

COMPUTER VISION PROJECT POISON IVY

CHECKPOINT 2

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Pre-processing the image:

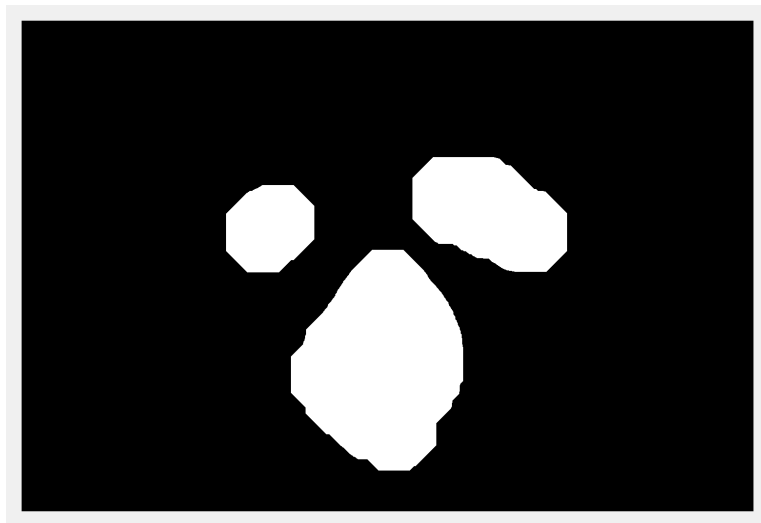
We are given an RGB image that might or might not contain a poison ivy. The image contains different types of leaves surrounded by stems and branches. The center of the image are the three leaves which we want to use for identification and find some way to remove the unwanted leaves and other things. For this, we started with a couple of trial and errors.

Firstly, we decided to resize the input images by a factor of 0.25 so that we don't take forever to process the image. At first, we thought binarizing the grayscale version of the image using the `graythresh()` function will help us isolate the center leaves from the background. It did not help much as we can see from the following image:



There was still a lot of noise and the center leaves were not clear. Then, to remove the noise, we decided to use morphology. We used small sized(=16) “disks” to perform closing on the binarized image. This removed the small black noise that was present on the leaves. Then, we used large sized(=75) “disks” to perform opening on the resulting image, so that the surrounding white noise in the image would get removed. Finally, we also removed the leaves that were

smaller than the center leaves using `bwareaopen()` function for which we set the `area=3900`. The image found after this was:



Using this, we were able to isolate the center three leaves from the surrounding. However, we lost the shape of the leaves. There were no more connected leaves nor the pointed edges of poison ivy. So, performing opening and closing operations was also not very useful.

Our Strategy:

After trying binary threshold and some morphology operations we realized that while we were able to isolate 3 leaves, we were losing information about the leaf stalks, veins and edges of leaves.

So, we decided to work on the RGB image itself and perform k means segmentation like we did in HW 4. We first try to smoothen the image using the gaussian filter having a sigma value of 0.75. Next, we plan to extract the channels of the smoothened images and apply k-means clustering to cluster the leaves at the center of the image. After we obtain the labels of the clusters, we plan on detecting the edges of the leaves. At the moment we think that this approach might be a good one to isolate the leaves from the background and still retain information like color, veins and stalks of the poison ivy. However, it is still a work in progress and we will make some changes as required if our classifier does not perform well with this pre-processing of the images.

A snippet of the leaf image after we applied a gaussian filter to smoothen it:

