Activity 12 Feature Extraction

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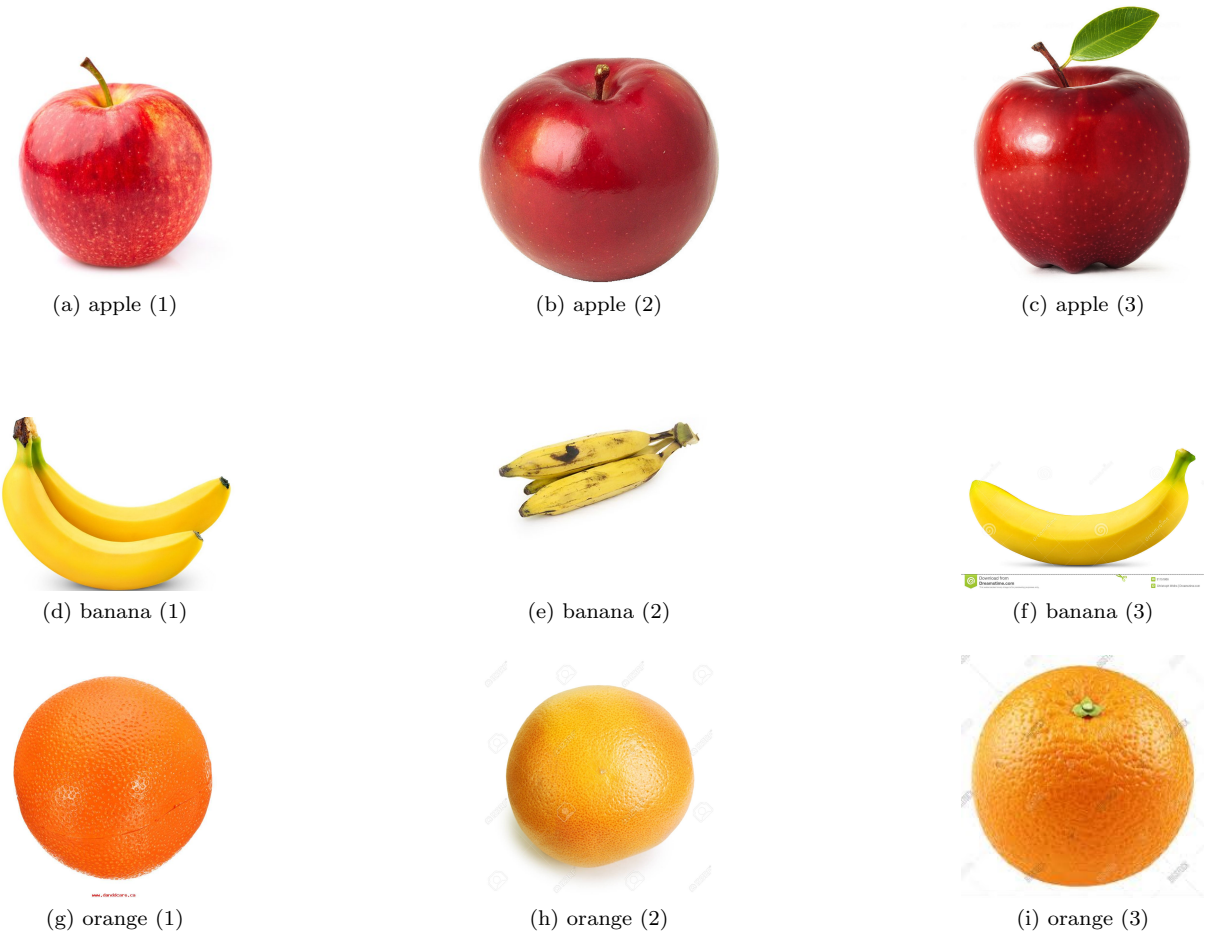
Objective(s)

1. Obtain a data set of images such as bananas, apples and oranges.
2. For each data set of images, extract features such as eccentricity and hue.
3. Plot the feature points in a 2D or 3D space depending on the number of features extracted. Observe if class clustering has occurred. [1] [2]



(a) apple (1) (b) apple (2) (c) apple (3)

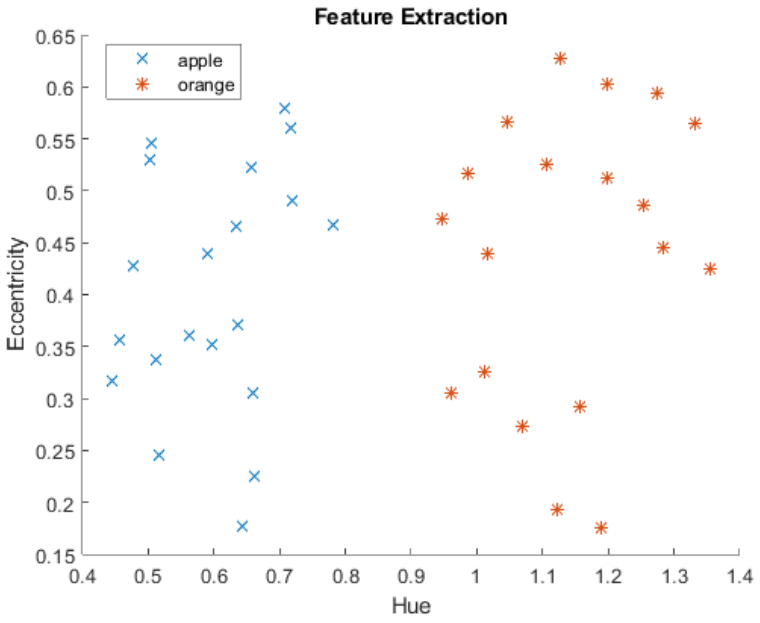
(d) banana (1) (e) banana (2) (f) banana (3)

(g) orange (1) (h) orange (2) (i) orange (3)

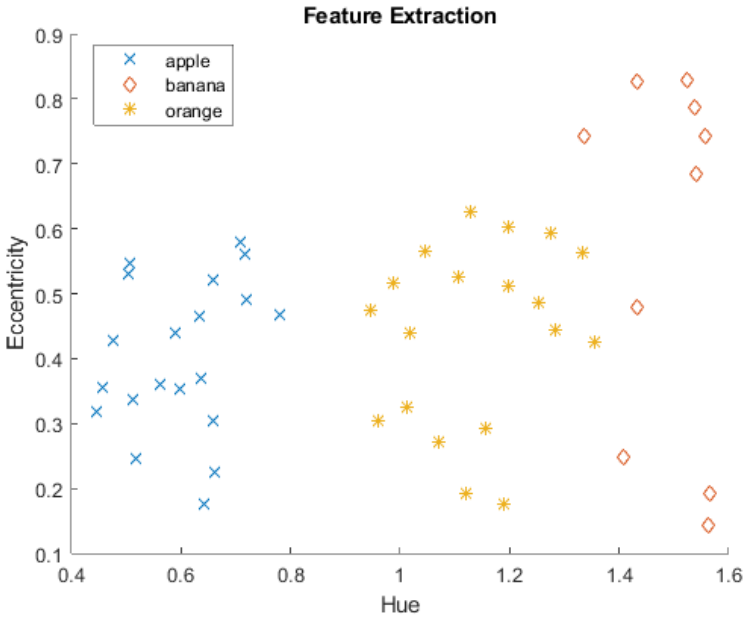
Figure 1: Sample of the test Images used [3]

Results

Figure 2: Sample of post processing and feature extraction of data. [4]



(a) 2 Classes (Apple and Orange)



(b) 3 Classes (Apple, Orange, and Banana)

Figure 3: Feature extraction from image data sets.

Comment(s)

Post Processing. Figure 2 shows a brief preview of the post processing that occurs for one image. The main tools used were regionprops and non-parametric segmentation which was used for the blob analysis. The L*a*b* values of the image were also obtained to determine its hue for an accurate measure of the object's color.

Feature Extraction. Figure 3 shows the feature space and the respective feature data points obtained from the image data sets. The feature data points were obtained from post processing such that the eccentricity and hue of the object can be extracted from the image. Class clustering is observed in the feature plot such that each class cluster can be separated from one another.

Self-Evaluation

I would rate myself a 10. The objectives for this activity was met. The image data sets were properly processed such the each of the image's features are extracted via regionprops and hue values from its L*a*b values. Class clustering was also observed in the feature space plotted such that each class cluster is distinguishable from each other. Things I would like to improve on the activity is the accuracy of the segmentation such that the image is perfectly segmented such that the blob obtained is 100% without any loss from the segmentation.

References

[1] M. Soriano, A12-feature extraction.pdf.

[2] M. Soriano, Machine learning intro.pdf.

[3] G. Search, Google images (2019), last accessed 29 October 2019, https://www.google.com/search?q=images.

[4] TheMathWorksInc., regionprops (2006), last accessed 10 October 2019, https://www.mathworks.com/help/images/ref/regionprops.html.