

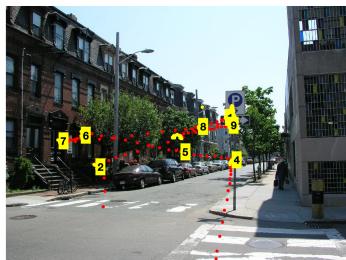


In The Name Of God
HW08
Advanced Neuroscience

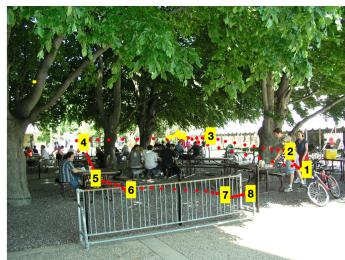
MohammadAmin Alamalhoda
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■ Part1 - Eye tracking database

□ Single Person



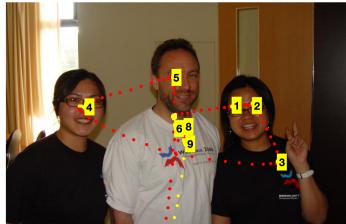
(a) Sample 1



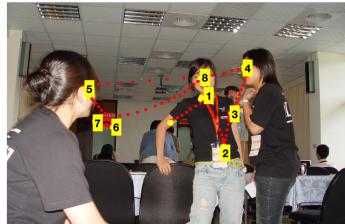
(b) Sample 2



(c) Sample 3



(d) Sample 4



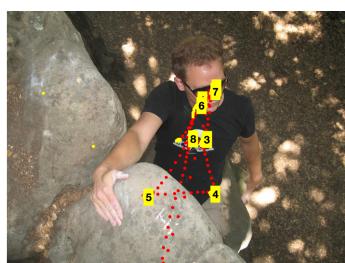
(e) Sample 5



(f) Sample 6



(g) Sample 7



(h) Sample 8



(i) Sample 9

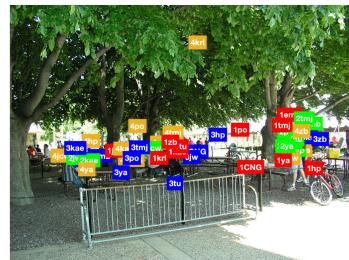
Figure 1: Sample images with eye path plotted as red points (Subject hp)



□ Multiple Persons



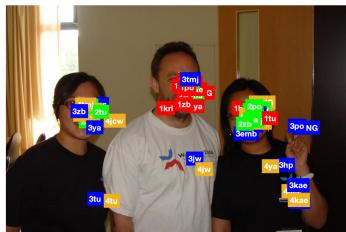
(a) Sample 1



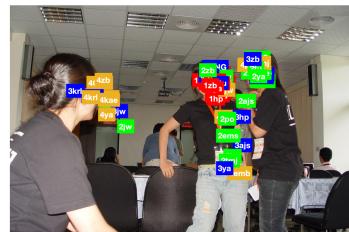
(b) Sample 2



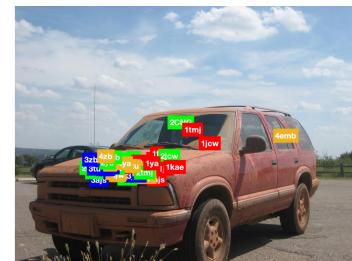
(c) Sample 3



(d) Sample 4



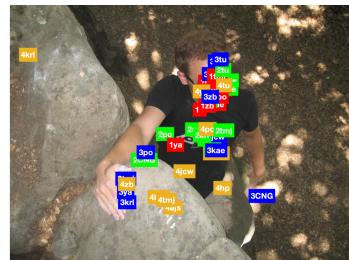
(e) Sample 5



(f) Sample 6



(g) Sample 7



(h) Sample 8



(i) Sample 9

Figure 2: Sample images with eye path plotted as red points (Subjects ya, po, kae, jcw, tmj, krl, CNG, tu)



■ Part2 - Saliency Model

Saliency map is synthesized using three different feature groups: low level, mid level, and high level features. The used function on the simulation extracts each set of these features and added them together in order to make the saliency map.

Each feature is explained shortly:

- *Low-Level*

- **Subband:** Subband features represent frequency features like mean of the image, edges and frequent patterns.
 - **Itti:** Itti features consist of orientation, color, and intensity of the image.
 - **Color:** Color features consist of red, green, and blue colors probabilities in the image.
 - **Torralba:** Torralba saliency map is also calculated from subband pyramids of the image. So, it should be similar to subband.
 - **Distance from Center:** When humans take pictures, they naturally frame an object of interest near the center of the image. For this reason a center feature is included.

- *Mid-Level*

- **Horizon:** It finds the possible horizon in the image and puts a gaussian area around the horizon.

- *High-Level*

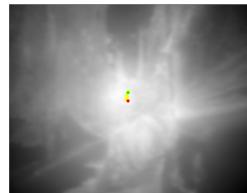
- **Object:** Puts A white rectangle in the places of the faces, cars, and people



□ Eye Positions on Saliency Maps



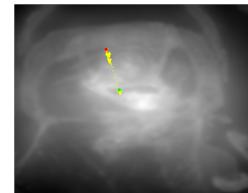
(a) Sample 1



(b) SM of sample 1



(c) Sample 2



(d) SM of sample 2



(e) Sample 3



(f) SM of sample 3



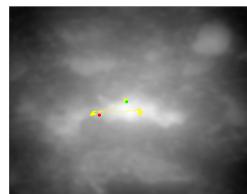
(g) Sample 4



(h) SM of sample 4



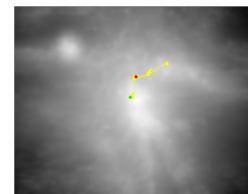
(i) Sample 5



(j) SM of sample 5



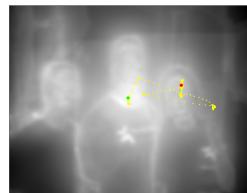
(k) Sample 6



(l) SM of sample 6



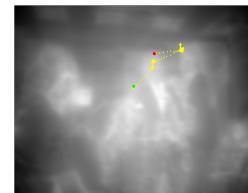
(m) Sample 7



(n) SM of sample 7



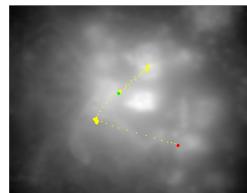
(o) Sample 8



(p) SM of sample 8



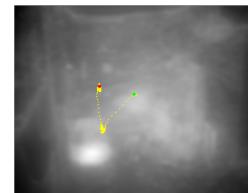
(q) Sample 9



(r) SM of sample 9



(s) Sample 10



(t) SM of sample 10

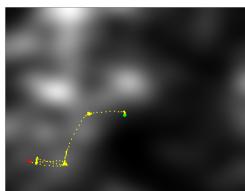
Figure 3: Sample images and their saliency maps with eye path plotted as yellow points (subject hp). The green dot is the initial eye location and the red dot is the last eye location.



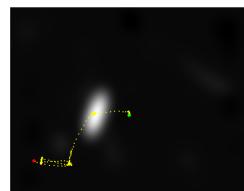
□ Different Saliency Maps



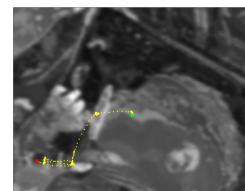
(a) Sample Image



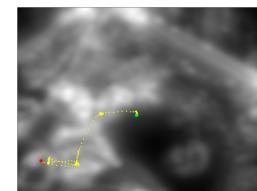
(b) Subband



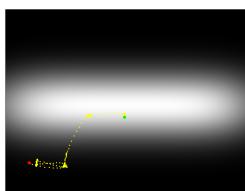
(c) Itti



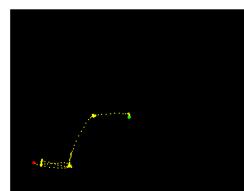
(d) Color



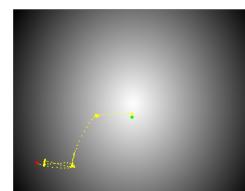
(e) Torralba



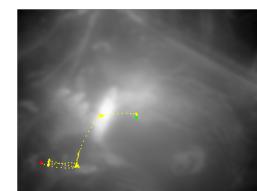
(f) Horizon



(g) Object



(h) Center

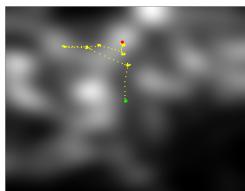


(i) All of the features

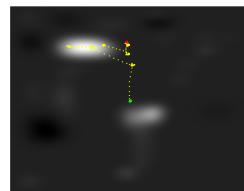
Figure 4: Sample Image 1 with saliency map. Saliency map for different features are made by equalizing all of the other weights instead of its weight in the model to zero.



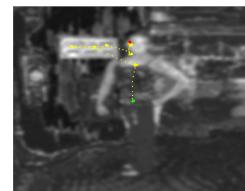
(a) Sample Image



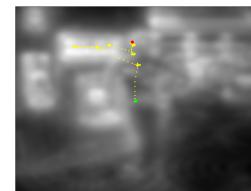
(b) Subband



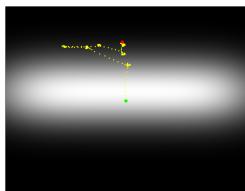
(c) Itti



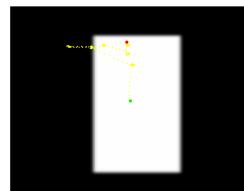
(d) Color



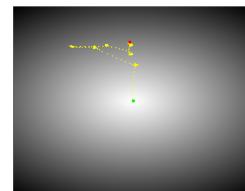
(e) Torralba



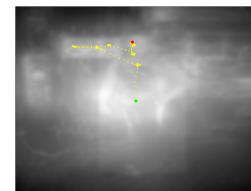
(f) Horizon



(g) Object

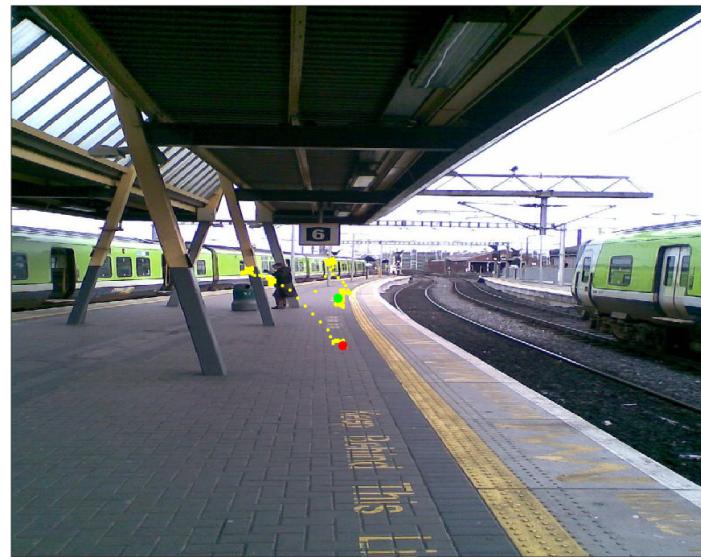


(h) Center

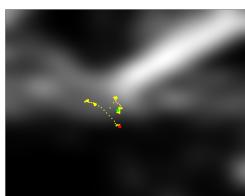


(i) All of the features

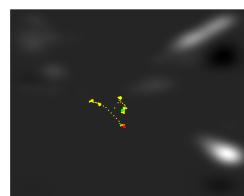
Figure 5: Sample Image 2 with saliency map. Saliency map for different features are made by equalizing all of the other weights instead of its weight in the model to zero.



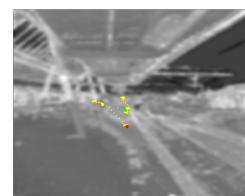
(a) Sample Image



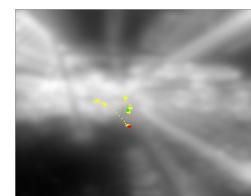
(b) Subband



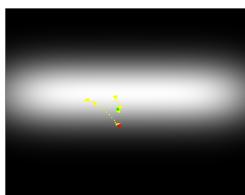
(c) Itti



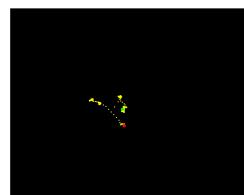
(d) Color



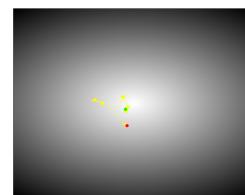
(e) Torralba



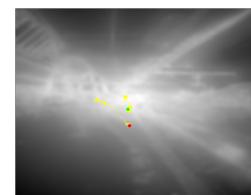
(f) Horizon



(g) Object



(h) Center

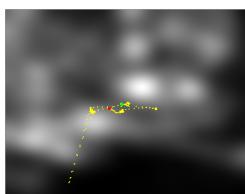


(i) All of the features

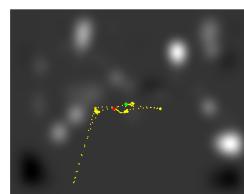
Figure 6: Sample Image 3 with saliency map. Saliency map for different features are made by equalizing all of the other weights instead of its weight in the model to zero.



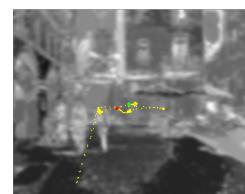
(a) Sample Image



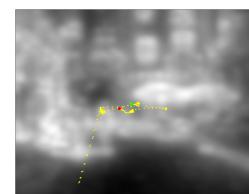
(b) Subband



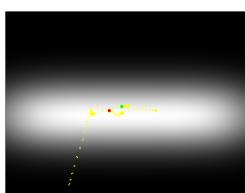
(c) Itti



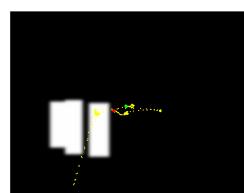
(d) Color



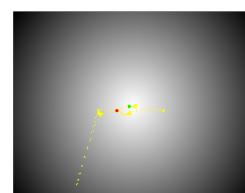
(e) Torralba



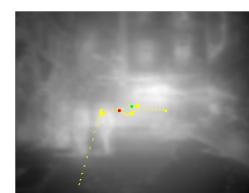
(f) Horizon



(g) Object



(h) Center



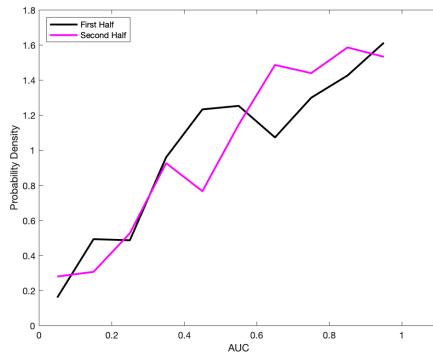
(i) All of the features

Figure 7: Sample Image 4 with saliency map. Saliency map for different features are made by equalizing all of the other weights instead of its weight in the model to zero.

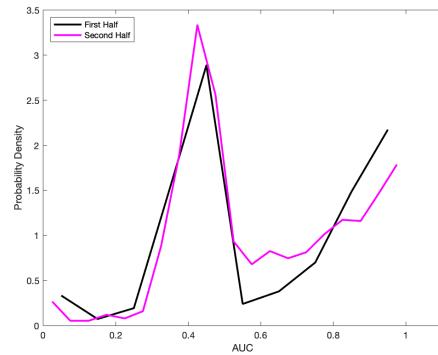


■ Part3 - Comparing Saliency Maps to Fixations

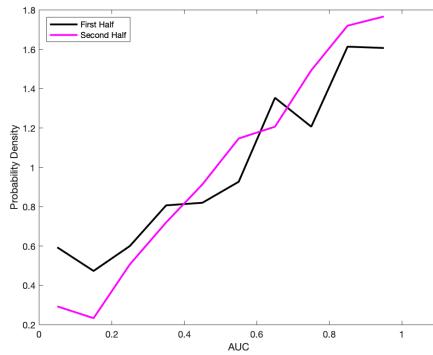
□ Presence of only one feature



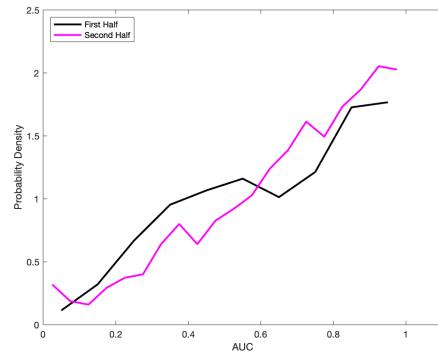
(a) Subband



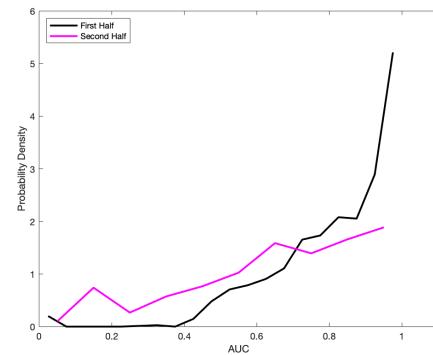
(b) Itti



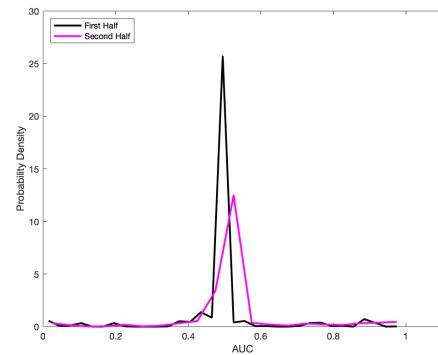
(c) Color



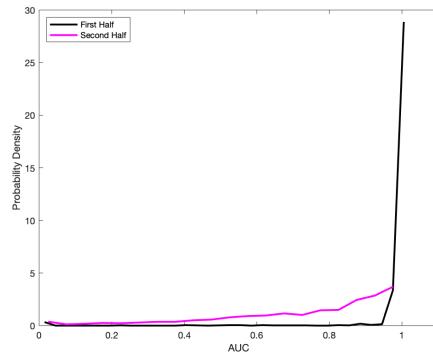
(d) Torralba



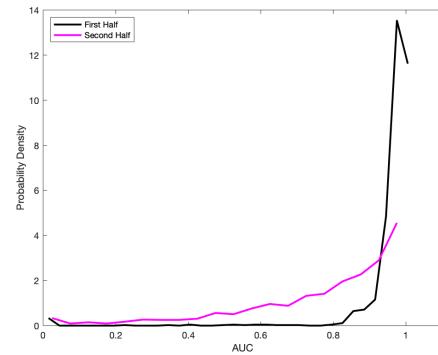
(e) Horizon



(f) Object



(g) Center



(h) All of the features

Figure 8: PDF of AUC scores for different features between saliency maps and first 0.2 seconds of the eye path