EE 367 Project Proposal

Image Inpainting

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1. Overview and Motivation

Imaging inpainting is a task which fills missing pixels with semantically and perceptually plausible contents. We can remove unwanted objects by using masks. It is important that inpainting region should be filled semantically plausible and match with the existing backgrounds.

However, there are still some limitations. Inpainting network often produces unnatural and awkward results. In addition, the results are often blurry. In this project, I will improve unnaturalness and awkwardness of inpainting results, and enhance the image quality.

2. Related Work

There are some great approaches for image inpainting tasks. For example, *Globally and Locally Consistent Image completion* [1] uses Global discriminator and local discriminator to consider global context and local context. Another approach is using coarse to refine network [2], which first produces coarse result, and uses this information to produce inpainting results (refine results). In addition, *Edgeconnect: Generative Image Inpainting with Adversarial Edge Learning* [3], learns edge maps of input images and use this information to produce inpainting results. Other paper suggests using unique convolution called "Gated Convolution" [4], which predicts the mask region and selectively execute convolution.

3. Project Overview

In this project, I will implement image inpainting network for face images and background images. CelebaHQ dataset will be used for face images, and Places 365 dataset will be used for background images.

The objective of this project is improving the image quality. The result will be evaluated quantitatively and qualitatively. For the qualitative result, PSNR, SSIM, Perceptual loss, etc. will be used.

4. Milestones & Timeline

(week 1) Idea proposal / Test for small dataset

(week 2) Training for face images / Validation test for face images

(week 3) Training for background images / Validation test for background images

(week 4) Get the result / Prepare for a poster and a report

References

[1] Iizuka, Satoshi and Simo-Serra, Edgar and Ishikawa, Hiroshi, "Globally and Locally Consistent Image Completion," in Association for Computing Machinery, 2017

[2] Yu, Jiahui and Lin, Zhe and Yang, Jimei and Shen, Xiahui and Lu, Xin and Huang, Thomas S, "Generative image inpainting with contextual attention," in Proceedings of the IEEE conference on computer vision and pattern recognition, 2018, pp5505-5514.

[3] K. Nazeri, E. Ng, T. Joseph, F. Qureshi, and M. Ebrahimi, "Edgeconnect: Generative image inpainting with adversarial edge learning. arxiv 2019," arXiv preprint arXiv:1901.00212.

[4] J. Yu, Z. Lin, J. Yang, X. Shen, X. Lu, and T. S. Huang, "Free-form image inpainting with gated convolution," in Proceedings of the IEEE International Conference on Computer Vision, 2019, pp. 4471– 4480.