

“Selective Coloring”

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In this project we will implement a tool to selectively and automatically colorize the foreground of black and white photographs. The tool will consist of two main algorithms. First, a deep neural network will colorize the entire photograph using a pre-trained model. Second, a graph cut algorithm will segment the foreground from the background. The last step will be to combine the colorized foreground and the original background. As “bells and whistles” we also proposed to colorize the background by changing its hue and saturation to get appealing or unusual results.

Motivation. We hope to strengthen our knowledge on deep neural networks and in segmentation of images by treating them as graphs.

Milestones.

- Select a publicly available dataset to train the model and prepare the data. 2-3 days.
- Construct the DNN model and the training/evaluation algorithm. 4-5 days.
- Test the model on our own images and make changes and retrain as needed. 4-5 days.
- Develop and test the segmentation algorithm using graph cuts. 7-8 days.
- Combine both parts into a fully contained Python script. 2-3 days.
- Collect data and write the final report. 4-6 days.

Evaluation. Our algorithm will be evaluated with color images (as “ground truth”) as well as original black and white images. We will determine the capabilities of the tool on different classes of photos: landscapes, portraits, still objects. In each case we will choose examples with plain and with complex backgrounds.

Resources.

- Images dataset. For example, the COCO or the ImageNet dataset, or even a collection of our own photos.
- Tools. We will be using Jupyter Notebooks either locally or on the cloud (Google Colab or AWS) for developing, training and testing. The final tool will be implemented as a standalone Python script.
- Final report will be written in Google Docs or in LaTeX.

Group contributions.

We have not decided yet which one of us will be working on which part of the project but one of us will be in charge of the DNN and the other will be responsible for implementing the graph cut algorithm. The final report will be equally written by both.