Lens flare detector

Run instruction (used Python 3, should work with 2.7 but didn’t check):

image should be in the same folder as detector.py Run … detector.py yourImg.jpg

if you need blur, use -b parameter (detector.py yourim.jpg -b), will print blur=0/1 (1=faulty).

Analysis. Pictures with lens flare have in common effects:

White sun spot (top of the picture) with rays – sometimes not clear boarder; small white oval blobs (not always); the overall spectrum is bright; sometimes colourise rainbow semicircles. Good data may have white cloud sky.

Blurry pictures are mostly due to motion (all area is blur); some just partially (out of focus); Some good data also have small even blur.

There is not much data (25 pictures) to train a CNN in my opinion (the data also quite similar), so CNN might fit to green walls rather than sun. However, if time, still better to try.

So, I decided to try basic statistical approach (use smaller, grey images):

By calculating white area proportion; or as white variation distribution.

By taking black minimum value threshold;

By finding bright oval blobs (not included into current code, need refinement)

Weights are applied to make one prediction. For the blur I used Laplacian distribution.

Results: The thresholds could be adjusted better, however, overall results seems to be weak, so more work should be done.

What could be done:

Create more fake images with flare presents, train networks, used transfer learning.

Adjust blob search to sun spiky shapes (not sure how for now)

Use shape labelling services to create masks and train with UNET

Find more pictures with lens flare, train a model (Tree forest or XGBoost).

If more info available:

Use more scans flared pictures to train a CNN.

Fastai library used rsnet32 + torch (need squared pictures), could provide good results.

Check alpha channel or analyse raw formats.

Implement approaches from papers:

<http://www.imatest.com/docs/veilingglare/> (<http://www.imatest.com/wp-content/uploads/2018/01/EI2018_Norman_Koren_final_paper.pdf>)

<https://web.stanford.edu/class/ee368/Project_Autumn_1516/Reports/Chabert.pdf>

<http://vision.eng.shizuoka.ac.jp/pubs/pdfs/glare_mehran_2017.pdf>

<https://web.stanford.edu/class/ee368/Project_Autumn_1516/Reports/Chabert.pdf>

Don’t have access: <https://ieeexplore.ieee.org/document/7140095>

<https://link.springer.com/article/10.1134/S1054661811020854>

Creates flares

<https://github.com/JacquesLucke/Lens-Flares>

and more…