
```
%{
Orange Fruit Recognition using Image Segmentation
Implemented using EDGE Detection and Color Based Segmentation.
%}
clc % Clear command window.
clear all % Delete all variables.
close all % Close all figure windows except those created by imtool.
warning off %To turn off the warning.img=clickingSingleImage(vidObj);

%Step 1: Reading the Image
I = imread('xyz2.jpg');
subplot(5,2,1);
imshow(I);
title('Original Image');

%Step2: Colour Based Segmentation
%To convert the image to gray scale image.
m= rgb2gray(I);
subplot(5,2,2);
imshow(m);
title('Gray Scale Image')
imwrite(m, 'GrayScale.jpg');

%To find the orange colored objects.
orange=I(:,:,1);
subplot(5,2,3);
imshow(orange);
title('Orange Fruit Detection');
imwrite(orange, 'orangePartDetection.jpg');

%To get the segmented image for Orange coloured Objects.
l=imsubtract(orange,m);
J=im2bw(l,0.25);
subplot(5,2,4);
imshow(J);
title('Orange Segmented Image');
imwrite(J, 'orange_part_segmented.jpg');

%Edge Based Segmentation
%Step 3: Detecting the Entire Cell
temp1 = edge(J,'approxcanny');
fudgeFactor = 0.5;
subplot(5,2,5);
imshow(temp1);
title('Binary Gradient Mask');
imwrite(temp1, 'BinaryGradientMask.jpg');

%Step 4: Dilating the Image
dialated1 = strel('line', 3, 90);
dialated2= strel('line', 3, 0);
temp2 = imdilate(temp1, [dialated1 dialated2]);
subplot(5,2,6);
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imshow(temp2);
title('Dilated Gradient Mask');
imwrite(temp2, 'DilatedGradientMask.jpg');

%Step 5: Filling Interior Gaps
fill1 = imfill(temp2, 'holes');
subplot(5,2,7);
imshow(fill1);
title('Binary Image With Filled Holes');
imwrite(fill1, 'FilledHoles.jpg');

%Step 6: Removing Connected Objects on the Border
border1 = imclearborder(fill1, 4);
subplot(5,2,8);
imshow(border1);
title('Cleared Border Image');
imwrite(border1, 'clearedBorder.jpg');

%Step 7: Smoothing the Object
seD = strel('diamond',1);
finall = imerode(border1,seD);
finall = imerode(finall,seD);
subplot(5,2,9);
imshow(finall);
title('Segmented Image');
imwrite(finall, 'finalGraySegmentation.jpg');

%Step 8: Original outlined Image
outline = bwperim(finall);
Segmentedout = I;
Segmentedout(outline) = 0;
subplot(5,2,10);
imshow(Segmentedout);
imwrite(Segmentedout, 'output.jpg');
title('Outlined Original Image');
imwrite(Segmentedout, 'Output.jpg');

%Display Orange Fruit Detected output
imwrite(label2rgb(J), 'SantraOutput.jpg');
figure, imshow(label2rgb(J));
title('Orange Fruit Detected');
%Display Final output
figure, imshow(Segmentedout);
title('FINAL ORANGE FRUIT RECOGNIZED IMAGE');
```

Original Image



Gray Scale Image



Orange Fruit Detection



Orange Segmented Image



Binary Gradient Mask



Dilated Gradient Mask



Binary Image With Filled Holes



Cleared Border Image



Segmented Image



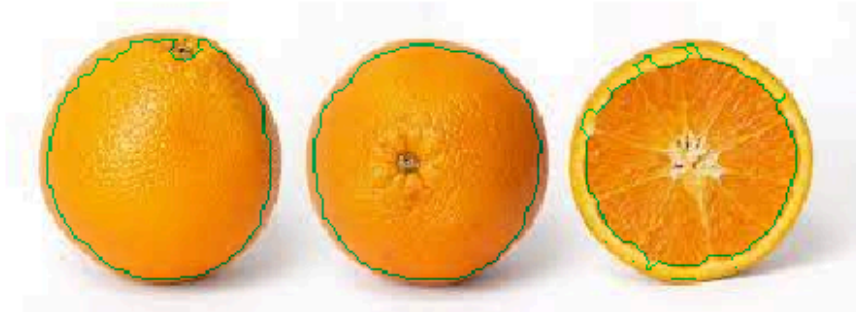
Outlined Original Image



Orange Fruit Detected



FINAL ORANGE FRUIT RECOGNIZED IMAGE



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