



# EXPECTATION MAXIMIZATION

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USING THE DATA GENERATED FROM ACTIVITY 12. I AM GOING TO SOLVE FOR THE PROBABILITY DISTRIBUTION FUNCTION (PDF) OF EACH CLASS (FRUIT).

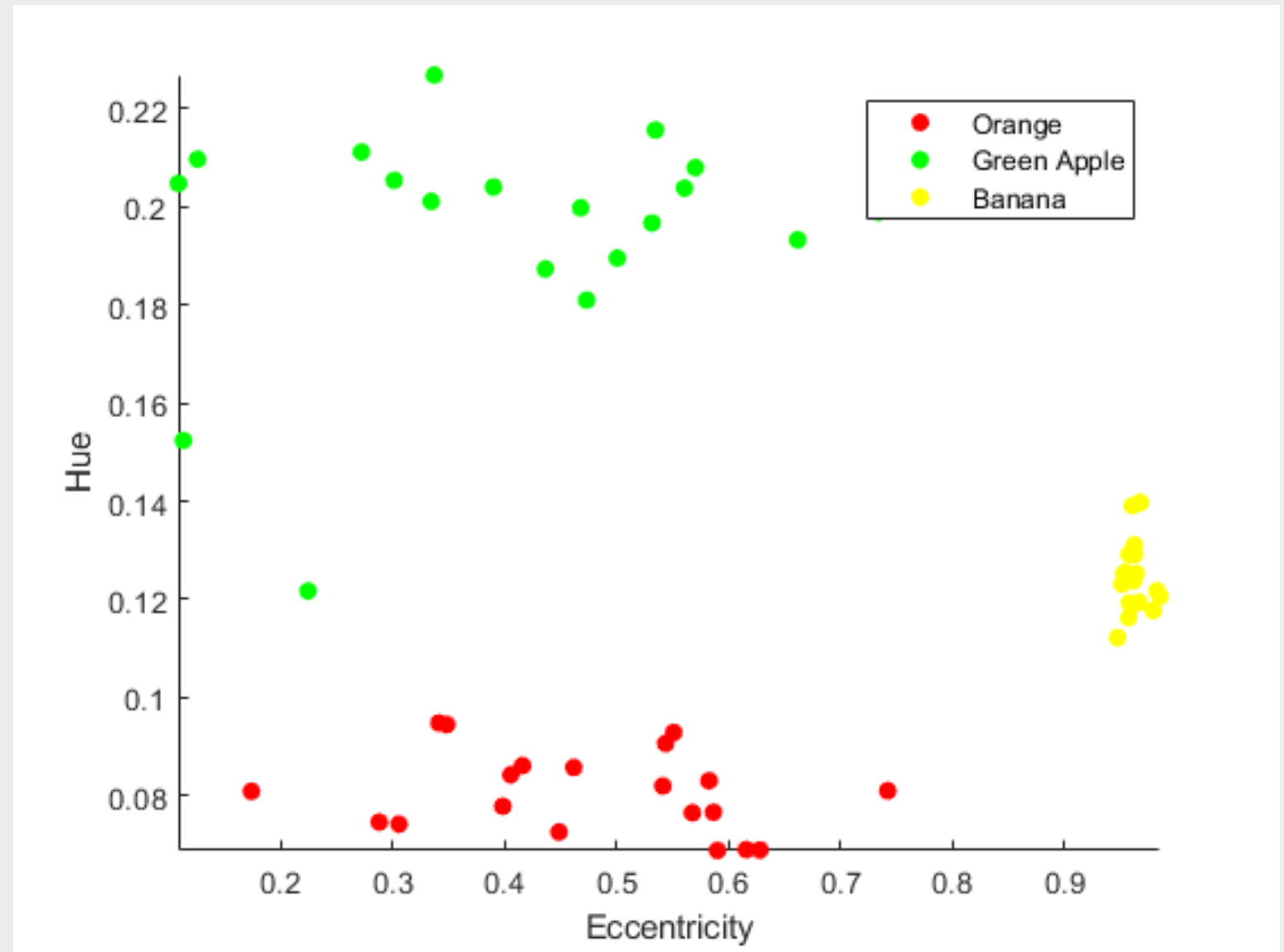


Figure 1. Feature plot of the fruits green apple, banana, and orange according to their hue and eccentricity.

# FINAL RESULTING PARAMETERS AFTER THRESHOLD IS REACHED AFTER N-ITERATIONS.

Classes l = 1,2,3	P
1 (Green Apple)	0.05
2 (Banana)	0.05
3 (Orange)	0.05

Classes l = 1,2,3	mean $\mu$	
	Eccentricity	Hue
1 (Green Apple)	0.456	0.1998
2 (Banana)	0.9597	0.1241
3 (Orange)	0.489	0.808

Covariance matrix $\Sigma$ (Green Apple)	
0.0168	-0.0001
-0.0001	0.0001

Covariance matrix $\Sigma$ (Banana)	
0.00003481	-0.00000044
-0.00000044	0.00001912

Covariance matrix $\Sigma$ (Orange)	
0.01	-0.0002
-0.0002	0

USING THE FINAL  
PARAMETERS. WE  
SOLVE THE PDF FOR  
EACH FRUIT TO BE  
FIG. 2: GREEN APPLE.  
BANANA. AND  
ORANGE FROM TOP  
TO BOTTOM.

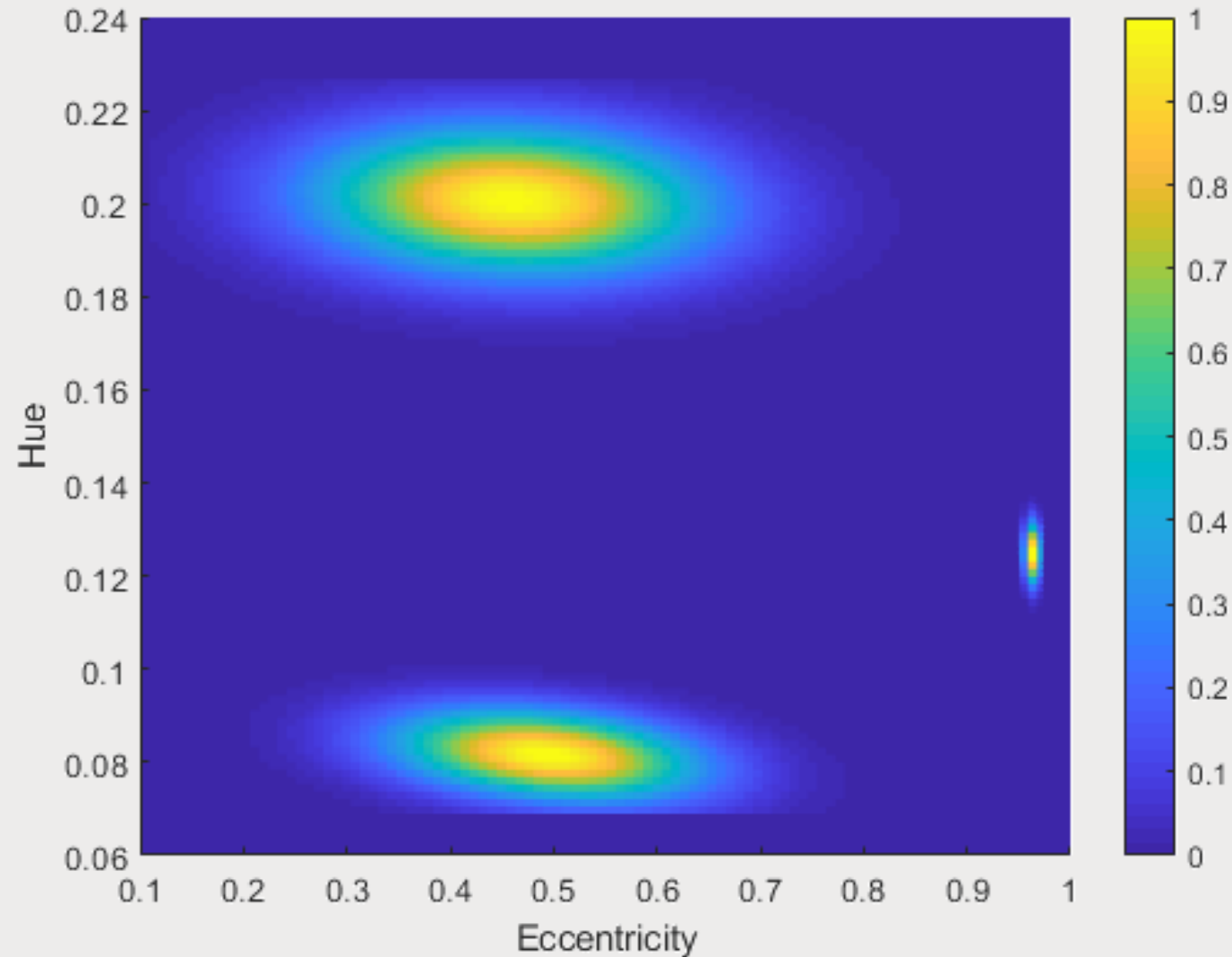


Figure 2. PDF of the three classes. Blue (0) corresponds to 0 probability, increasing towards yellow(1), corresponding to high probability.

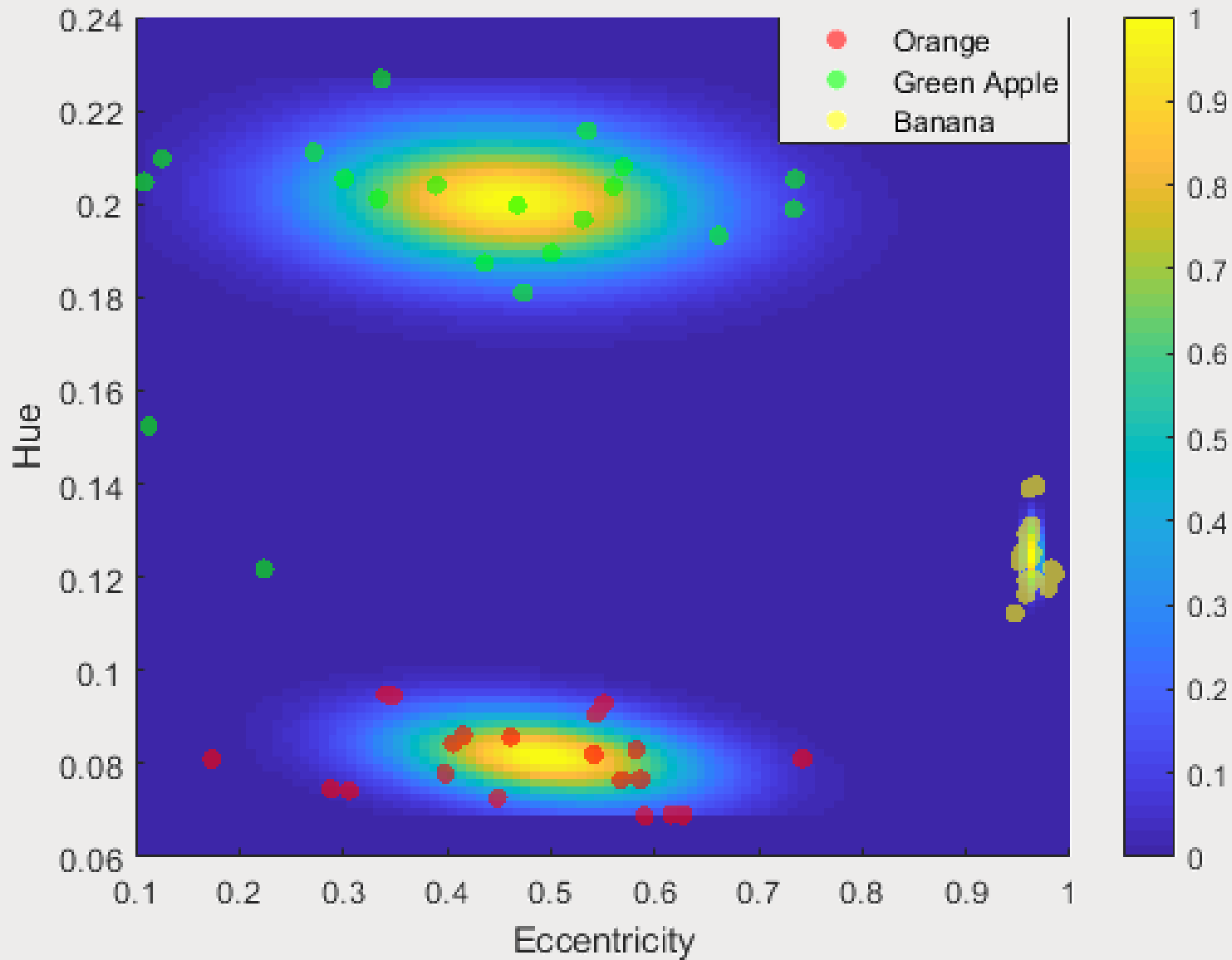


Figure 3. Feature plot overlayed onto the pdf plot.

VISUALLY IT CAN BE SEEN THAT THE DATA POINTS ARE GENERALLY WITHIN THEIR CORRESPONDING PDF'S WITH ONLY A FEW OUTLIERS OUTSIDE.

I rate myself 10/10 for accomplishing the required outputs and I would like to acknowledge and thank Rhei and LJ for the discussions on this activity.