LABWORK
23 MARCH 2016

MENGUKIUR JARI-JARI LINGKARAN STICKY TAPE

```
RGB = imread('tape.png');
imshow(RGB);

hTxt = text(15,15,'Estimate radius of the roll of tape',...
   'FontWeight','bold','Color','y');



Rmin = 60;
Rmax = 100;
[center, radius] = imfindcircles(RGB,[Rmin Rmax],'Sensitivity',0.9)

%% Step 3: Highlight the Circle Outline and Center

% Display the circle
viscircles(center,radius);

% Display the calculated center
hold on;
plot(center(:,1),center(:,2),'yx','LineWidth',2);
hold off;

delete(hTxt);
message = sprintf('The estimated radius is %2.1f pixels', radius);
text(15,15,message,'Color','y','FontWeight','bold');

displayEndOfDemoMessage(mfilename)
```

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```
RGB = imread('pillsetc.png');
imshow(RGB);



I = rgb2gray(RGB);
threshold = graythresh(I);
bw = im2bw(I,threshold);
imshow(bw)



% remove all object containing fewer than 30 pixels
bw = bwareaopen(bw,30);

% fill a gap in the pen's cap
se = strel('disk',2);
bw = imclose(bw,se);

% fill any holes, so that regionprops can be used to estimate
% the area enclosed by each of the boundaries
bw = imfill(bw,'holes');

imshow(bw)



[B,L] = bwboundaries(bw,'noholes');

% Display the label matrix and draw each boundary
imshow(label2rgb(L, @jet, [.5 .5 .5]))
hold on
for k = 1:length(B)
  boundary = B{k};
  plot(boundary(:,2), boundary(:,1), 'w', 'LineWidth', 2)
end

%% Step 5: Determine which Objects are Round
% Estimate each object's area and perimeter. Use these results
% to form a simple metric indicating the roundness of an object:
%
```

```
%  metric = 4*pi*area/perimeter^2.
%
% This metric is equal to one only for a circle and it is less than one for
% any other shape. The discrimination process can be controlled by setting
% an appropriate threshold. In this example use a threshold of 0.94 so
% that only the pills will be classified as round.
%
% Use |regionprops| to obtain estimates of the area for all of the objects.
% Notice that the label matrix returned by |bwboundaries| can be
% reused by |regionprops|.

stats = regionprops(L,'Area','Centroid');

threshold = 0.94;

% loop over the boundaries
for k = 1:length(B)

 % obtain (X,Y) boundary coordinates corresponding to label 'k'
 boundary = B{k};

 % compute a simple estimate of the object's perimeter
 delta_sq = diff(boundary).^2;
 perimeter = sum(sqrt(sum(delta_sq,2)));

 % obtain the area calculation corresponding to label 'k'
 area = stats(k).Area;

 % compute the roundness metric
 metric = 4*pi*area/perimeter^2;

 % display the results
 metric_string = sprintf('%2.2f',metric);

 % mark objects above the threshold with a black circle
 if metric > threshold
  centroid = stats(k).Centroid;
  plot(centroid(1),centroid(2),'ko');
 end
 text(boundary(1,2)-35,boundary(1,1)+13,metric_string,'Color','y',...
    'FontSize',14,'FontWeight','bold');
 end
title(['Metrics closer to 1 indicate that ',...
    'the object is approximately round']);

displayEndOfDemoMessage(mfilename)
```