

Poisson Matting (ID: 25)

Team: Made Online



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Main Goal

- Matting for natural images in complex scenes by calculating the gradient of matte from image.
- Solving Poisson equation.
- Integrating user's knowledge and calculating matte in semi-supervised way(global and local matting)

Image matting



Image matting in our setting refers to foreground extraction from any given image.



A new image can be blended from a background image and foreground image with its "alpha matte".



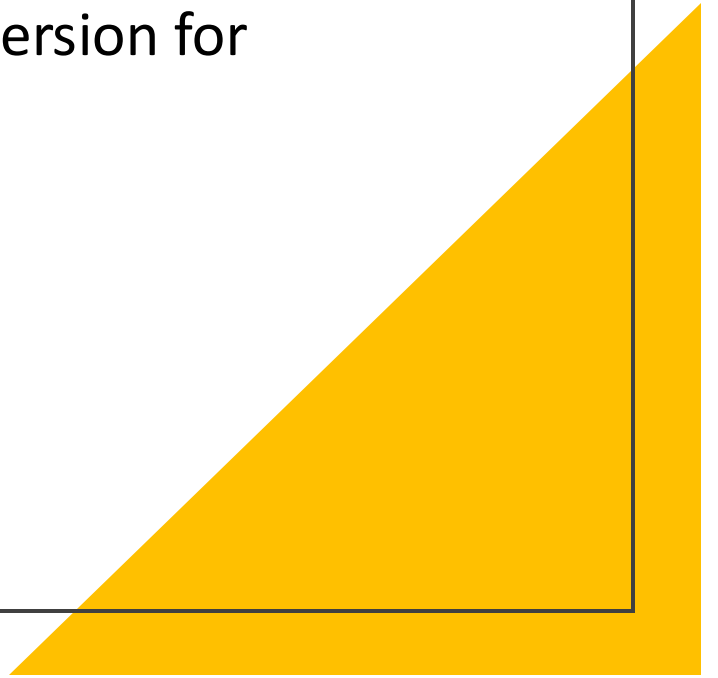
$$I = \alpha(x, y)F(x, y) + (1 - \alpha)B(x, y) \quad \text{--- --> (1).}$$



In natural image matting: α , F and B need to be estimated.

Work
Done
till now
..

- Implemented Global Matting.
- Implemented efficient version for finding alpha matte.



Steps Involved (Global Matting)

Step 1

Find approximate foreground and background using an alpha.

Step 2

Find the Poisson Equation for this image.

Step 3

Apply Gauss Siedel Iteration to find a good approximate for alpha.

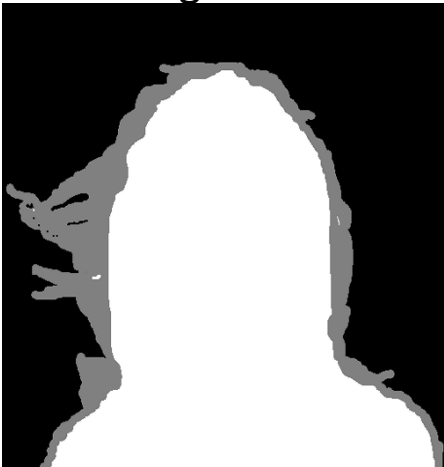
Step 4

Use this alpha to get the final new image.

Results



Image



Trimap



Estimated matte



New
Background

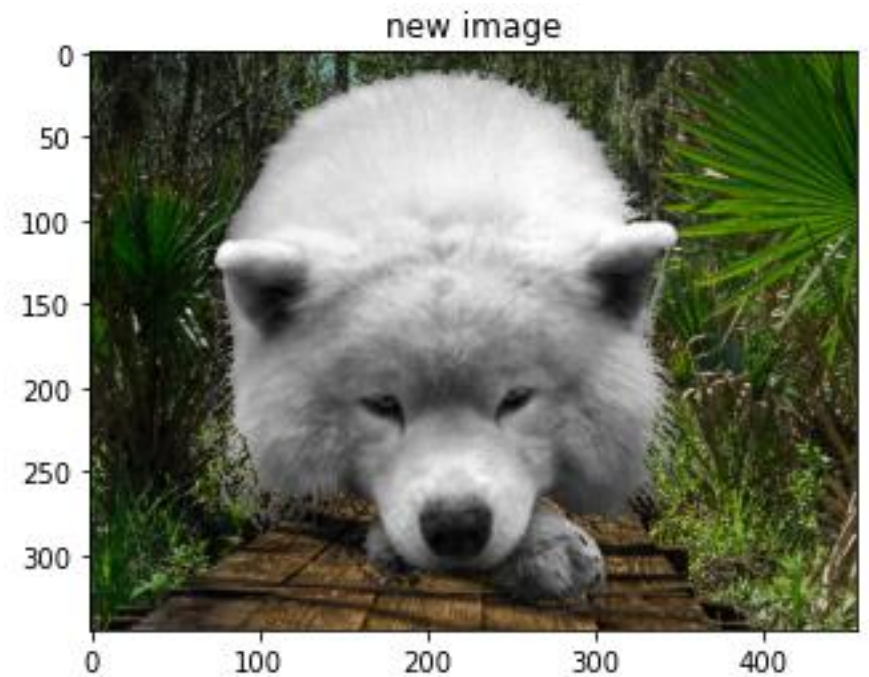
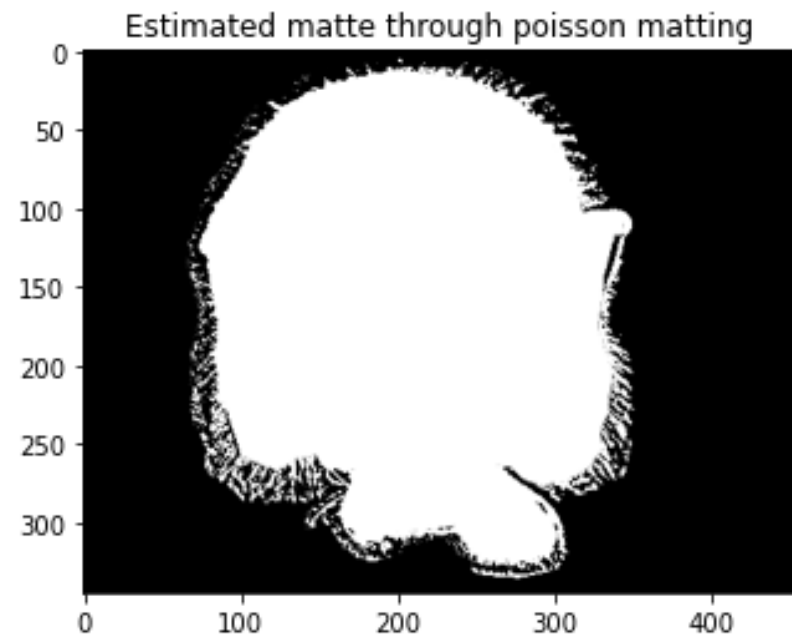
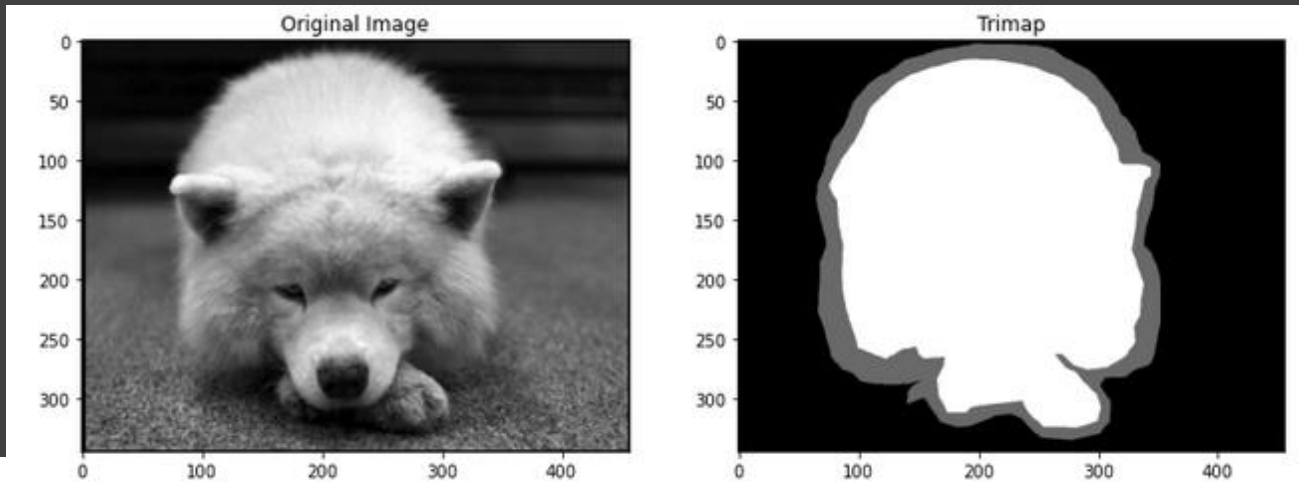


Alpha blending
 $I = \alpha F + (1 - \alpha) B$



Image with new bg

Example



Results

- Here global matting is not able to cover the fine details of hair, hence there is a need of a better algorithm, local matting.



Image



Estimated matte

+



New Background

=



Image with new bg

Results comparison with efficient algorithm

For the image on right side following results time was taken

- Slow algorithm :

39.6 s \pm 138 ms per loop (mean \pm std. dev. of 7 runs, 1 loop each)

- Efficient algorithm:

272 ms \pm 22.4 ms per loop (mean \pm std. dev. of 7 runs, 1 loop each)



Tasks for next evaluation

- Implement Local Matting
- Poisson matting on multiple backgrounds
- De-fogging(tentative)