Shape Distinctions

This file takes in a color image, enhances the contrast, then makes it a binary image. It then uses this binary image to detect the border of the shape and then calculate the centroid and the distances from the centroid to compare to sample data in order to determine which shape it is an output that name.

```
function [window] = shape_find(filename)
X = imread(filename);
I = X(1:end, 1:end, 1:3);
I2 = rgb2gray(I);
I2 = imadjust(I2, [0;1], [1;0]);
% figure
% imshow(I2)
I2 = im2bw(I2);
% I3 = bwconncomp(I2);

% Pulling out boundary points
window = figure('Name','Shape Recognition Progress');
[B,L,N,A] = bwboundaries(I2);
stat = regionprops(I2, 'Centroid');
cent = stat.Centroid;
boundary = B{1};
subplot(2,2,2)
hold on
plot(boundary(:,2), boundary(:,1), 'b', 'LineWidth', 1)
plot(cent(1),cent(2), 'g+')
axis([0 length(I(1,:))/3 0 length(I(:,1))])
hold off
title('Edges')

% Finding Distances from Centroid
distPlot = [];
for i = 1:length(boundary)
%     distPlot = [distPlot cast(sqrt((cent(1)-boundary(i,1))^2 + (cent(2)-boundary(i,2))^2)
,'int32')];
    distPlot = [distPlot sqrt((cent(1)-boundary(i,1))^2 + (cent(2)-boundary(i,2))^2)];
    % does not cast data to integer for use later with findpeaks
end
distPlot2 = round(distPlot, -1);
distPlot = cast(distPlot2, 'like', distPlot);
subplot(2,2,3)
hold on
plot(distPlot)
% axis([0 length(boundary) 400 800])
hold off
title('Distance from Centroid to Edge')

% Showing the initial shape
subplot(2,2,1)
imshow(I);
title('Original Image')

% Shape Comparisons
```

```
[maxs locs] = findpeaks(distPlot2,'MinPeakDistance',cast(length(boundary)/12,'int16'));
subplot(2,2,4)
plot(locs, maxs, 'r+')
title('Corners')

end
```

```
Error using shape_find (line 10)
Not enough input arguments.
```

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