

CSL 402

DIGITAL IMAGE ANALYSIS

Final Project Report

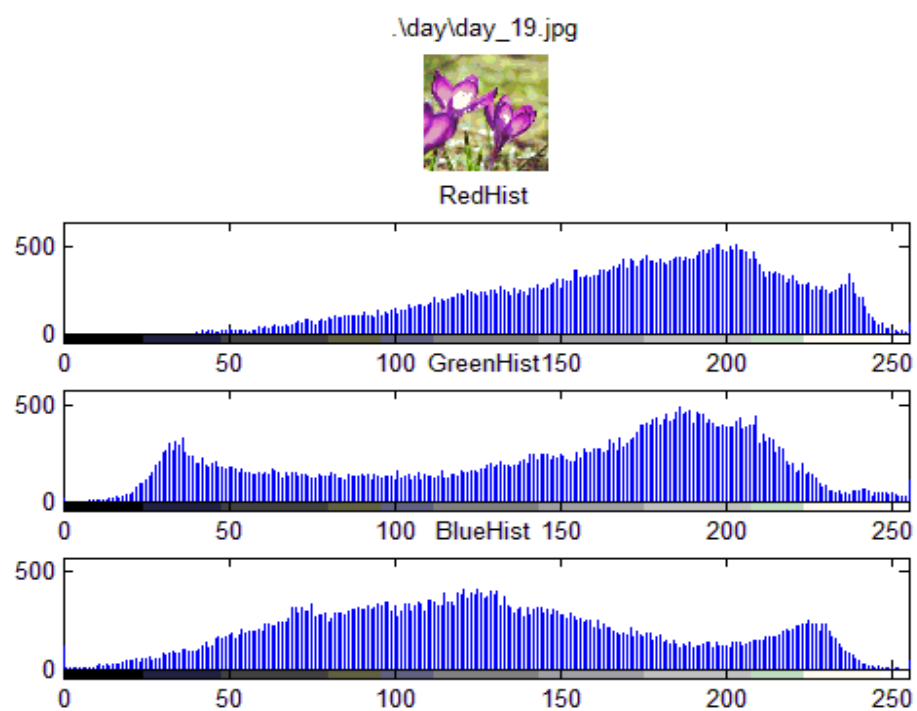
Detecting day/night in images

Introduction

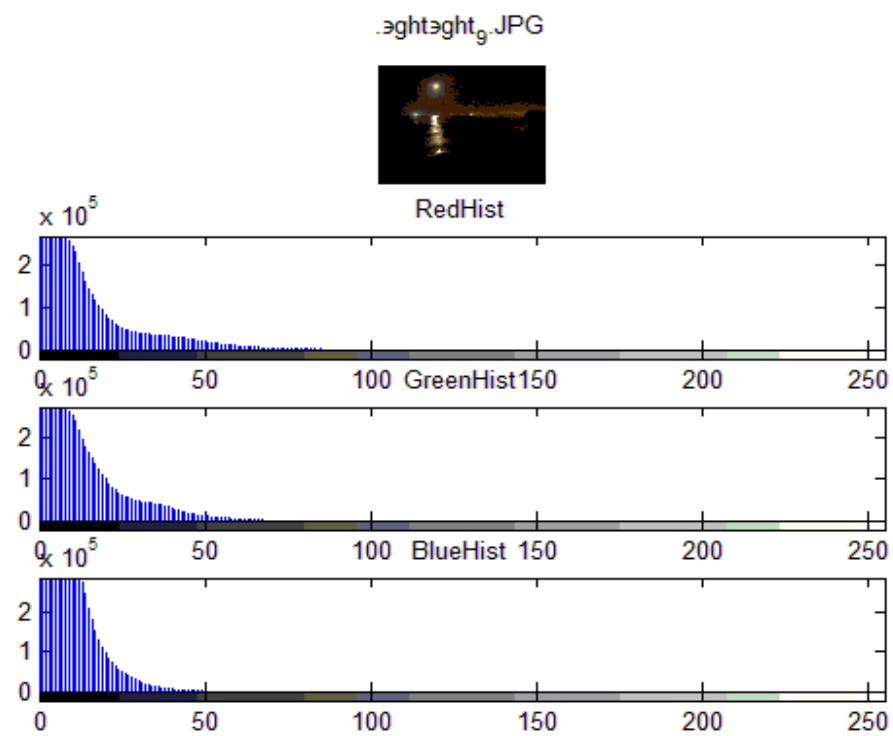
We have tried to implement a program which can detect day/night in images. We implemented 3 algorithms and have tabulated the performance of 3 algorithms on the day image dataset and the night image dataset.

Observations

Histogram of image of a typical day (the image with the rgb histograms)



Histogram of image of a typical night (the image with the rgb histograms)



Based on the histograms of these images we decided upon the threshold values. In these 2 images it can be clearly seen that in the first 50 levels(0-50)

Body

We used 3 methods:

1. **Thresholding of intensity values in the histogram:** We took the intensity values the red, blue, green component of the image and then we found the histogram of the 3 components of the image. Since the intensity values are from 0 to 255, by observing the histograms of various day and night images, we realized that keeping threshold of intensity value 50 helped us significantly in distinguishing day and night images. We calculated the percentage of red, blue, green colors in the first 50 levels ie. 0-50 in the histogram. We found out that for a day image, the individual percentage of the r-g-b colors is less than 40% in these 0-50 levels and the rest 60% in intensity levels above 50, vice-versa for the night images.

2. **Taking mean of intensity values of r-g-b for a single pixel and averaging this over the entire image:** We took the intensity values the red, blue, green component of the image. Then we found the average matrix for the image computed as

Average = (red+green+blue)/3, where red, green, blue, were the intensity matrices of the image.

Then we calculated the average per pixel. Then we took the mean of this average matrix which gave us the average intensity per pixel.

3. **Take mean of r-g-b values separately:** We took the intensity values the red, blue, green component of the image. We found the mean of red, blue, green component of the image. From these mean value of images, we observed that for the day image the mean of these 3 values is greater than 100.

Results

Method used	Day images	Night images	Average accuracy
1	56.52	95.45	76
2	100	72.72	86
3	69.56	90.9	80.23

Conclusions

After implementing 3 algorithms, we concluded that these 3 algorithms on an individual basis can't be generalized for good performance over all datasets as these are observation based. We earlier tried our experiments on particular data set on which we found 3rd one to be performing the best while on current dataset, it is evident that 2nd is performing better. Thus, we take the one-vs-all approach that is if 2 or more classifiers classify the image as a *day* image then it's a day image else it's a night image.

Suggestions for future work

It can be ported to camera software for the automatic detection of day and night for capturing good quality images without the intervention of the user changing the settings.

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