PES UNIVERSITY

Department of Computer Science & Engineering

Problem Solving with C Laboratory-UE20CS152

Apr-Aug, 2021

Mini - Project Synopsis

TITLE: Image Filters **DATE: 17.06.2021**

Objectives:

The project implements a system to take in images of BMP File Format, and apply image processing filters, such as grayscale, sepia, blurring, edge detection and reflection, creates a new file and writes the new image into the file.

Description in points:

- An image is represented in a computer as a grid of pixels, with each pixel value representing the corresponding color value.
- This can be taken as a 2D array of pixel values.
- A BMP Image of 24-bit can be taken, and represents 8-bits for signifying red color, 8-bits for signifying blue and 8-bits for green.
- The grayscale filter is applied to the image and outputs a file which has only black-and-white colors, with corresponding brightness values according to the original image.
- Sepia filter makes the image warmer, and gives it a more orange tint, again with corresponding brightness values.
- Reflection filter is applied by moving the pixels around in a 2D array, and giving the mirror reflection of the image.
- Blurring is done with the help of box-blur technique, where the blurred pixel value is based upon the surrounding values.
- Edge detection, which is commonly used in artificial intelligence, is used to detect the boundary between two objects in an image. We use the **Sobel operator**, a mathematical technique to create the edges.
- The Sobel operator gives a new value to the pixels by taking the weighted sum of the 3x3 Kernel, with 2 weighted sums, one for the horizontal direction and another for vertical direction.
- Making use of the makefile to execute the program.
- **Method of execution:**

```
$ make filter

$ ./filter -[filter letter] infile.bmp outfile.bmp
```

Current Status of Implementation:

- ➔ ~ 50% implementation
- ➔ Reading bmp file done.
- ➔ Checking for invalid files done.
- ➔ Creating output file done.
- ➔ Creating filter flags done.
- ➔ Implemented Grayscale filter.
- ➔ Makefile created.
- ➔ Required header files and function definitions are done.
- ➔ To implement sepia, blur, reflection and edge detection filters.

Team Details:

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