Computer Vision -Assignment-2
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Task-1:

- I(r,g,b)=P*I(r,g,b)
- Here P is taken as 0.5 for the better observation of results
- Task1 HSI values {H1,S1,I1}

Images	Original Image			Task-1			Difference		
.Tiff	H	S	I	H1	S1	I1	abs(H-H1)	abs(S-S1)	abs(I-I1)
1	95.549	0.321	0.13	95.279	0.321	0.065	0.27	0.0	0.065
2	55.141	0.221	0.462	54.837	0.221	0.23	0.303	0.232	0.232
3	93.22	0.191	0.551	93.344	0.191	0.276	0.124	0.0	0.275
4	138.01	0.174	0.656	137.944	0.175	0.328	0.065	0.0	0.328
5	47.612	0.48	0.427	15.381	0.52	0.168	32.231	0.04	0.259
6	118.223	0.257	0.496	120.36	0.282	0.229	2.137	0.024	0.267
7	84.807	0.076	0.713	77.125	0.088	0.358	7.682	0.011	0.355
8	104.389	0.278	0.484	86.623	0.261	0.253	17.766	0.017	0.231
9	124.417	0.488	0.434	123.203	0.52	0.218	1.214	0.032	0.216
10	81.568	0.334	0.503	70.373	0.331	0.252	11.194	0.003	0.251

Observation:

1. After performing task-1 the H and H1 are closer so the difference between them lie in 0.065(min) to 32.231(max)

2. Whereas saturation values S and S1 are very very closer to each other the difference in all cases lie between 0.0(min) to 0.04
3. In Task-1 we multiplied by P (0.5) so the Intensity values are affected largely . The I1 is equal to I *0.5 . I1 is 0.5 times the I(Original).

Taske-2:

- I (R[i,j],G[i,j],B[i,j]) = I (G[i,j],B[i,j],R[i,j]) operation
- HSV values of image after task2 are H2,S2,V2

Images	Original Image			Task-2			Difference		
	H	S	I	H2	S2	I2	abs(H-H2)	abs(S-S2)	abs(I-I2)
1	95.549	0.321	0.13	0.243	0.997	0.227	95.306	0.676	0.097
2	55.141	0.221	0.462	0.543	0.997	0.76	54.598	0.776	0.298
3	93.22	0.191	0.551	0.384	1.0	0.5	92.836	0.809	0.051
4	138.01	0.174	0.656	0.096	0.997	0.647	137.913	0.822	0.01
5	47.612	0.48	0.427	0.31	0.998	0.232	47.302	0.518	0.195
6	118.223	0.257	0.496	0.256	0.997	0.436	117.967	0.74	0.06
7	84.807	0.076	0.713	0.573	0.997	0.659	84.234	0.921	0.054
8	104.389	0.278	0.484	0.372	1.0	0.336	104.017	0.722	0.148
9	124.417	0.488	0.434	0.346	1.0	0.509	124.07	0.512	0.075
10	81.568	0.334	0.503	0.232	0.997	0.534	81.335	0.663	0.031

Observation:

1. The difference between the H and H2 is almost equal to H. i.e H2 values distributed near to zero.The H2 range of values are between {0.096(min) to 0.573(max) }
2. In case of Saturation all S2 values are distributed **very close** to 1(i.e 0.9 to 1) .

3. There is a slight variation for I and I2(Not affected much due to operation) values so the difference between them is also low.

Task-3

- ABW on given image
- The generated HSI are H3,S3,I3

Images	Original Image			Task-3			Difference		
	H	S	I	H3	S3	I3	abs(H-H3)	abs(S-S3)	abs(I-I3)
1	95.549	0.321	0.13	60.0	1.0	0.036	35.549	0.679	0.094
2	55.141	0.221	0.462	119.491	1.0	0.129	64.35	0.779	0.334
3	93.22	0.191	0.551	119.529	1.0	0.174	26.31	0.809	0.377
4	138.01	0.174	0.656	60.0	1.0	0.186	78.01	0.826	0.471
5	47.612	0.48	0.427	112.458	1.0	0.059	64.846	0.52	0.368
6	118.223	0.257	0.496	60.0	1.0	0.136	58.223	0.743	0.36
7	84.807	0.076	0.713	0.0	1.0	0.237	84.807	0.924	0.477
8	104.389	0.278	0.484	59.726	1.0	0.161	44.663	0.722	0.323
9	124.417	0.488	0.434	57.712	1.0	0.08	66.705	0.512	0.354
10	81.568	0.334	0.503	120.0	1.0	0.124	38.432	0.666	0.378

Observation:

1. Here the saturation is maximum i.e exactly 1 after AWB operation
2. The values of H3 sometimes go higher than H and sometimes go lower than it.
3. The values of I3 are lower than I.

HSI Image Results in all three tasks: