

## Short answer problems

1. These texture descriptions using textons built from a filter bank will be sensitive to orientation as these filter in the filter bank influence the image to change its direction. A high response from a filter would mean a higher value in the corresponding positions of the vector we get at the end.

2. K-Means is one of the most popular "clustering" algorithms. K-means stores k centroids that it uses to define clusters. A point is considered to be in a particular cluster if it is closer to that cluster's centroid than any other centroid. K-Means finds the best centroids by alternating between (1) assigning data points to clusters based on the current centroids (2) choosing centroids based on the current assignment of data points to clusters. In this case, we randomly find the cluster centers on the image. Suppose we find/assign cluster centers to be on either side of an imaginary line dividing the circle into two. Each datapoint on the inner and outer circle finds out which center its closest to on either side of the line. K-means will divide the region into two halves, which is going to be incorrect result if we were looking to divide the points by the circle that they belong to.

3. Mean shift as it works with regions of interest and it works better with center weighting such as gaussian blobs. After the region of interest, the center of mass is calculated. The mean shift algorithm seeks modes or local maxima of density in the feature space. This will be the best algorithm to quantize up the continuous Hough Space. This is because mean-shift will give us the mode of each cluster to give us the centre values, in centre-of-mass manner. Also, it will give us consistent results across different runs.

2 b)

verification point

```
I1 = imread('D.png');  
figure;
```

```
imshow(I1);  
points = ginput;
```

```
figure;  
subplot(1,2,1);  
imshow(I1);  
hold;  
H = computeH(points, new_points);
```



