APPM4058A Project – Report

Oluwatimileyin Obagbuwa, 2134111, Coms Hons

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Project: Cartoon-ify

The challenge for this project is to create at least 3 artistic effects for colour images including one that applies a cartoon effect on an image. This is a very practical application of Image processing as we see it today in social media media applications, movie animations, novels, children storybooks etc.

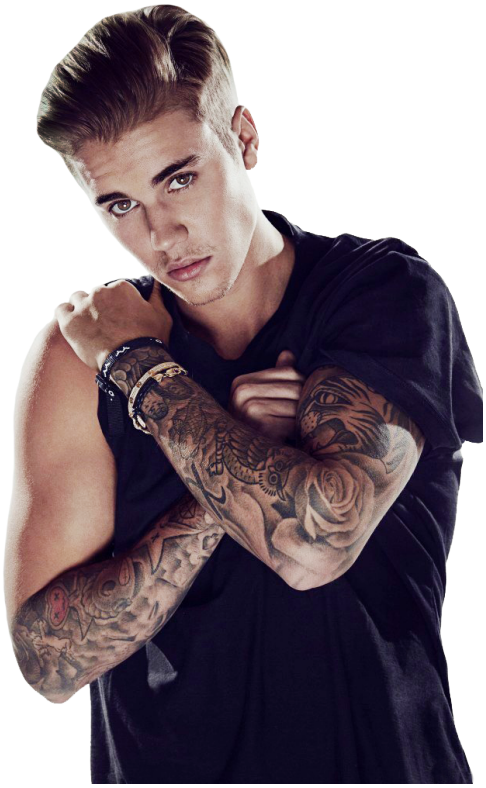

Figure 1: Sample Original Image: Justin Bieber (from pngmart.com)

Effect One: Pencil Sketch

This effect will produce a pencil sketch of a color image.

How it works:
1) Transform the Image to grayscale
2) Slightly Blur/smooth the grayscale Image with a box filter
3) Divide the grayscale image by the smooth image. This will produce a image that looks like a pencil sketch because when a pixel in the grayscale image is lighter than the same pixel in the smooth image the resultant pixel after dividing will have a white color (255). When the grayscale image has a darker value than the same pixel in the smooth image the resultant pixel would be in the range of (0,255) depending on the ratio of the two values. When the values are significantly different i.e the grayscale pixel value is much darker than the smooth pixel, the resultant pixel value will be relatively dark. So because the edge values in the grayscale will be significantly darker than the edge values in the smooth image because the edge values in the smooth value have been blended with the surrounding pixels after blurring. In the resultant pencil sketch image the edges will remain dark and outlined. But the other non-edge values will be very light as the values in both the grayscale and smooth images are not significantly different. Thereby creating an effect that looks like a pencil sketch.

Figure 2: Pencil Sketch

Effect Two: Cartoon-ify

This effect will produce a cartoon image of a color image.

How it works:
1) Use an edge detection function from openCV to obtain the edge Image of the Color Image
2) Smoothen the color Image using a bilateral filter to preserve the edges
3) Superimpose the Edge image on the smooth color Image using "cv2.bitwise_and" function. This will result in a image that is smooth but still contains the original edges. It resembles a cartoon.

Figure 3: Cartoon Image

Effect Three: Custom Social Media Filter- Shades of Orange

This effect is a simple yet very practical and realistic application of Image processing. It will apply a typical image gallery filter on a color image like the ones on snapchat or instagram. I designed this filter to give the image a overall calm and orange background and look. Hence, why I called it Shades of Orange.

How it works:
1) Split Color Image into its Red, Green and Blue channels
2) The RGB color code for orange is RGB(255, 165, 0). So I set Blue to 0. Essentially removing all blue from the image. Then for all red values less than 100, I increased them to 120. And reduced all green values greater than 200 to 165 to create a net orangy look.
3) Merge the channels back to a full RGB Image.
4) Smoothen Image with a Gaussian blur to blend everything nicely.

Figure 4: Shades of Orange Custom Filter

Experimental Setup and Running My program

I tested my program on numerous images and I saw a consistent performance to produce the desired effects. The Images folder I used currently contains 13 images, some of which I downloaded for free on the internet(referenced) and the others from the labs and class examples for this course.

My program adds all the images in the images folder to a drop down where you can select any image to apply these effects on. You can even add your picture to the folder and generate these effects on your picture.

Conclusion

Applying image processing techniques learned in class and online in real-life scenarios made this project fun and practical. It re-iterates the usefulness of image processing and need for research into image processing to be able to perform other useful applications.

References

Some Images I used in this project were gotten from :

https://www.deviantart.com/bossofmymind/art/camila-cabello-png-625649781
https://www.pngmart.com/image/10841
https://www.pngarts.com/explore/tag/selena-gomez

Ideas from :

https://thecleverprogrammer.com/2020/09/30/pencil-sketch-with-python/
https://data-flair.training/blogs/cartoonify-image-opencv-python/