Image Colorization

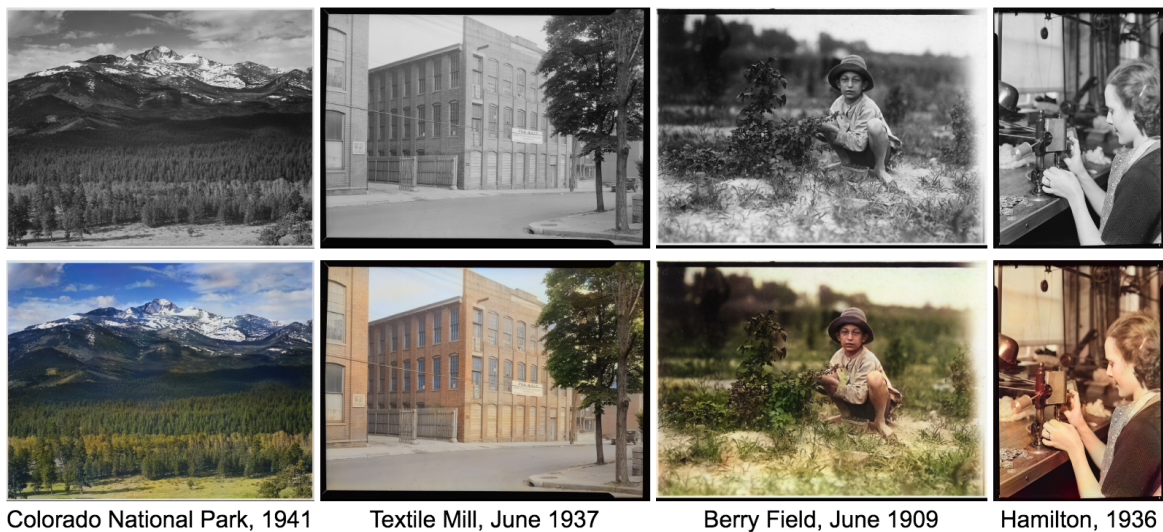| Colorado National Park, 1941 | Textile Mill, June 1937 | Berry Field, June 1909 | Hamilton, 1936 |

Figure 1: Examples of old photograph colorization[1].

Isn't it cool to turn an old photo into a colorful one? We aim to solve this problem in this project. Given a gray photograph as input, hallucinating its color version is an ill-posed problem. There are generally two approaches to tackle this problem: (1) user-guided; (2) data-driven.

One of the most famous user-guided image colorization work is *Colorization Using Optimization* [2]. Users only annotate an image with a few color scribbles, the colors are automatically propagated in space to produce a fully colorized image. Examples can be found on `http://www.cs.huji.ac.il/~yweiss/Colorization/`.

Data-driven methods depend heavily on the color priors in training dataset. Some recent work tried to solve this problem end-to-end using convolutional neural networks [1, 3].

Dataset for colorization is not a big issue, as RGB-Gray image pairs are easily accessible. Evaluations can be done by a "turing test": asking human participants to choose between a generated and ground truth color image.

References

[1] S. Iizuka, E. Simo-Serra, and H. Ishikawa, "Let there be Color!: Joint End-to-end Learning of Global and Local Image Priors for Automatic Image Colorization with Simultaneous Classification," *ACM Transactions on Graphics (Proc. of SIGGRAPH 2016)*, vol. 35, no. 4, 2016.

[2] A. Levin, D. Lischinski, and Y. Weiss, "Colorization using optimization," in *ACM Transactions on Graphics (TOG)*, ACM, vol. 23, 2004, pp. 689–694.

[3] R. Zhang, P. Isola, and A. A. Efros, "Colorful image colorization," *European Conference on Computer Vision*, 2016.