CSCI 677
Homework 2

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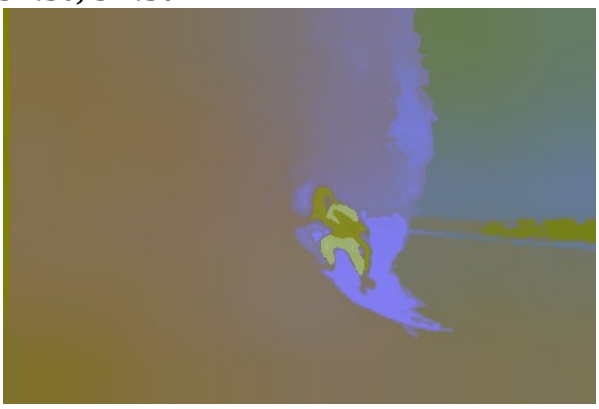
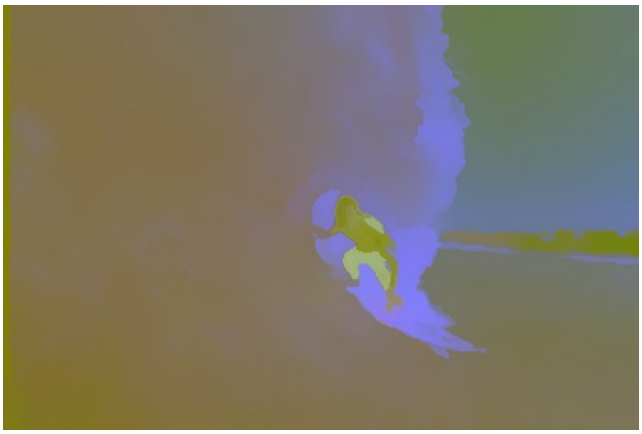
Part (a): Mean Shift Segmentor

Original Image:

SP:30, SR:30

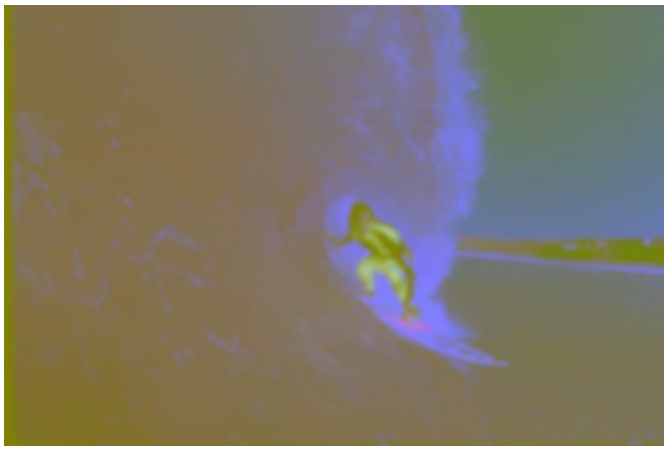


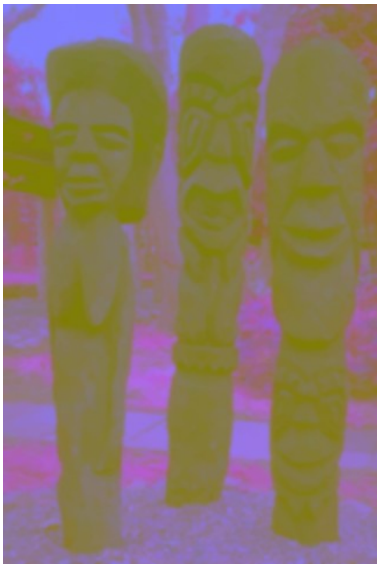
SP:10,SR:30



SP:80, SR:100

SP:5,SR:3





Discussion:

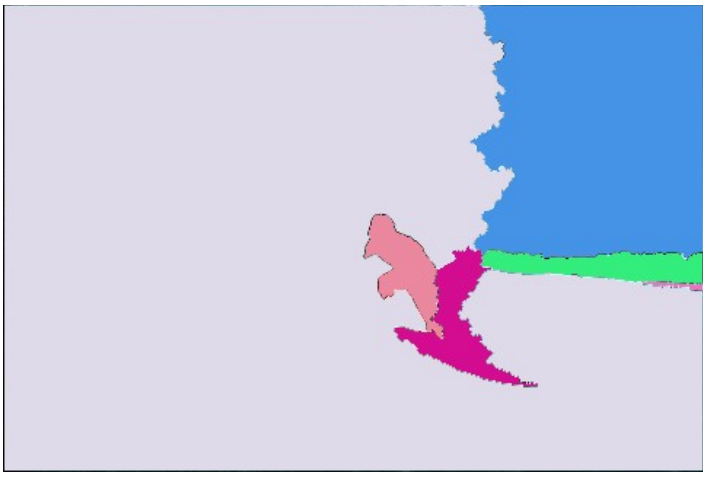
- The above results were primarily based on the mean shift segmentor in the LAB color space.
- Parameters varied here are Spatial Window Radius(sp) and Color Window Radius(sr).
- Here we can see there is a clear distinction of segments in the image for SP an SR value above 10 and 30.
- As the Window radius increased the image becomes blurry as it covers many colors and pixels in order to fit in the radius.
- For smaller values of sp and sr, the distinction gets clearer, but the segmentation becomes more and more independent of the pixel rather than the region, therefore it is not recommended.

Conclusion:

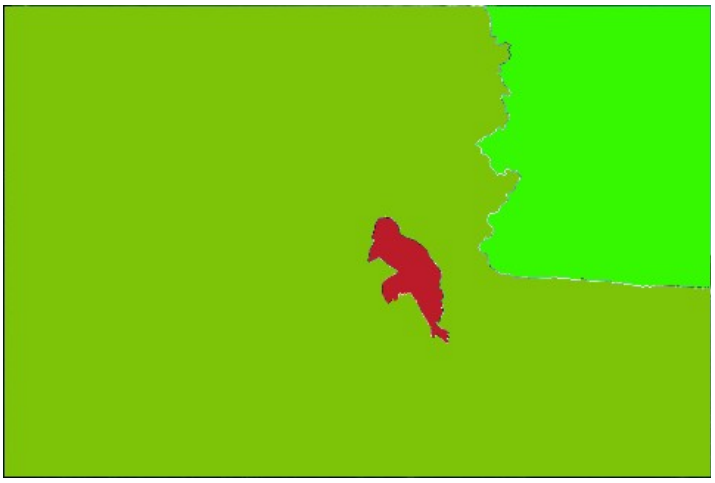
- Unlike K-means clustering, Mean shift clustering does not require the information about the number of clusters in order to segment the image. All it needs is the window radius, which automatically detects the number of clusters that can be formed.
- This results in a better segmentation, but the window radius should be ideal enogh to segment the image.
- Too large or too small a window radius will hinder the chances of segmentation of the image.

Part b) Watershed Segmentor

For Surfer image:



```
Marker location: 109,133
Marker location: 178,278
Marker location: 250,318
Marker location: 195,474
Marker location: 177,402
Marker location: 100,399
```



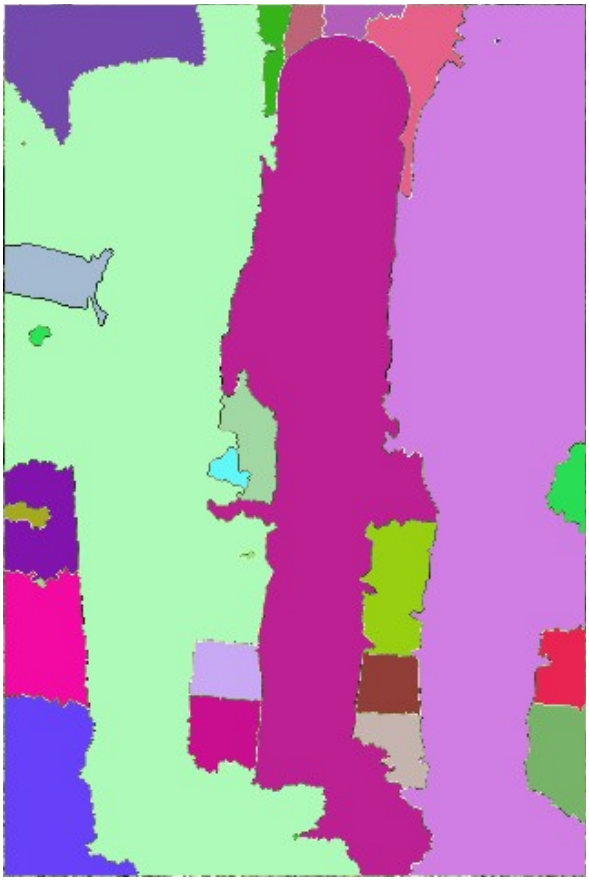
```
Marker location: 176,282
Marker location: 102,426
Marker location: 124,94
```

For Zebra image:

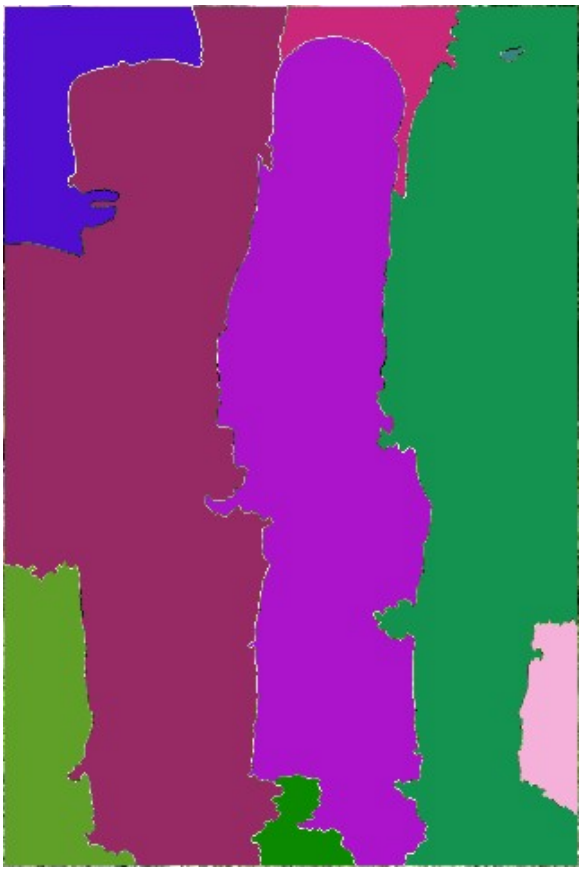
```
Marker location: 67,110
Marker location: 276,342
Marker location: 168,240
Marker location: 163,395
Marker location: 166,88
```

```
Marker location: 61,90
Marker location: 281,355
Marker location: 173,83
Marker location: 166,87
Marker location: 163,97
Marker location: 162,107
Marker location: 176,107
Marker location: 189,118
Marker location: 188,122
Marker location: 184,129
Marker location: 170,131
Marker location: 154,140
Marker location: 158,141
Marker location: 168,155
Marker location: 183,175
Marker location: 168,167
Marker location: 174,272
Marker location: 178,264
Marker location: 174,243
Marker location: 179,240
Marker location: 171,225
Marker location: 147,224
Marker location: 148,217
Marker location: 148,211
Marker location: 156,368
Marker location: 144,362
Marker location: 139,365
Marker location: 138,377
Marker location: 146,387
Marker location: 146,390
Marker location: 148,397
Marker location: 161,404
Marker location: 163,405
Marker location: 166,409
Marker location: 158,413
Marker location: 146,418
Marker location: 168,429
Marker location: 163,431
Marker location: 156,431
Marker location: 143,437
```

For Stonehenge image:



```
Marker location: 458,160
Marker location: 398,29
Marker location: 395,116
Marker location: 402,212
Marker location: 412,306
Marker location: 324,262
Marker location: 276,177
Marker location: 285,62
Marker location: 356,32
Marker location: 368,128
Marker location: 374,213
Marker location: 379,304
Marker location: 283,315
Marker location: 294,219
Marker location: 304,132
Marker location: 230,145
Marker location: 252,124
Marker location: 264,24
Marker location: 283,23
Marker location: 319,19
Marker location: 183,17
Marker location: 138,21
Marker location: 77,11
Marker location: 15,47
Marker location: 9,147
Marker location: 9,162
Marker location: 13,193
Marker location: 16,229
Marker location: 20,272
```



```
Marker location: 250,61
Marker location: 227,183
Marker location: 222,254
Marker location: 130,25
Marker location: 352,30
Marker location: 380,302
Marker location: 456,161
Marker location: 26,227
Marker location: 28,285
```

Discussion:

- The above results are based on the Watershed segmentor.
- Since Watershed segmentor only identifies continuous images, it cannot identify the patterns in an image.
- As shown in the zebra image, if the marker locations are less, it cannot identify the patterns inside the zebra.
- In order to segment the patterns, we need to provide more marker points for a good segmentation.
- This can be clearly seen in the distinction of segmentation of both the zebra and stonehenge images.

Conclusion:

- Watershed Segmentor works very well for the images with less number of patterns.
- Watershed segmentor identifies continuos images rather than images with patterns.
- The only way to segment such images is to provide more number of marker locations.
- Other than this con, this segmentor works really well when compared to the meanshift segmentor.