
EECS 4422: Computer Vision Project Proposal

Edge Detection For Colouring Book

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1 Motivation

During these trying times there's been a spike in the demand for colouring books. People with nothing to do have found colouring books to be a great way to use their time and express themselves artistically. That is why designing software like this will allow consumers to take photos of their own and turn them into a colouring book page. They can then add their artistic flair to their pictures.

2 Datasets

Any large repository of images, preferably close up pictures of nature (flowers). Some datasets we have already compiled include sets of flowers [1, 2] and close-ups of leaves [3]

3 Proposed Methods

Method 1: Canny based [4]

1. Turn the image to grayscale
2. Reduce the noise of the image by applying a gaussian filter to the image
3. Find the intensity image
4. Apply a high pass filter
5. Apply a double threshold filter
6. edge tracking by hysteresis
7. Apply another high pass filter
8. Invert the color of the image
9. Apply another smoothing layer with a gaussian filter

Other Methods:

- Use a holistically-nested edge detection algorithm [5]
- Use an ant-colony edge detection algorithm [6]

4 Evaluation Methodology

Quality: Let a human draw the edges of the image. Compare it to the result of running edge detection on the same image.

Efficiency: Run the edge detection on a large set of images and record how long it took. Compare it to running other similar softwares on the same set.

5 Proposed Timeline For Completion

Project presentation should be done by November 30th 2020

Project report should be done by December 7th 2020

6 Team Organizations

Lead author on proposal - Idongesit Uwah

Lead for project presentation - David Mounes Flores

Lead author on project report - Omar Mohamud

Dataset curator - Chidi Okongwu

Algorithm evaluation - Matthew Grech, Ziyin Zhong

References

- [1] Alexander Mamaev. Flowers recognition.
- [2] Prasun Roy, Subhankar Ghosh, Saumik Bhattacharya, and Umapada Pal. Effects of degradations on deep neural network architectures. *arXiv preprint arXiv:1807.10108*, 2018.
- [3] Alex Olariu. Leaf detection.
- [4] Wei Zhang Weibin Rong, Zhanjing Li and Lining Sun. An improved canny edge detection algorithm. *IEEE International Conference on Mechatronics and Automation*, 2014.
- [5] Saining Xie and Zhuowen Tu. Holistically-nested edge detection. In *Proceedings of the IEEE International Conference on Computer Vision (ICCV)*, December 2015.
- [6] Jing Tian, Weiyu Yu, and Shengli Xie. An ant colony optimization algorithm for image edge detection. *IEEE Congress on Evolutionary Computation*, 2008.