ECOR 1051

Project Report

Photo-Editing Application

Submitted by

TEAM L1A - 10

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2 THE PROBLEM STATEMENT:

Photograph-editing and filter manipulation has a wide range useful application such as viewing galaxies far away to medical imaging that may provide critical insight in life-saving diagnosis and treatments [1, 2]. From enhancing professional photographs to creating wacky color filters for selfies, developing a program that allows users to manipulate images through applying a variety of filters serves a great niche in the digital-visual domain [3, 4]. Digital communication is ubiquitous due to the advent of modern phone cameras as people often take dozens of personal photographs a day. As imaging technology advances, the development of image-editing applications must follow. Hence, creating a basic image-filtering program will elevate the user experience and deliver a means of self-directed photo-editing to the user.
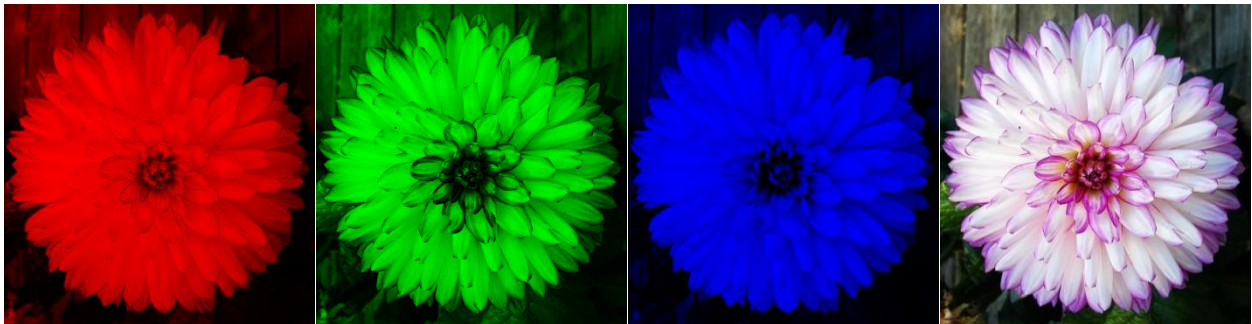

Figure 1. A basic photo-editing program based on RGB color representation for digital image combining red, green, and blue filtered images will result in the original image. Photograph and modified by T. Nguyen, 2018 [5].

3 THE PROJECT GOAL

The goal is to develop a photo-editing program that allows users to apply a variety of image filters. The interface will prompt the user to load an image into a Python console. Then the user is able to edit the image by selecting from a variety of image filtering applications. A series of culminating image filters can be applied in succession on the selected image. The resulting photo will be displayed after each filter is applied to the previous image.

4 THE PROJECT DESIGN:

This project is an opportunity to explore digital color representation and the manipulation of pixels within images utilizing Python tuples, conditional and iterative statements. The program will be developed incrementally which can be reduced to three major functional steps:

1. The photo-editing program will prompt the user to select an image file to be loaded for filtering. A function in the program will create a copy of the selected image along with the corresponding (x, y) pixel coordinates along with the red, green, and blue components [6].

2. A text-based user interface will prompt the user to select from a variety of filters (see example in *Figure 1*) in the command console which will manipulate the red, green, and blue components corresponding to each pixel. After each filter is applied the image will be displayed. Some of the image filter functions planned for this project are the following: red, green, blue, combine, 2/3-tone, extreme contrast, sepia tint, posterize, edge detection, vertical and horizontal flip [7].

3. The combination of successive image filters on the applied image will be returned to the user as a resulting new image. A series of culminating filters can be applied until the user quits the program. The new image is saved as a new image file in the same directory as the original image.

5 THE PROJECT PROCESS

The code will be constructed as a collection of modules where portions of the code will be written by different group members. The modular code will be written to exacting standards such that the unification of the codes will be operable. The corresponding test functions will be constructed concurrently with the main code. This task is suited for a team of four people with each member responsible for an equal division of the code development. A plan is in place for equal distribution of workload. The workflow will incorporate both self-tested functions and testing functions for filters developed by another member. The project is organized into three milestones approximately 2 weeks apart for deliverables to be developed incrementally [6]. Each milestone will be guided with tasks to be completed along with details documentation, testing, coding of the program modules as facilitated by the team leader. The code development and workflow for each milestone are as follows:

1. The framework will be where each member will implement both an image filter and its corresponding test code for an image filter. To facilitate parallel development, the member creating the combine filter function will be using a hard-coded set of data points, which will be later replaced with filtered images from the other image filters created. Thus, generating a total of four image filters and corresponding test function for Milestone 1.

2. Organization of codes into modules where each member will be creating two filters and the testing function for two image filters developed by another member. Thus, generating a total of 8 image filters and corresponding test functions for Milestone 2.

3. Implementation of an interactive text-based user interface in order to prompt the user to load an image, selected a series of image filters, and quit the photo-editing program for Milestone 3.

6 TEAM CONTRIBUTIONS

Trong Nguyen   Project Statement, Project Goal, Project Design

Ahmed Abdellah   Project Goal, Project Design, Project Process

Karandev Andotra   Project Process

Hussein Rashid   Proof-Reading, Editing

7 REFERENCES

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