## EECS 442 F14 HW # 5

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## 1 Clustering

Implementation

- Initialize cluster centroids  $\mu_1, \mu_2, \mu_3 \in \mathbb{R}^n$  randomly since there are k=3 clusters
- repeat until convergence:

```
  \{ \text{ For every } i, \text{ set } c^{(i)} := \underset{\sum_{i=1}^{m} 1(c^i = j) x^{(i)}}{argmin_j || x^{(i)} - \mu_j ||^2},  For every j, \text{ set } \mu_j := \frac{\sum_{i=1}^{m} 1(c^i = j) x^{(i)}}{\sum_{i=1}^{m} 1(c^i = j)}  }
```

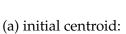
Please refer to the code for the detailed implementation. The result is shown in Figure 1. While the initialization is different, the results look similar.

## 2 Object Recognition

a,b

The accuracy is around 72%. Please refer to the code for implementation.





233 213 150



(c) initial centroid:

255 255 

250 252 255 255



(b) initial centroid:



(d) initial centroid:

255 255



(e) initial centroid:

21] 118 132 73 228 156 48

Figure 1: Images with different distributed ray tracing effects