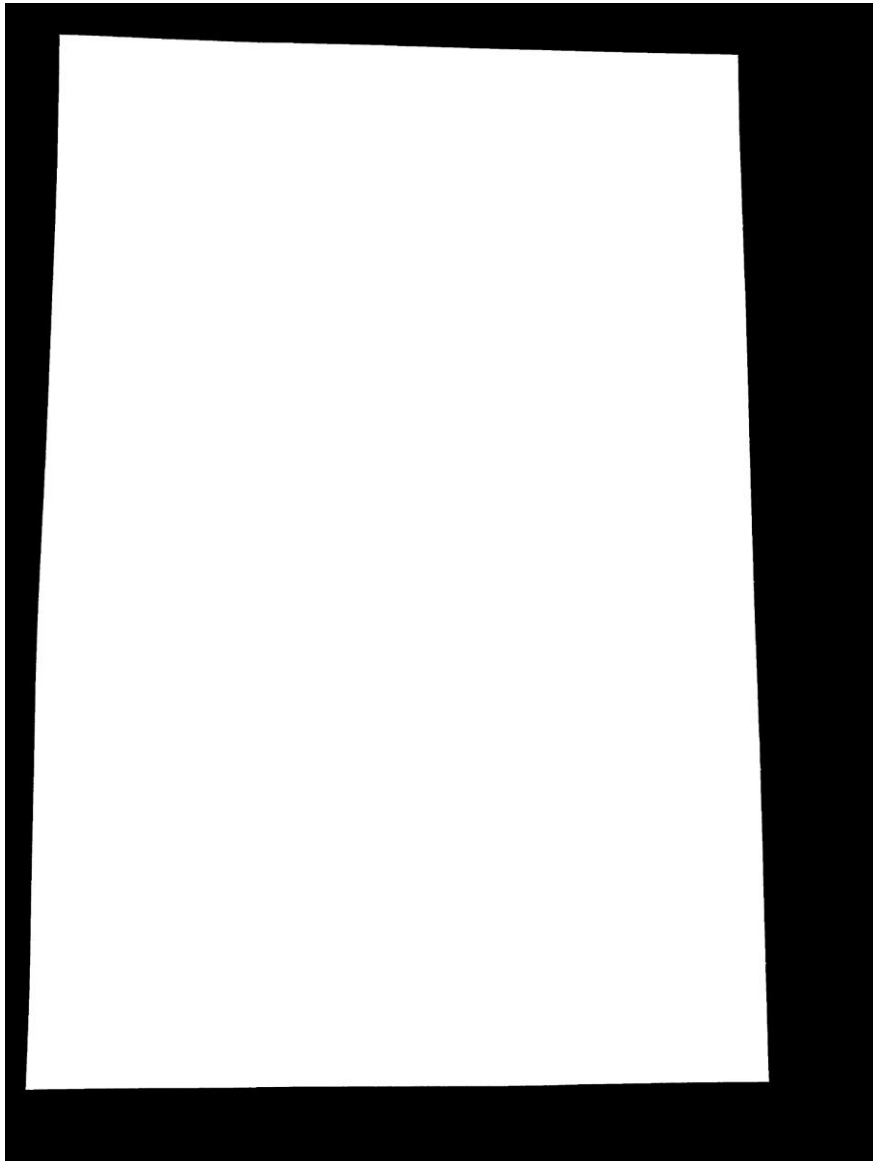
Removed shadow for images (pre-processing)

Details of pre-processing

Preprocessing processes used on image (300 x 300):
1.Contour Detection: Detects & isolates the largest contour(here A4 paper). applies a perspective transformation to **correct camera angle distortion**, ensuring the leaf is **properly aligned and centered** in the frame.

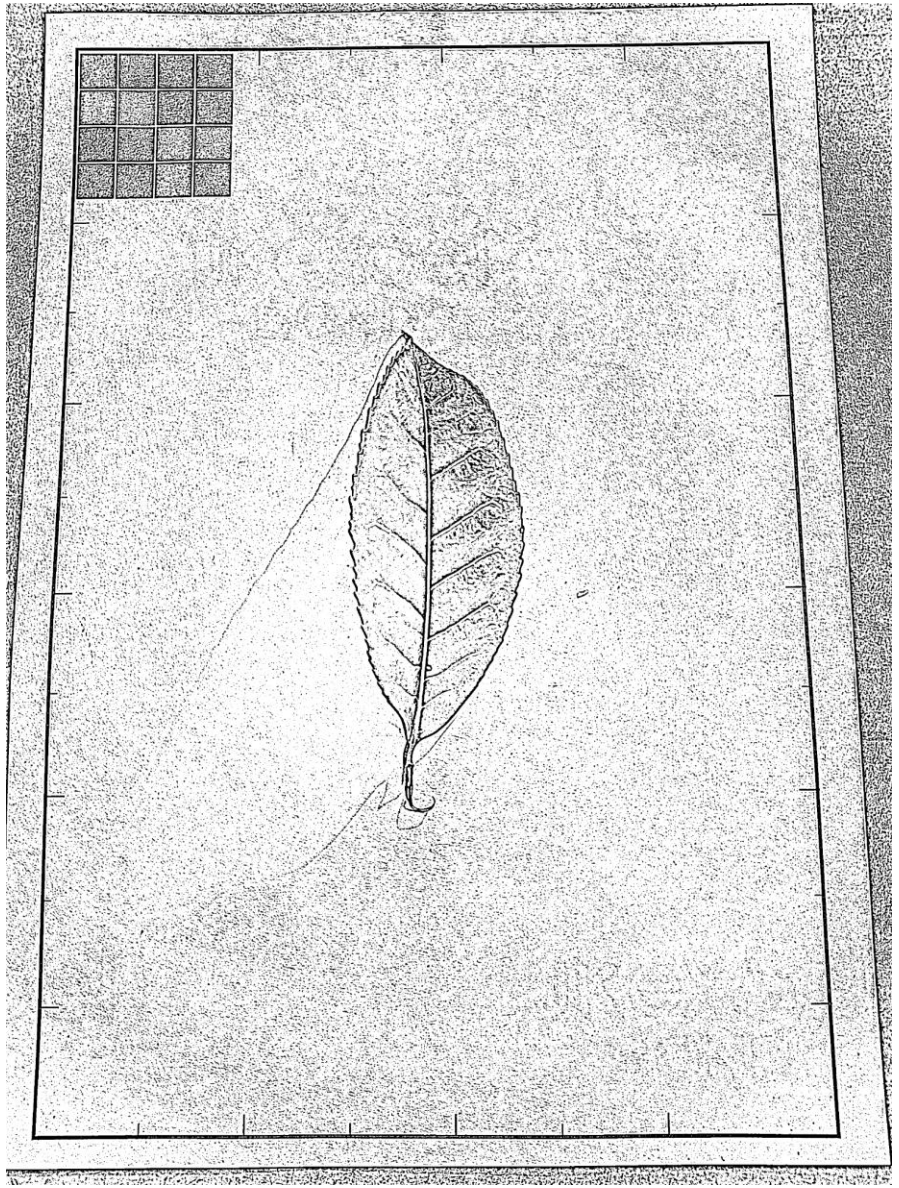
2.Noise Reduction & Thresholding:
Converts the image to grayscale and applies Gaussian blur to control background noise.Uses **adaptive thresholding** to create a binary mask that helps in detecting leaf contour.
3.Green Color Segmentation in HSV: Segments green hues in HSV space to isolate leaves and stems. By setting an upper and lower green HSV bound value to detect leaf.
5.Morphological Tasks: Used closing, opening, erosion, and dilation to refine the mask and remove noise.
6.Isolation: Extracts the convex shape using convex hull. Finally separated the largest detected component (i.e. leaf along with stem) and placed it on a white background/canvas with dimensions adjusted.
Thereby, removing the shadow.

1.Contour Detection: Detects & masks the largest contour(here A4 paper). Identifying a 4-sided quadrilateral (best possible fit)

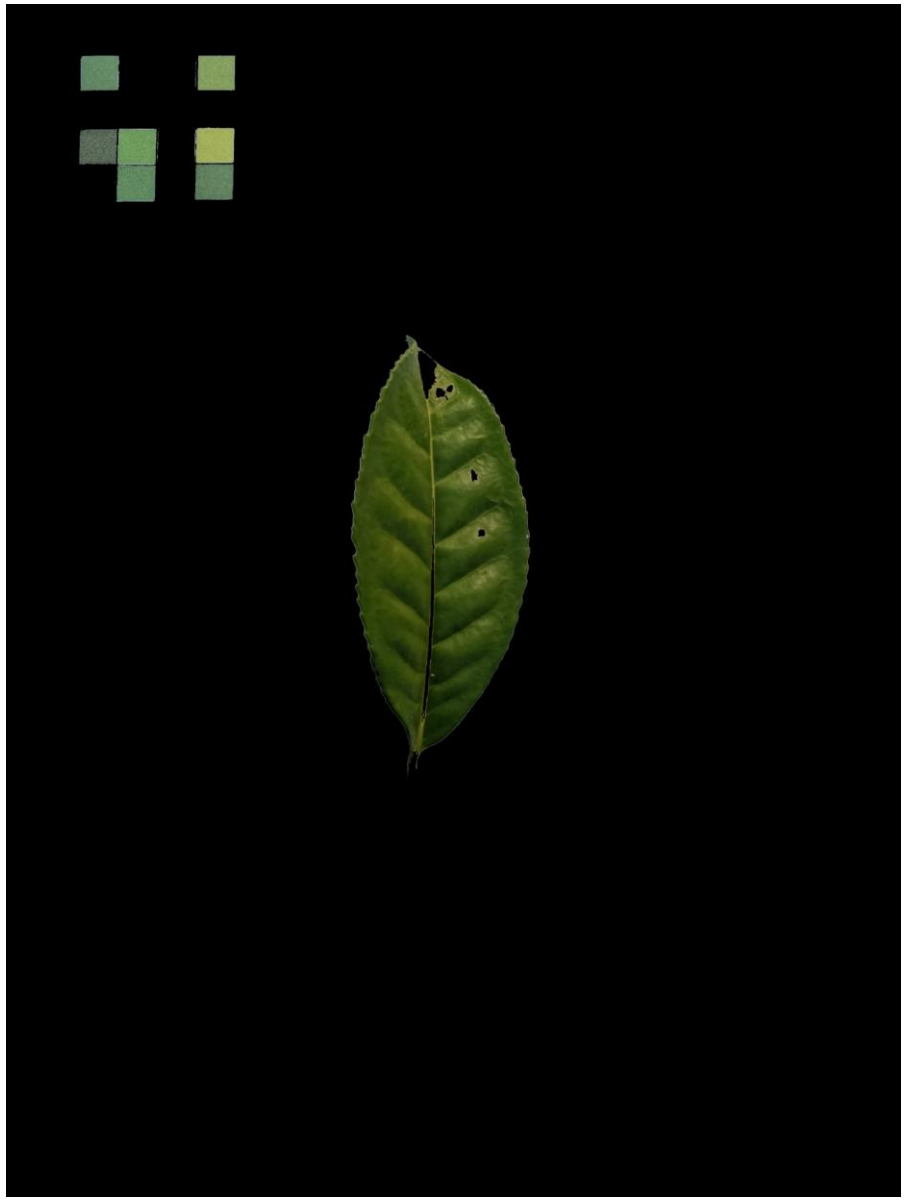


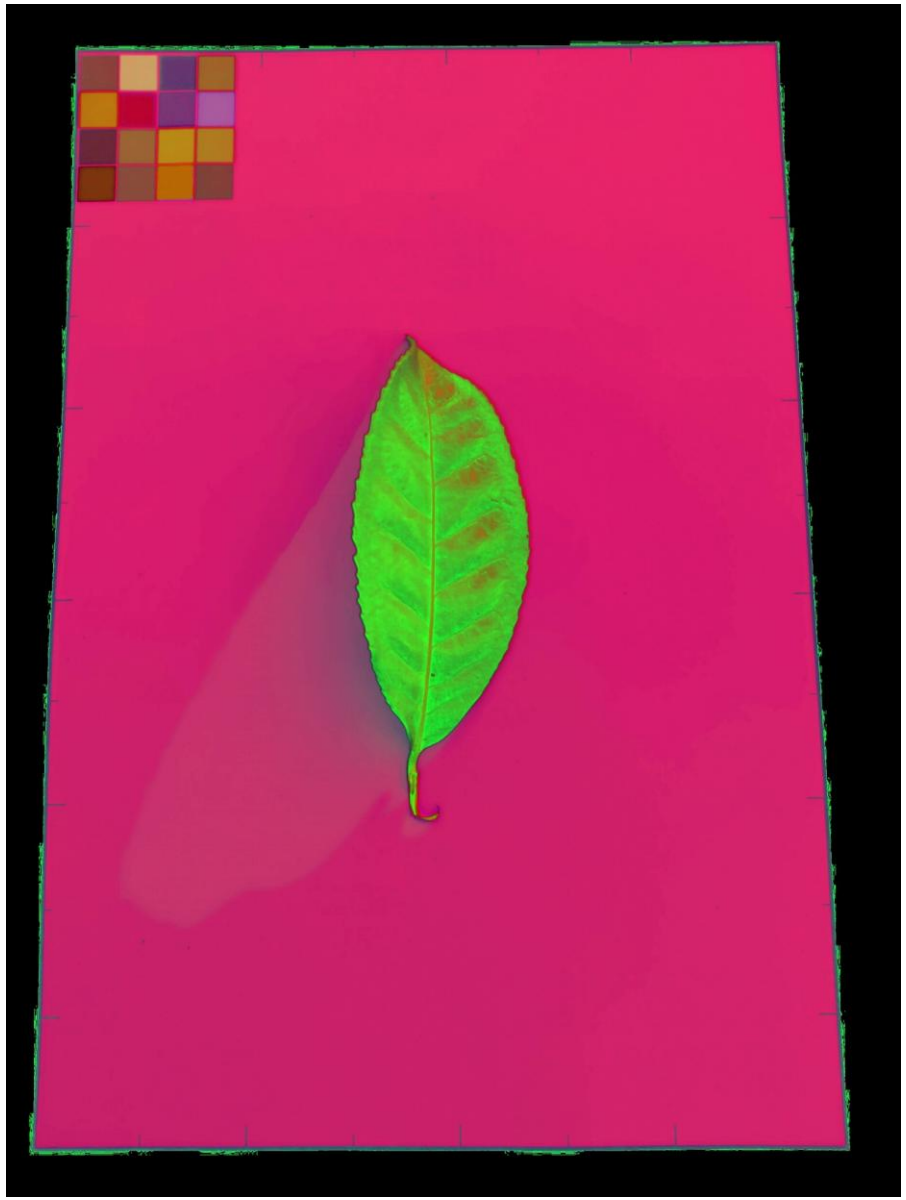
2.Grayscale and Blurring: To reduce noise before applying thresholding process.

3.Adaptive Thresholding: Captures finer details of the image for detection.

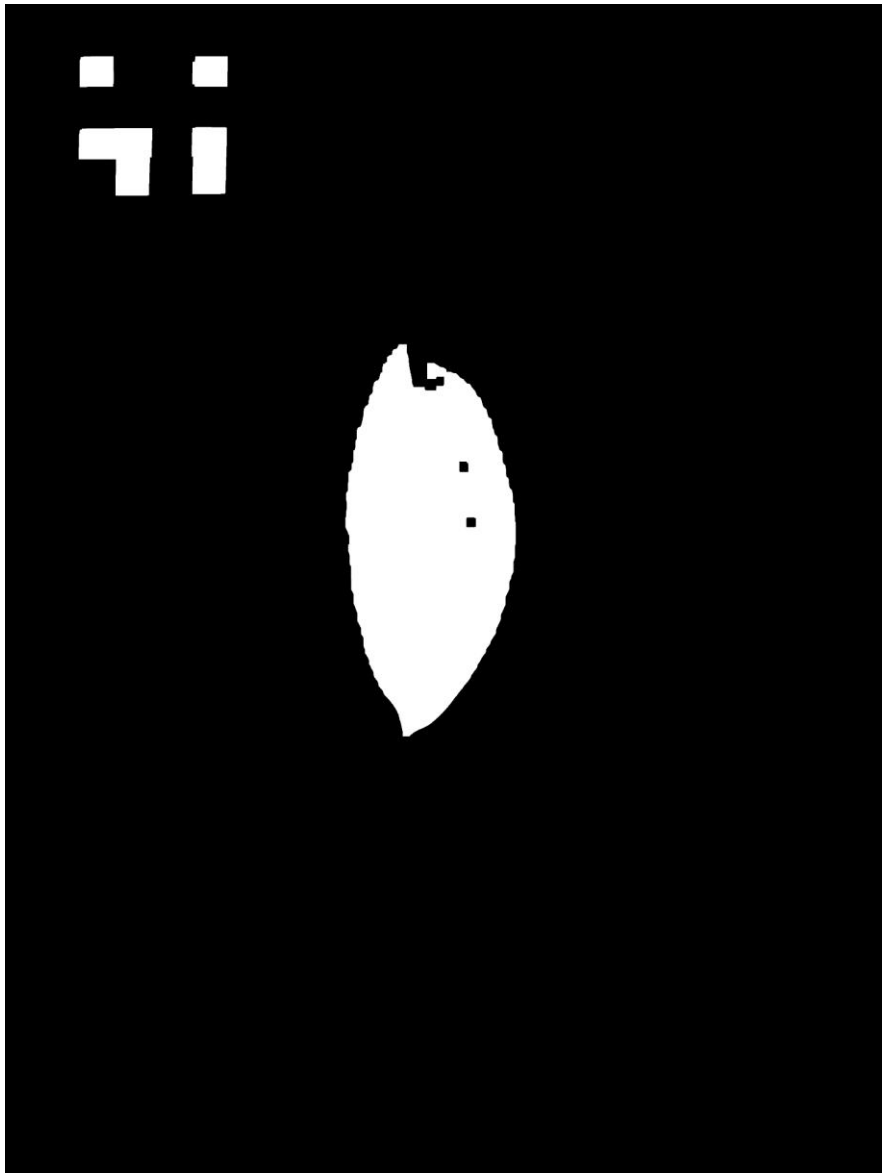


4.Color Segmentation: Segments green hues in HSV space to isolate leaves and stems. By setting an upper and lower green HSV bound value to detect leaf.

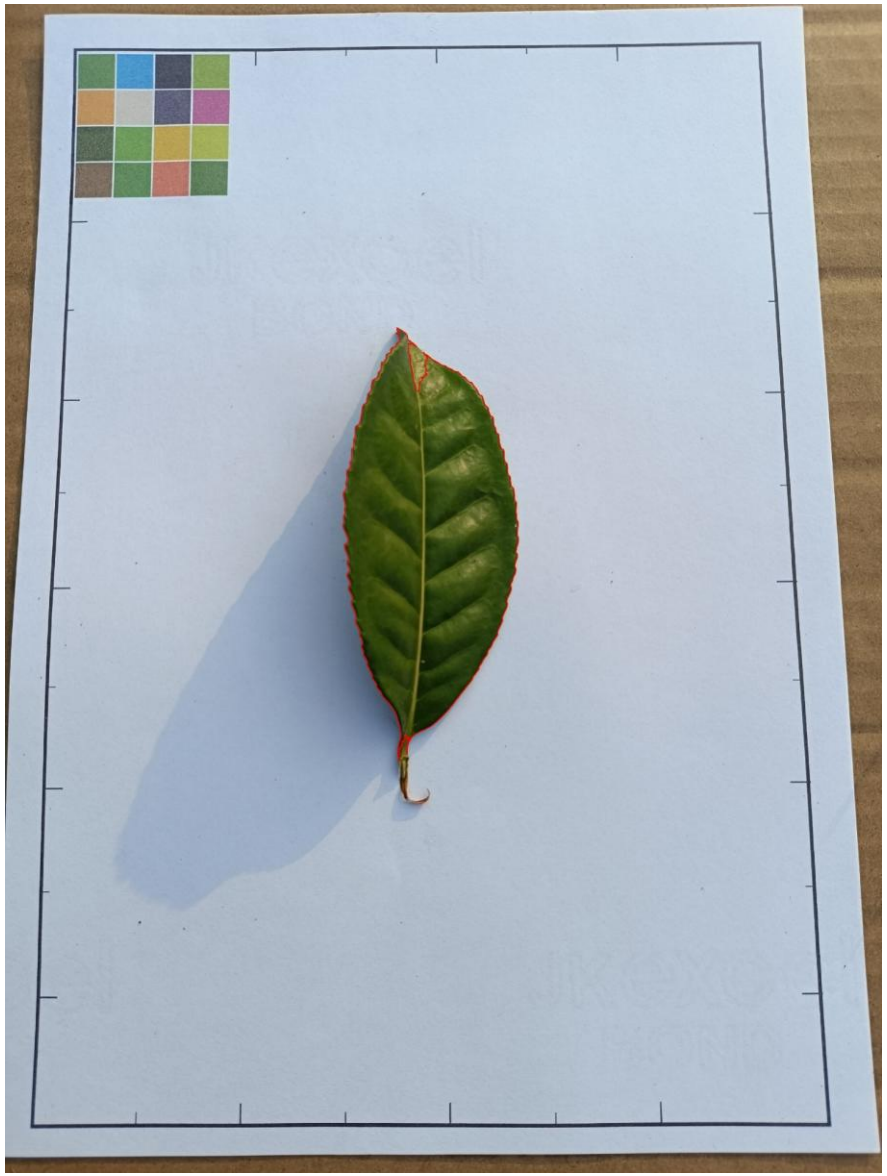




5.Morphological Tasks: Used closing, opening, erosion, and dilation to refine the mask



This way it tries to identify the best possible contour of the leaf excluding shadow



6.Isolation: Finally separated the largest detected component (i.e. leaf along with stem) and placed it on a white background with dimensions adjusted.
Thereby, removing the shadow.