ROBOTICS CLUB
IIT Guwahati

Problem Statement - Image Processing Hackathon

Level 1:-

The below picture consists of various types of leaves. Your task is to classify each of the leaves into types 'fresh leaf' or 'old leaf.'

Hint: Let each of the leaves consist of two colors, yellow and green. Yellow be denoted by Y, and green be represented by G.

The leaf will be classified according to the below rule:-

$\frac{G}{G+Y} > 0.70$ **-> The leaf will be classified as fresh.**

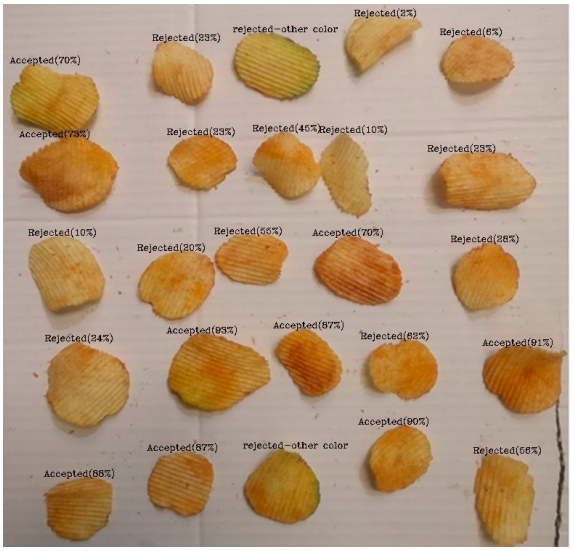
$\frac{G}{G+Y} \leq 0.70$ **-> The leaf will be classified as old.**

Your task is to label each of the leaves as fresh or old according to the above rule and contour mapping.

Marking Scheme:- You would get 5 points for each of the leaves contoured and 10 points if correctly contoured and predicted. Well Commented code gives you extra 10 points.

Note:- The below pictures are just for example and reference and have no relation with the problem statement.

Example of a contour map for each component.



Example of labeling each component.

Level 2:-

In the below picture, you will find two leaves, the first one is a Neem Leaf, and the second one is a maple leaf. Let this be Image A.

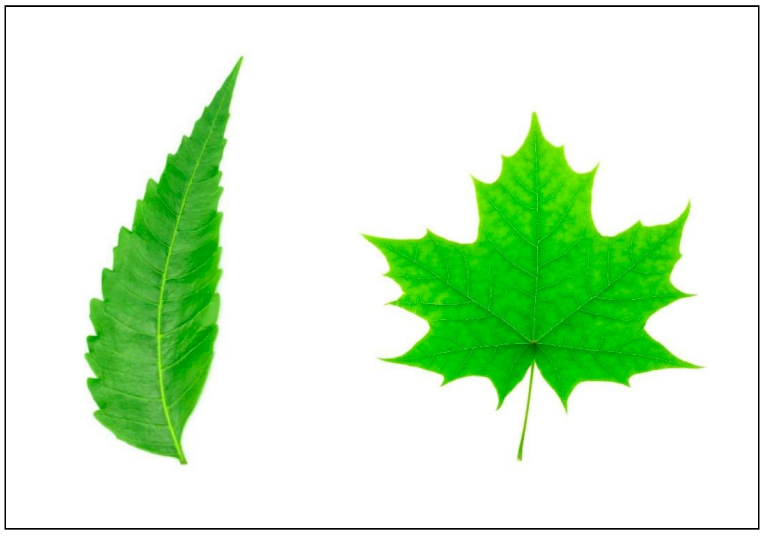


Image A

Now below, there are two more images. The first image or Image B contains different Maple Leaves, and the 2nd one or Image C contains different Neem Leaves.

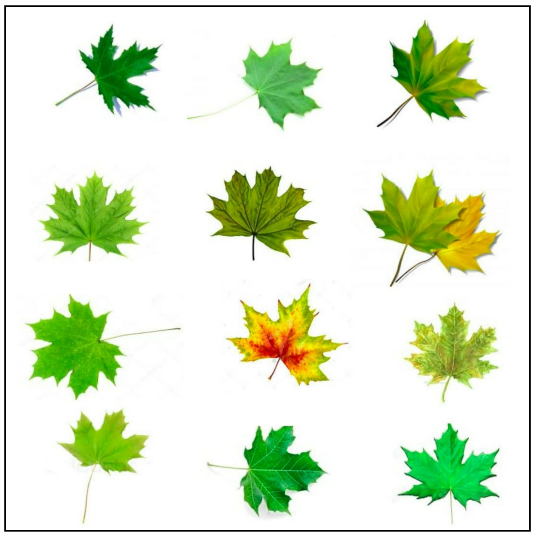


Image B

Image C

In Image A the leaves of both the types are perfect ones, and in subsequent images, you would find different but not perfect images of both types. Your task is to determine how much each of the leaves in Image B and Image C match the perfect leaves in Image A.

You have to quantify this matching in the form of a percentage. You will have to label each of the leaves in Images B and C with their percentage, i.e., again what percent each of the leaves in Images B and C matches the perfect Leaf in Image A.
For this, you would start by extracting relevant features of each of the perfect leaves of Image A and then set a benchmark or threshold based on quantifying the features and then comparing the set of leaves present in Images B and C with their respective benchmark and label them accordingly.

Note:-

1. There is no correct benchmark. It will depend on the features you use to set the benchmark.
2. Thus according to your set benchmark, we will see whether the percentage matching of each of the leaves is correct or not.

Marking Scheme:-

1. For each of the labeled leaves, you will get 5 points, and if correctly labeled with its percentage, you would get 10 points. This is for both the set of leaves present in Images B and C.
2. Well Commented code gives you extra 10 points.

Submission:- (For both levels)

For both levels, you need to write your code separately and upload the code and output file in the google form(link provided below).

1. For level 1, you need to submit your **well-commented code** along with the output image file of both the contour output and labeling output.
2. For level 2, you need to submit your **well-commented code** along with the output image files of both types of leaves, i.e., maple leaf and neem leaf.

Submission links:
For level 1 use this link - https://forms.gle/kRVYppUeorNVgD1t5
For level 2 use this link - https://forms.gle/7CXagE2da4Q7QAfN6

Instructions:

1. The participants can be asked for an explanation of any code block, and there would be an immediate disqualification of defaulters of any kind.
2. You are not supposed to use any Deep Learning or such related Algorithms to solve the Problem Statement.
3. Multiple responses in a form won't be accepted and will lead to disqualification.
4. File naming format:
    a. For submitting the code file of level1, name the file as level1.py
    b. For submitting the output image file of level1, name the file as output1.jpg(or png). In case you have to submit multiple files for level 1 then follow the naming procedure as described in below point.
    c. In case of multiple output image file(in level2), name the first image file as output2_1.jpg and the second image file as output2_2.jpg
5. Input images are uploaded in the drive link provided:

Drive Link for Input images:
https://drive.google.com/drive/folders/1S6c710yua7bikfR8fmhEY6L0aJmRrVDW?usp=sharing

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