Benchmarking of Photobombing Removal in Images

Sai Pavan Kumar Prakya

Advisor: Dr. Tam Nguyen

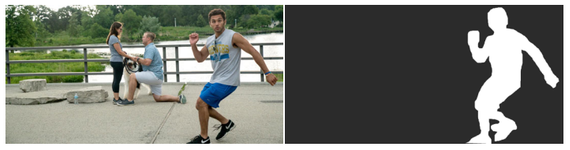
Abstract: The project aims to tackle the photobombing in images. To this end, we first collect a dataset of images requiring the removal of photobombing. Then, we annotate the removal regions. Next, we evaluate different image inpainting methods to replace the removal regions. In order to evaluate the methods, we define a performance metrics. The experimental results show the effectiveness of some inpainting methods in this particular problem.

Image Inpainting: Reconstructing the missing region of the image.

Figure(a) Figure(b) Figure(c)

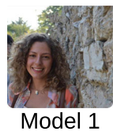
Data Collection and Preparation

- Collected Photobombed Images from Facebook and various online sources. All Images are similar to Figure(a).
- We Created Mask for the removal regions, this Mask is used to identify the empty region where image inpainting is required. Example for Mask in Figure(b).



Methods Execution

- We have 6 Image Inpainting methods, out of which two are Neural Network methods.
- The Photobombed Images and its respective Masks are passed as inputs into the methods. The method completes the image by reconstructing the masked region like Figure(c)

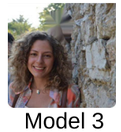


Model 1

Criminisi, A., P. Perez, and K. Toyama. "Region Filling and Object Removal by Exemplar-Based Image Inpainting."

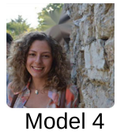
Model 2

F. Bornemann and T. März. "Fast Image Inpainting Based on Coherence Transport."



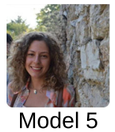
Model 3

Telea, Alexandru. "An image inpainting technique based on the fast marching method."



Model 4

M. Bertalmi`o, A. L. Bertozzi and G. Sapiro. "Navier-Stokes, Fluid Dynamics, and Image and Video Inpainting"



Model 5

Jiahui Yu, ZheLin,Jimei Yang, XiaohuiShen, Xin Lu and Thomas Huang “Free-Form Image Inpainting with Gated Convolution”

Model 6

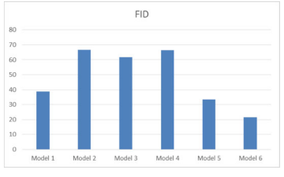
Roman Suvorov, Elizaveta Logacheva, Anton Mashikhin, Anastasia Remizova, Arsenii Ashukha, AlekseiSilvestrov, Naejin Kong, Harshith Goka, Kiwoong Park, Victor Lempitsky “Resolution-robust Large Mask Inpainting with Fourier Convolutions”

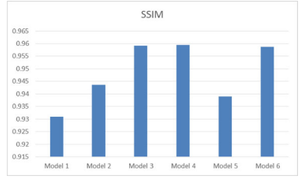
Evaluation

- To evaluate the generated image we need to compare it with ground truth image. As we don't have ground truth image we created our own by using photoshop.
- We have used distance, similarity metrics and also human ratings to compare between ground truth and generated image.

- Example of Photoshopped Image, which we have used to compare with the generated inpainting image.

- A lower FID indicates better-quality images; conversely, a higher score indicates a lower-quality image





- SSIM value 1 being the best, a higher score indicates a good quality image