In the name of God

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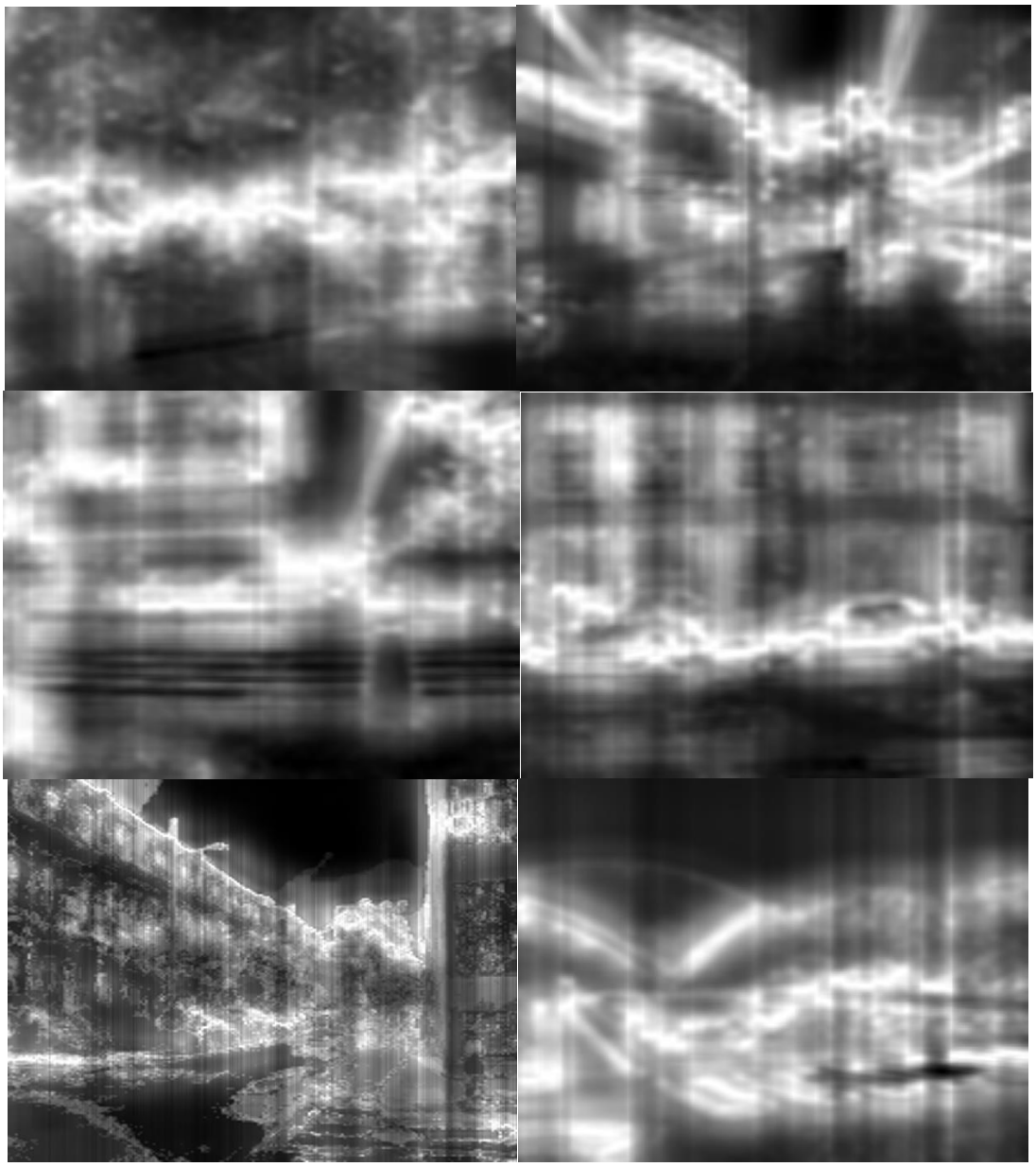
Advanced Neuroscience – Homework 8

1. Results for 5 images (Yellow dots: Fixation Points):

2. Saliency maps for 6 images:



SubbandFeatures: Coefficients of the subbands of the steerable pyramid
IttiFeatures: The three channels of Itti and Koch's saliency model

1. Color
2. Intensity
3. Orientation

ColorFearures: Find the colors, the color probabilities, and the 3D histogram of colors => R/G/B, R/G/B Probability, Colors at blur level by m=0, 2, 4, 8, 16

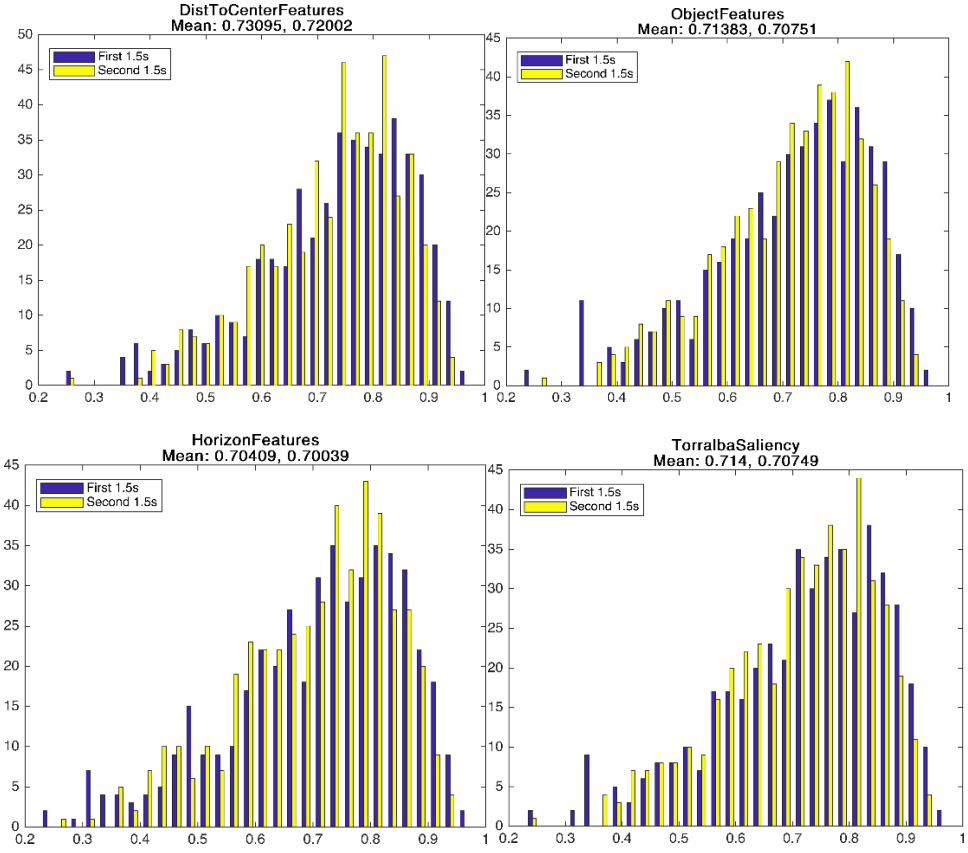
TorralbaSaliency

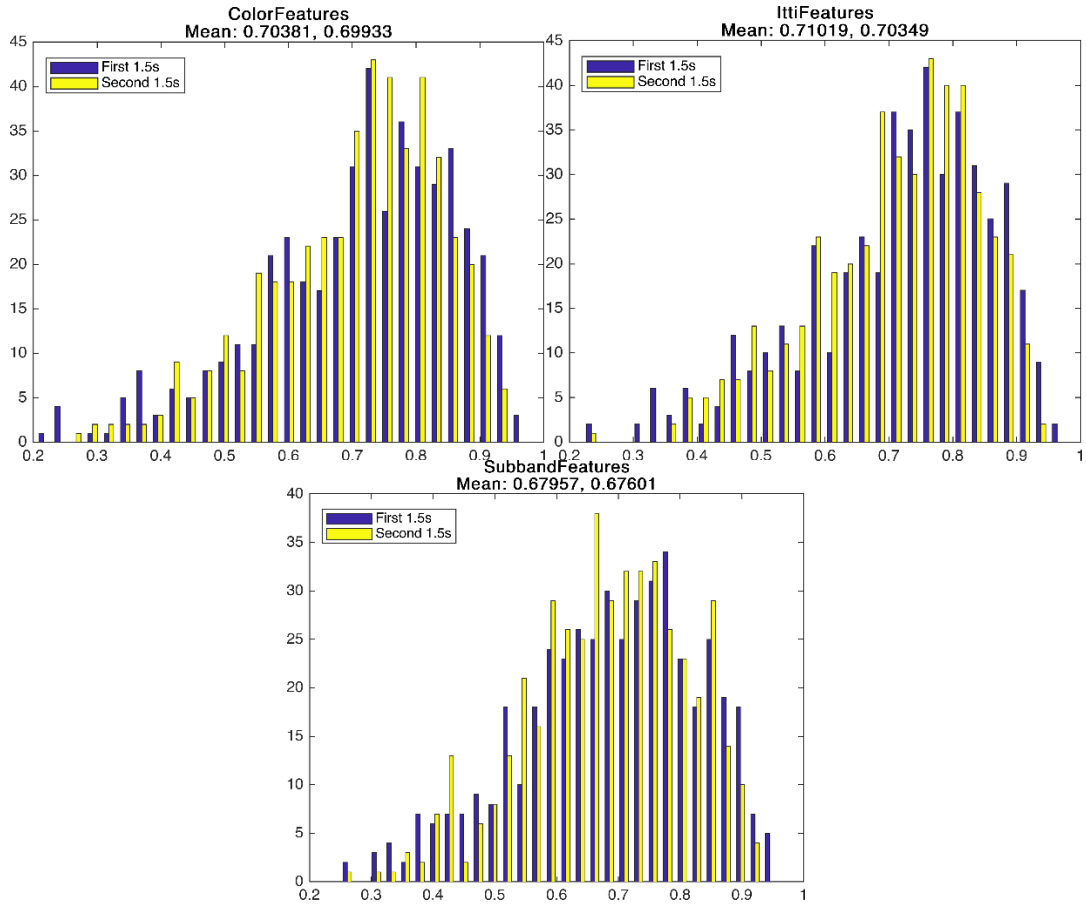
HorizonFeature: Horizon Gradient of image

ObjectFeatures: Find all the faces, cars and people in the images. Face is excluded in analyzes.

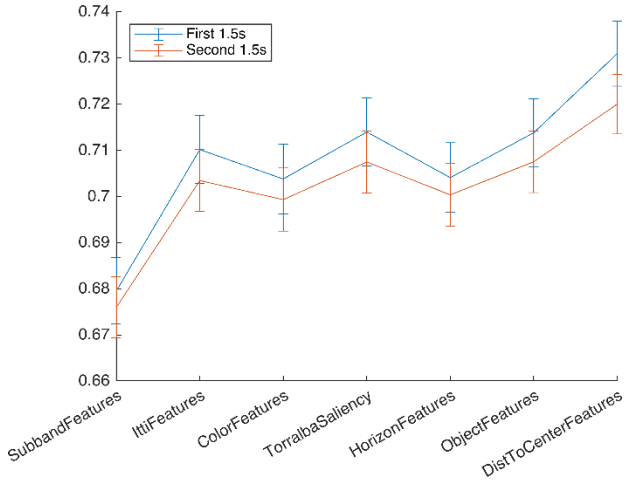
DistToCenterFeatures: Distance of each point in image to center of image.

3. I've considered all eye tracking data of 15 subjects for each image; And calculated the ROC for each saliency map derived form 1003 images. To address the effect of each feature, there is 7 saliency maps by excluding just one feature for each image. Also there is two 1.5s trial for each image used separately to indicate the bottom-up and top-down effect of each feature. Results are generated for 467 images because of the limit in processing time. ROC distribution for each feature:





Mean ROC derived from excluding each feature:



Mean ROC by all features is 0.7149 for the first 1.5s and 0.7083 for the second 1.5s.

By excluding SubbandFeatures, we have a decrease in ROC. So the result shows that this feature has a large effect.

By sorting the features from most significant:

1. SubbandFeatures
2. ColorFeatures
3. HorizonFeatures
4. IttiFeatures
5. TorralbaSaliency
6. ObjectFeatures
7. DistToCenterFeatures

There is a similar trend in both 1.5s trials. In this analysis features didn't show any difference to separate bottom-up and top-down features. A better approach was to use the first second and the last second of trials, but the processing time limit didn't let me obtain the results.