CSCI 631 Foundation of Computer Vision
HW 03

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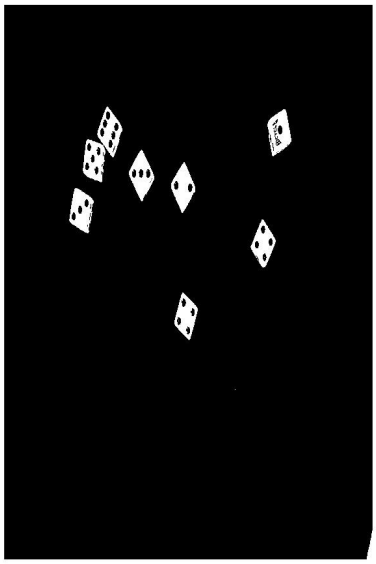
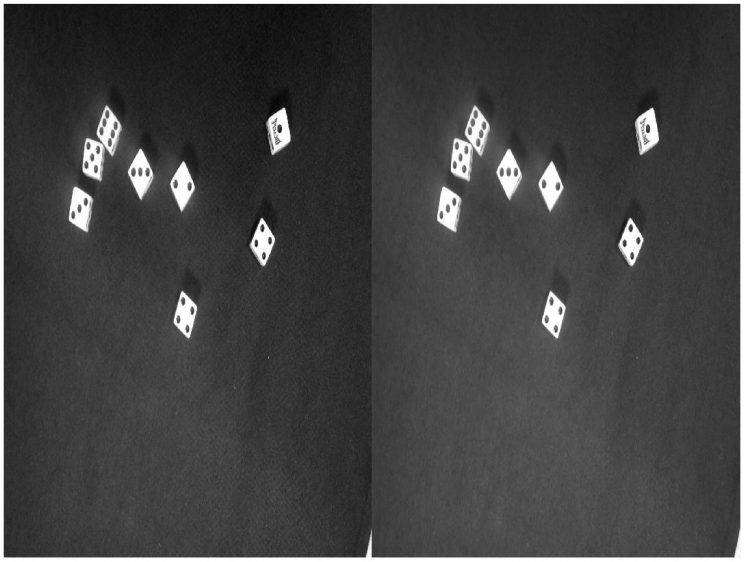
HW05 Dice Counting – Morphology

Answers to questions on processing:

1. Noise removal: After understanding some of the images, I used median filter to remove the noise which primarily removed the noise of small circles in the background, and since this filter also smoothens other noise, I did not spend too much time on removing very specific noises.
2. I used graythresh to find the threshold value for my imbinarize function which is the main image for the rest of the processing tasks.



Imbinarize function output



Noise removal using filtering

Before this process, I removed red lettering by converting red channel to ones values since the background color is white and the red converted to white will be easier to process.

Conclusion:

In this assignment, I wanted to learn how to methodically come up with the approach and combine all the smaller details into a program that performs the desired task. I began understanding the images with which I would be working on and made few observations. I then started the assignment by doing some pre-processing as the unprocessed image will give wrong results. I worked on removing red lettering and other noise and went on the binarize the image so that I can work with it easily during dice detecting and other tasks which primarily requires image to be in Logical form.

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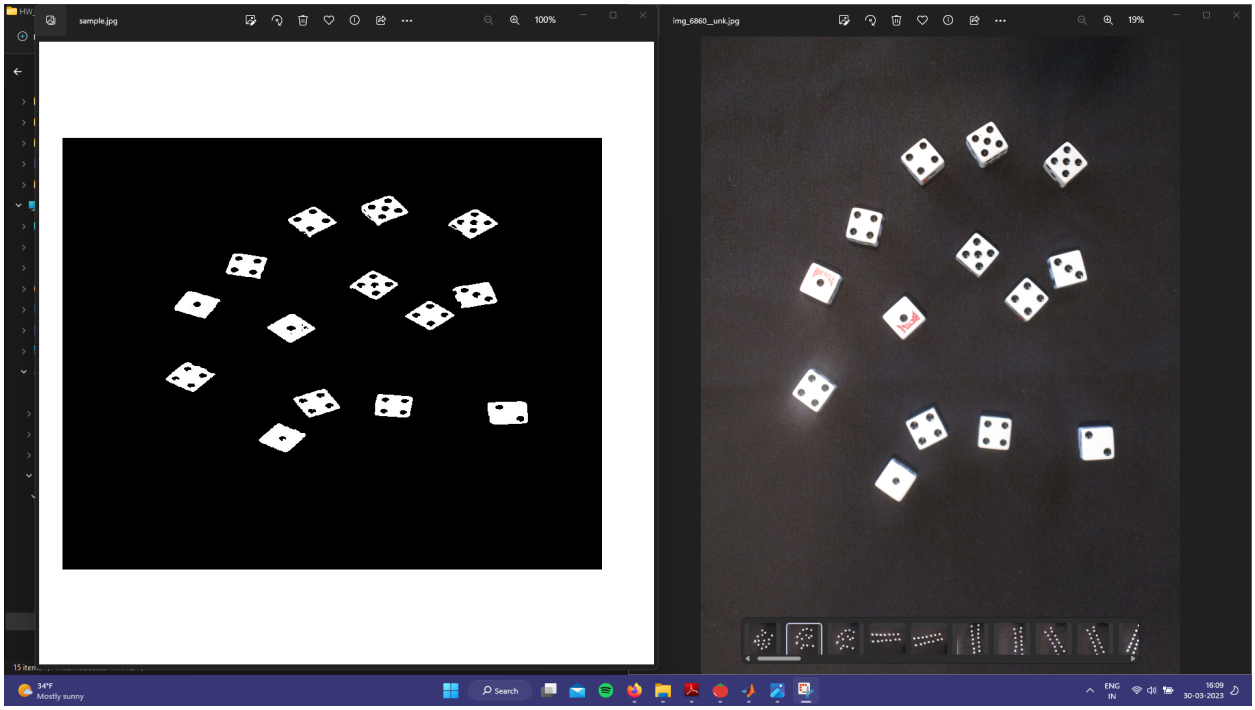

Remove red lettering and noise

I then started working on bwlabel function to detect various dice present in the image.

After working with bwlabel, I went ahead and learned how different functions like regionprops, bwareaopen, bwconncomp etc, which is the central part of this assignment.

I then went ahead to draw a border around the dice.

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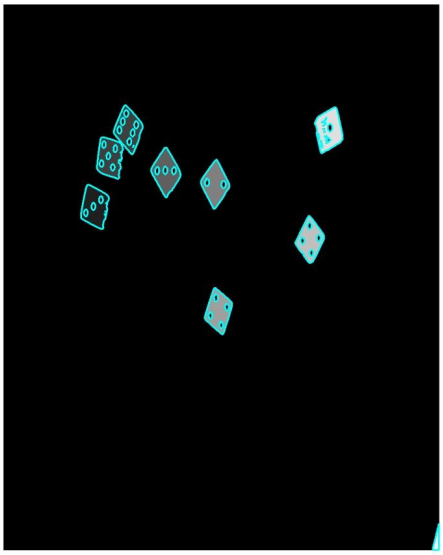
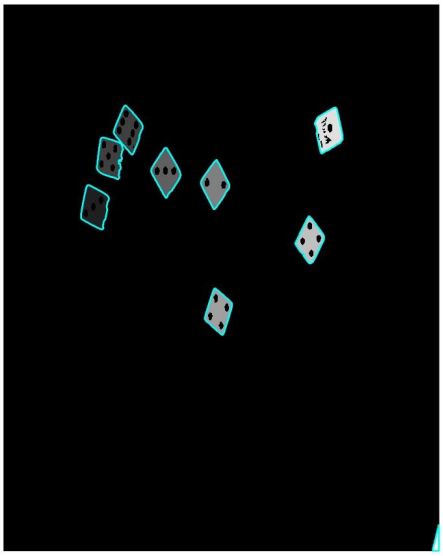


without using imfill

Then I used imfill with holes as parameter to only draw border around dice.

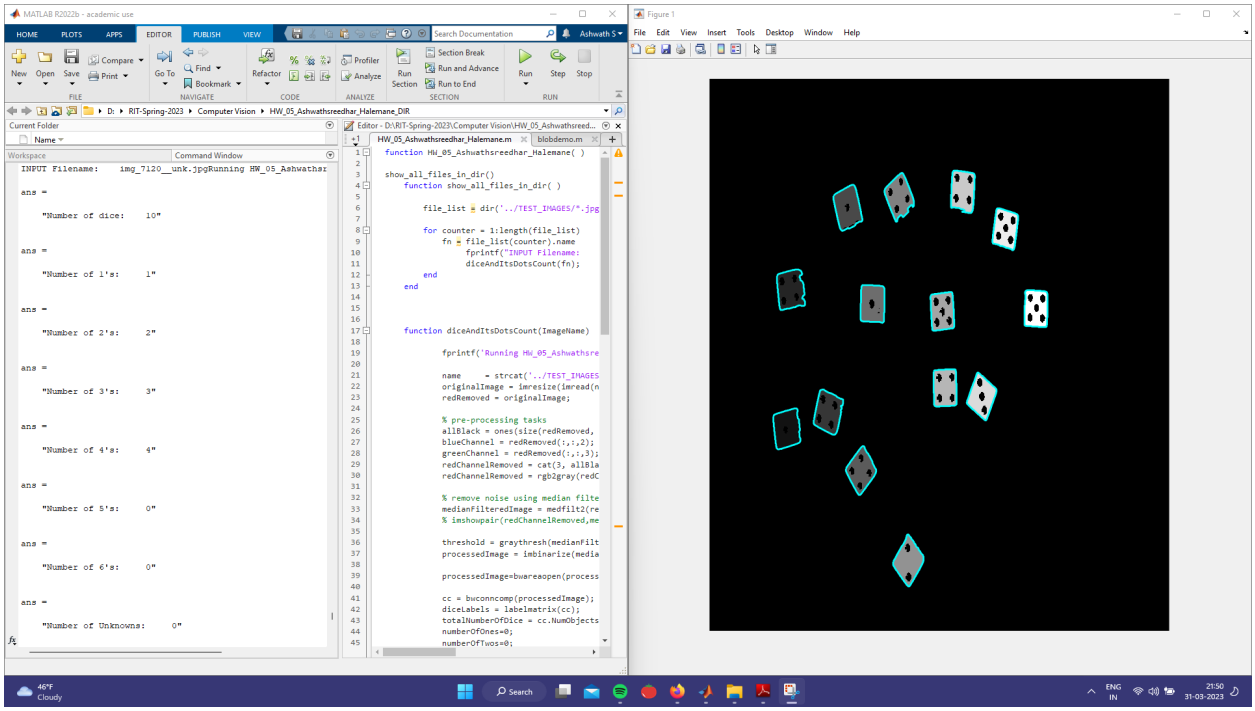


Before this I have also tried many morphological techniques like opening, closing, erosion and dilation.

Imclose function

Once I got the initial count of the dice, I understood the concept of find connected components and performed some morphological operations like imifll, logical AND inside the dice to properly get dots count. And finally, I refined few parameters to get my final

output.


INPUT Filename: img_7120__unk.jpgRunning HW_05_Ashwathsr
ans =
"Number of dice: 10"
ans =
"Number of 1's: 1"
ans =
"Number of 2's: 2"
ans =
"Number of 3's: 3"
ans =
"Number of 4's: 4"
ans =
"Number of 5's: 0"
ans =
"Number of 6's: 0"
ans =
"Number of Unknowns: 0"
function HW_05_Ashwathsreedhar_Halemane( )
show_all_files_in_dir()
function show_all_files_in_dir( )
file_list = dir('../TEST_IMAGES/*.jpg
for counter = 1:length(file_list)
fn = file_list(counter).name
fprintf('INPUT Filename:
diceAndItsDotsCount(fn);
end
end
function diceAndItsDotsCount(ImageName)
fprintf('Running HW_05_Ashwathsre
name = strcat('../TEST_IMAGES
originalImage = imresize(imread(n
redRemoved = originalImage;
% pre-processing tasks
allBlack = ones(size(redRemoved,
blueChannel = redRemoved(:,:,2);
greenChannel = redRemoved(:,:,3);
redChannelRemoved = cat(3, allBla
redChannelRemoved = rgb2gray(redC
% remove noise using median filte
medianFilteredImage = medfilt2(re
% imshowpair(redChannelRemoved,me
threshold = graythresh(medianFilt
processedImage = imbinarize(media
processedImage=bwareaopen(process
cc = bwconncomp(processedImage);
diceLabels = labelmatrix(cc);
totalNumberOfDice = cc.NumObjects
numberOfOnes=0;
numberOfTwos=0;