



Cairo University

Faculty of Computers and Artificial Intelligence

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Structured Programming - CS112

Dr. Mohamed Elramly

Assignment 3-part 3

Name	ID	E-mail	Filters
احمد محمد نور الدين احمد	20230035	ahmednourr278@gmail.com	1,4,7,10,13,16, 19(B),20(B)
احمد محمد محمود احمد	20230598	ahmedabdellatif5355@gmail.com	3,6,9,12,15,18
عادل احمد محمد الحفنى	20230198	adelahmedhefny@gmail.com	2,5,8,11,14,17

Bonus Filters

Video Link:

<https://youtu.be/nt8ExpL6C8g>

Bonus filter 1 (Sepia Tone):

Sepia tone is a reddish-brown monochrome tint that gives a nostalgic, old-fashioned feel to images. The filter works by adjusting the RGB values of each pixel in the image to simulate the effect.

For each pixel, it calculates new RGB values based on the sepia tone effect. This calculation is done separately for each color channel (Red, Green, Blue).

This following part from sepia function that show how the new RGB values are calculated. //

```
new red newR = min(255, (int)(0.393 * PixelValue + 0.769 * image(i, j, 1) + 0.189 * image(i, j, 2)));
```

```
// new green newG = min(255, (int)(0.349 * image(i, j, 0) + 0.686 * PixelValue + 0.168 * image(i, j, 2)));
```

```
// new blue newB = min(255, (int)(0.272 * image(i, j, 0) + 0.534 * image(i, j, 1) + 0.131 * PixelValue));
```

The new RGB values are calculated based on the original RGB values of the pixel, applying specific weightings for each channel. These weightings mimic the sepia tone effect.

Bonus Filters

This is the original photo



After Applying Sepia filter



Bonus Filters

Bonus filter 2 (Night Mood):

This filter aims to simulate the appearance of an image under low light conditions, typically associated with night scenes.

For each pixel, it iterates over each color channel (Red, Green, Blue) using another nested loop.

For each color channel of the pixel, it applies different intensity reductions to simulate the night mood effect:

For the Red and Green channels ($k == 0$ or $k == 1$), the intensity is reduced by 50% ($\text{PixelValue} *= 0.5$). This means the Red and Green components of each pixel are dimmed to half of their original intensity.

For the Blue channel ($k == 2$), the intensity is reduced by 30% ($\text{PixelValue} *= 0.7$). This channel is dimmed slightly less than the other channels, which helps maintain some blue tones in the image.

After adjusting the intensity, the code ensures that the pixel values stay within the valid range of 0 to 255 using max and min functions.

Finally, the updated pixel values are stored back into the image. This following part form code:

```
// Red channel
```

```
PixelValue *= 0.5; // Reduce intensity by 50%
```

```
PixelValue = max(0, min(PixelValue, 255)); // Ensure the value stays within valid range
```

```
image(i,j,0) = PixelValue; // Update the pixel value for the Red channel
```

```
// Green channel
```

```
PixelValue *= 0.5; // Reduce intensity by 50%
```

```
PixelValue = max(0, min(PixelValue, 255)); // Ensure the value stays within valid range
```

```
image(i,j,1) = PixelValue; // Update the pixel value for the Green channel
```

```
// Blue channel
```

```
PixelValue *= 0.7; // Reduce intensity by 30%
```

```
PixelValue = max(0, min(PixelValue, 255)); // Ensure the value stays within valid range
```

```
image(i,j,2) = PixelValue; // Update the pixel value for the Blue channel
```

Bonus Filters

This is the original photo



After Applying Night Mood filter

