- Problem 1:
  - Result of segmentation by normalized cuts

House.tif	Peppers_color.tif
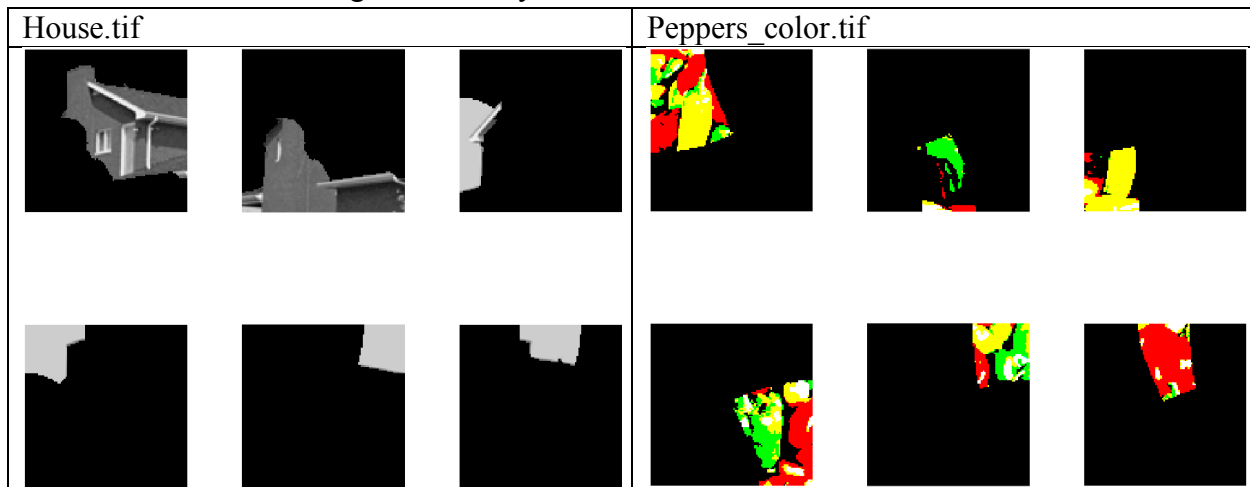
  - In normalized cuts for image segmentation, it's different from other segmentation methods due to the user doesn't have to decide the number of clusters at the beginning. However, it's important to choose the variance for sum of squared difference, while these 2 parameters determine the final result of the segmentation.

- Problem 2:
  - Result of segmentation by expectation maximization algorithm (k = 3)

(different grayscale value denotes different class)
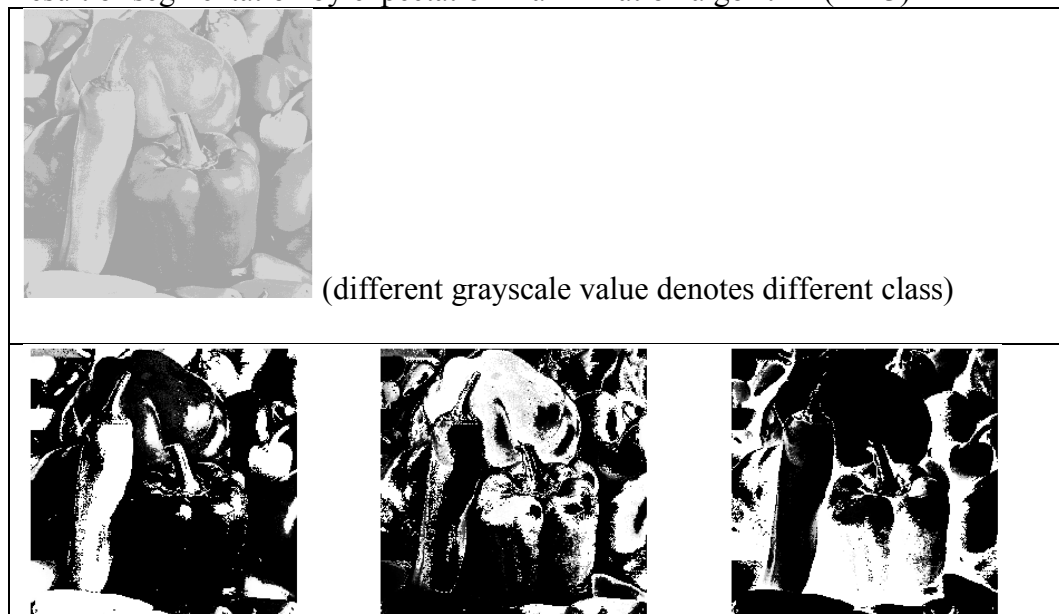
  - In the implementation of EM algorithm, the segmentation is not like the one we did in the previous question. By the color information, we can find the best k-cluster is equivalent to finding the best mixture of Gaussian distributions to represent the classes. While k-means clustering tends to stuck in local optimal, the EM algorithm is robust in avoiding such condition. After the implementation, the image would be separate by k classes but these k classes would not stick together.

- Problem 3:
  - We are using sum of the difference between 3 frames in the video to detect whether there are moving objects in the surveillance image. I first use two kinds of low pass filters, then pick up the stronger signal by thresholding to reduce the noise (most of them are result from the tree on the left side). With the morphology method, close and open, I can make the target clearer; finally, utilize the connected components and regionprops for getting the bounding box of the target. The result is shown in the program, and most of the time it could detect the whole objects. However, it's still nontrivial to detect the object occluded by the leaves of the tree, and sometimes the detected bounding boxes of the moving objects would be separated to little pieces. I think it could be solve by connecting those little pieces of bounding boxes with near distance.