PORTRAIT SEGMENTATION BY DEEP REFINEMENT OF IMAGE MATTING

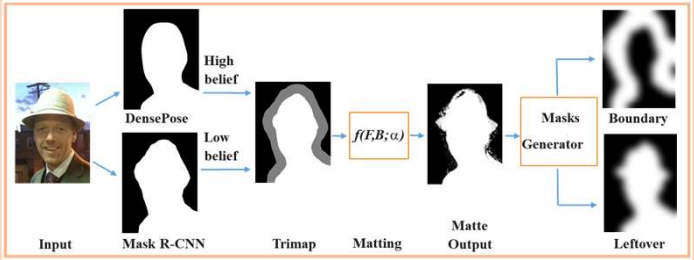
C. Orrite, M.A. Varona, E. Estopiñán, J.R. Beltrán

Graphics and Imagine lab, Aragon Institute of Engineering Research, University of Zaragoza, Spain

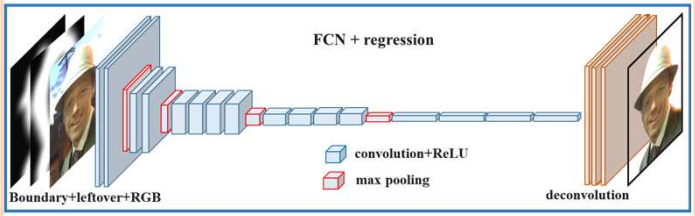
INTRODUCTION

- This paper introduces a novel framework for portrait segmentation with high precision on boundary area.
- Our proposal is based on:
  1. A trimap generated by fusing information coming from Mask R-CNN and DensePose algorithms.
  2. An alpha matting algorithm runs over the previous trimap
  3. Portrait is refined by a Fully Convolutional Network (FCN) plus a transpose convolution.
- Tested on two evaluation datasets:
  - PFCN, considered the largest publicly available dataset
  - COCO dataset

OVERVIEW



Alpha matting based on Mask R-CNN and Dense pose



Matting refinement by FCN plus regression

FLASH TEXT

- **Four stages are defined:**

1. Trimap generation
2. Alpha matting
3. Boundary and leftover masks generation
4. FCN plus regression

ATTENTION

Algorithm 1. Boundary mask generation

Input: binarized matte image I, kernel size th1

dilate_layer = dilate (I, th1)
erode_layer = erode (I, th1)
boundary_mask = dilate_layer – erode-layer
boundary = GaussianBlur (boundary_mask, (2*th1)+1)

Output: boundary

Algorithm 2. Leftover mask generation

Input: binarized matte image I, kernels size th1 and th2

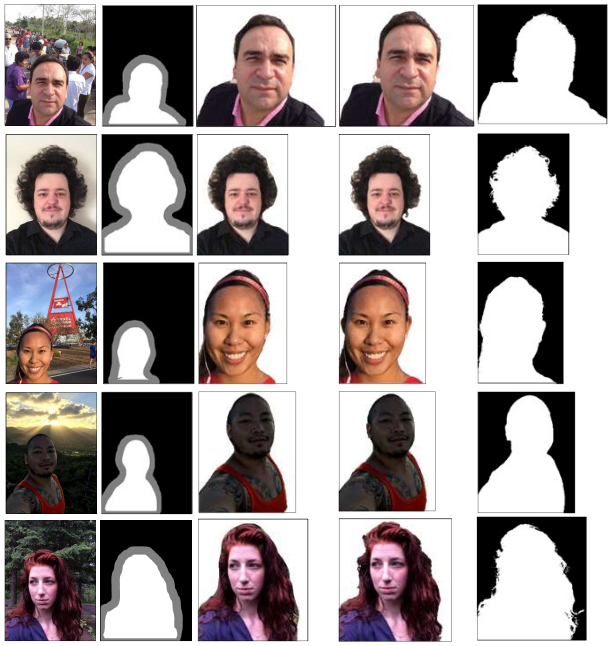
Leftover_mask = erode(I, th2)
leftover = GaussianBlur (leftover_mask, (2*th1)+1)

Output: leftover

NUMERICAL RESULTS

Method	PFCN	COCO	COCO+
Shared Matting	94.0%	88.1%	94.0%
Portrait FCN+	95.9%	68.6%	
BSN	96.7%	77.7%	
ours	**97.0%**	**89.6%**	**95.2%**

RESULTS



Input trimap shared matting **ours** ground truth

CONCLUSION

- Improvement of matting techniques
- Hair segmentation is still a challenging issue
- **Future work**: an end-to-end fully convolutional network taking as input the masks provided by Mask R-CNN and DensePose