

PORTFOLIO

E C S E 5 4 4

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Techniques Used

- Neural Style Transfer
- Super-resolution
- Kuwahara Filter
- Inpainting
- Denoising
- Colorization
- Color Correction
- Bokeh
- Blurring



IMAGE SOURCE

Apple iPhone 8

Wide Camera - 28 mm f1.8

12 MP . 4032x3024 . 2.2MB

ISO 25 | 0 ev | 1/5348 s

NEURAL STYLE TRANSFER

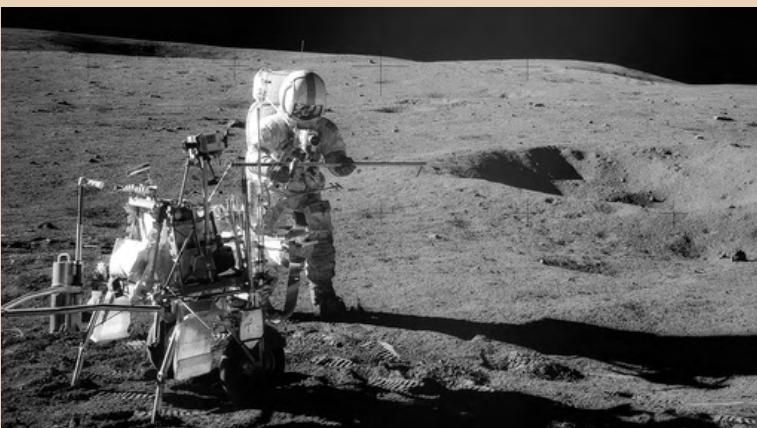


Before



After

Neural style transfer is an optimization technique simply used to take a content image and a style image and blend them together. The output image looks like the content image painted in the style of the style reference image. It is a creative technique that brings a taste of artistic visualization to real photos.



Style

Technique source: <https://towardsdatascience.com/python-for-art-fast-neural-style-transfer-using-tensorflow-2-d5e7662061be>

IMAGE SOURCE

Apple iPhone 11

Wide Camera - 26 mm f1.8

12 MP . 3024x4034 . 1.7MB

ISO 640 | 0 ev | 1/30 s

NEURAL STYLE TRANSFER



Before



After



Style

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Technique source: <https://towardsdatascience.com/python-for-art-fast-neural-style-transfer-using-tensorflow-2-d5e7662061be>

IMAGE SOURCE

Apple iPhone 8

Wide Camera - 28 mm f1.8

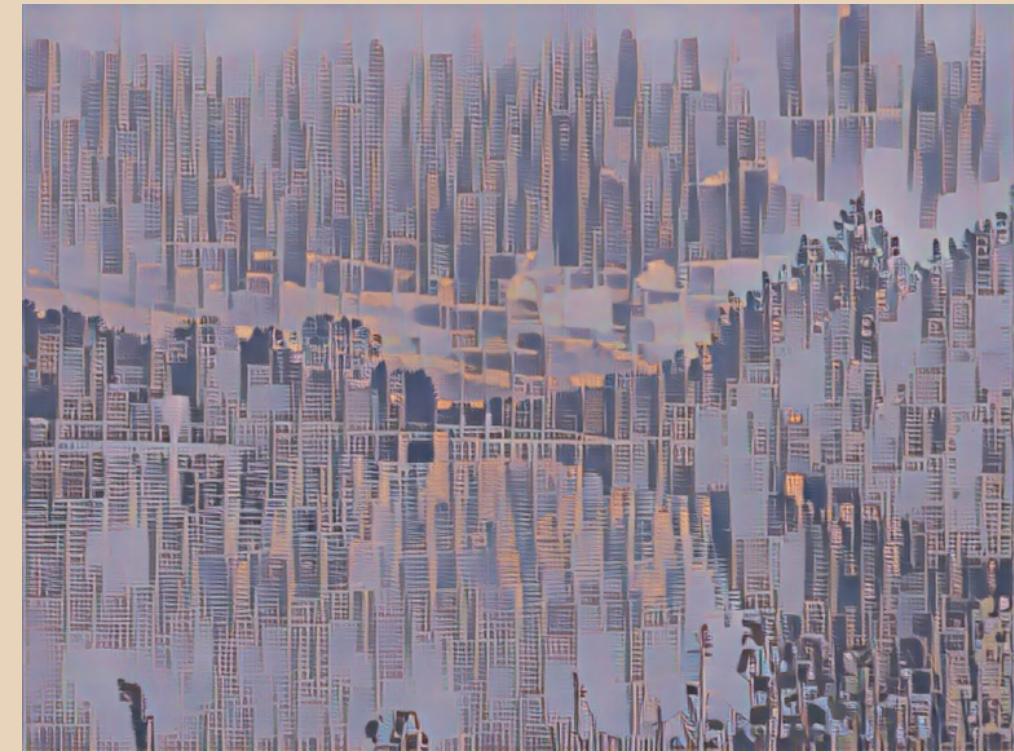
12 MP . 4032x3024 . 1.2MB

ISO 20 | 0 ev | 1/265 s

NEURAL STYLE TRANSFER



Before



After

Neural style transfer is an optimization technique simply used to take a content image and a style image and blend them together. The output image looks like the content image painted in the style of the style reference image. It is a creative technique that brings a taste of artistic visualization to real photos.



Style

Technique source: <https://towardsdatascience.com/python-for-art-fast-neural-style-transfer-using-tensorflow-2-d5e7662061be>

IMAGE SOURCE

Apple iPhone 8

Wide Camera - 76 mm f1.8

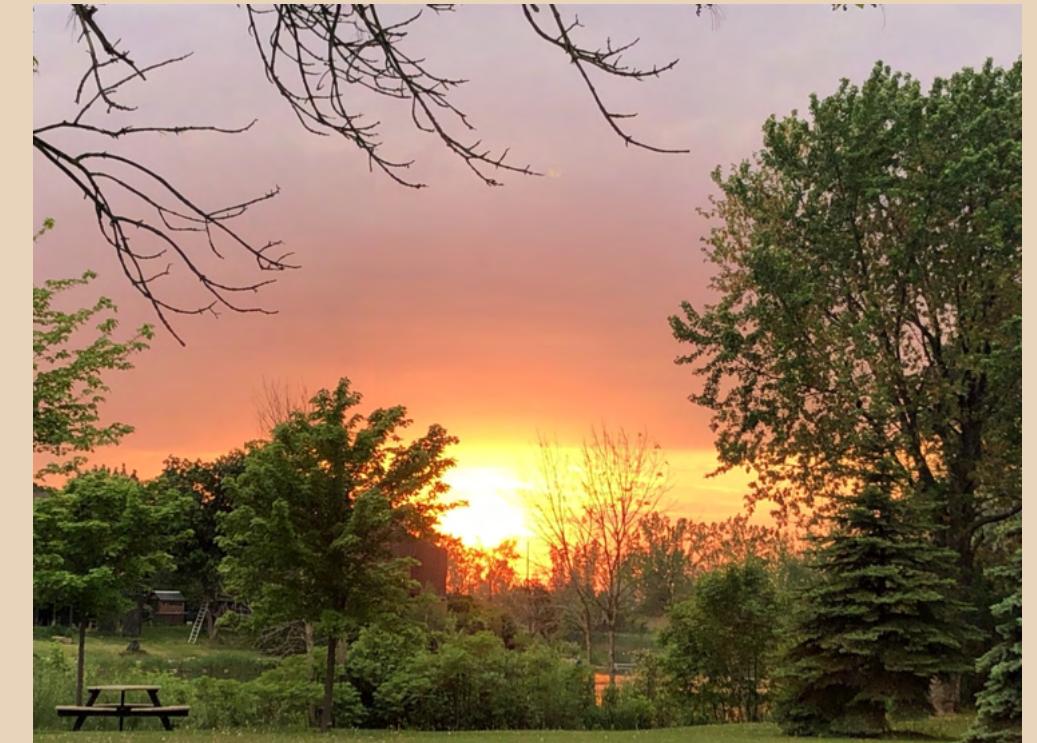
12 MP . 4032x3024 . 921 KB

ISO 25 | 0 ev | 1/120 s

SUPER-RESOLUTION



Before



After

Super-resolution imaging is a technique that enhances the resolution of an image. It reconstructs a higher-resolution image which makes the result more clear and appealing. Super-resolution is specifically used for zoomed-in photos (this example).

Technique source: <https://learnopencv.com/super-resolution-in-opencv/>

IMAGE SOURCE

Apple iPhone 8

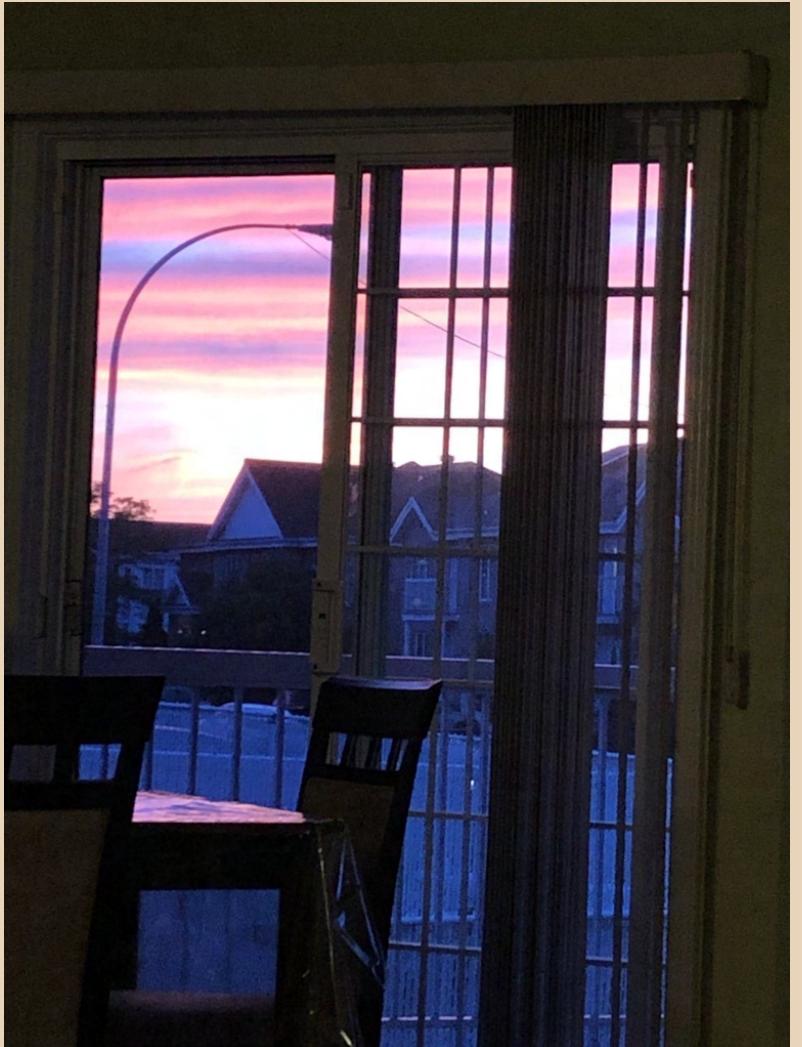
Wide Camera - 28 mm f1.8

12 MP . 3024x4032 . 486 KB

ISO 40 | 101 mm | 0 ev | 1/21 s

SUPER-RESOLUTION

Super-resolution imaging is a technique that enhances the resolution of an image. It reconstructs a higher-resolution image which makes the result more clear and appealing. Super-resolution is specifically used for zoomed-in photos (this example).



Before



After

Technique source: <https://learnopencv.com/super-resolution-in-opencv/>

IMAGE SOURCE

Apple iPhone 8

Wide Camera - 28 mm f1.8

12 MP . 4032x3024 . 4.3MB

ISO 32 | 0 ev | 1/120 s

KUWAHARA



Before



After

The Kuwahara filter is a non-linear smoothing filter used in image processing for adaptive noise reduction and edge preservation.

This technique would be a perfect choice to transform color images and videos into painterly abstractions.

Technique source: <https://pypi.org/project/pykuwahara/>

IMAGE SOURCE

Apple iPhone 8

Wide Camera – 28 mm f1.8

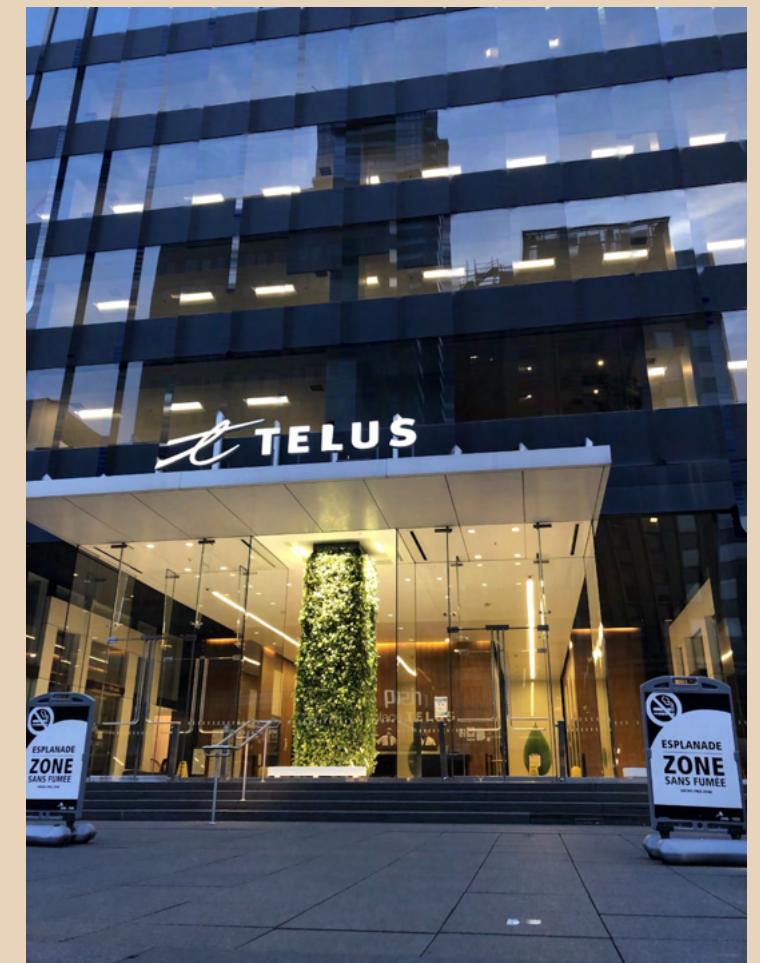
12 MP . 3024x4032 . 1.4MB

ISO 40 | 0 ev | 1/17 s

INPAINTING



Before



After

"Inpainting is a conservation process where damaged, deteriorating, or missing parts of an artwork are filled in to present a complete image. In some cases, it can be used to remove a specific object from the scene as well." (Wikipedia)

This process has long been applied to physical and digital art mediums such as oil or acrylic paintings, chemical photographic prints, sculptures, and recently digital images and video.

Technique source: https://docs.opencv.org/3.4/df/d3d/tutorial_py_inpainting.html

IMAGE SOURCE

Apple iPhone 8

Wide Camera – 28 mm f1.8

12 MP . 4032x3024 . 2.8 MB

ISO 25 | 0 ev | 1/120 s

INPAINTING



Before



After

"Inpainting is a conservation process where damaged, deteriorating, or missing parts of an artwork are filled in to present a complete image. In some cases, it can be used to remove a specific object from the scene as well." (Wikipedia)

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Technique source: https://docs.opencv.org/3.4/df/d3d/tutorial_py_inpainting.html

IMAGE SOURCE

Apple iPhone 8

Wide Camera - 28 mm f1.8

12 MP . 4032x3024 . 3.9 MB

ISO 20 | 0 ev | 1/2525 s

INPAINTING



Before



After

"Inpainting is a conservation process where damaged, deteriorating, or missing parts of an artwork are filled in to present a complete image. In some cases, it can be used to remove a specific object from the scene as well." (Wikipedia)

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Technique source: https://docs.opencv.org/3.4/df/d3d/tutorial_py_inpainting.html

IMAGE SOURCE

Apple iPhone 8

Wide Camera - 28 mm f1.8

12 MP . 4032x3024 . 2.1 MB

ISO 25 | 0 ev | 1/9615 s

INPAINTING



Before



After

"Inpainting is a conservation process where damaged, deteriorating, or missing parts of an artwork are filled in to present a complete image. In some cases, it can be used to remove a specific object from the scene as well." (Wikipedia)

This process has long been applied to physical and digital art mediums such as oil or acrylic paintings, chemical photographic prints, sculptures, and recently digital images and video.

Technique source: https://docs.opencv.org/3.4/df/d3d/tutorial_py_inpainting.html

IMAGE SOURCE

Apple iPhone 5s

Back Camera - 29 mm f2.2

8 MP . 3264x2448 . 1.5 MB

ISO 500 | 45 mm | 0 ev | 1/15 s

DE-NOISING



Before



After

The underlying goal of this technique is to estimate the original image by suppressing noise from a noise-contaminated version of the image. The resulting photo is of course of higher quality and thus visually more appealing.

Technique source: <https://www.askpython.com/python/examples/denoising-images-in-python>

IMAGE SOURCE

Apple iPhone 5s

Back Camera - 29 mm f2.2

8 MP . 3264x2448 . 982 KB

ISO 1250 | 45 mm | 0 ev | 1/15 s

DE-NOISING



Before



After

The underlying goal of this technique is to estimate the original image by suppressing noise from a noise-contaminated version of the image. The resulting photo is of course of higher quality and thus visually more appealing.

Technique source: <https://www.askpython.com/python/examples/denoising-images-in-python>

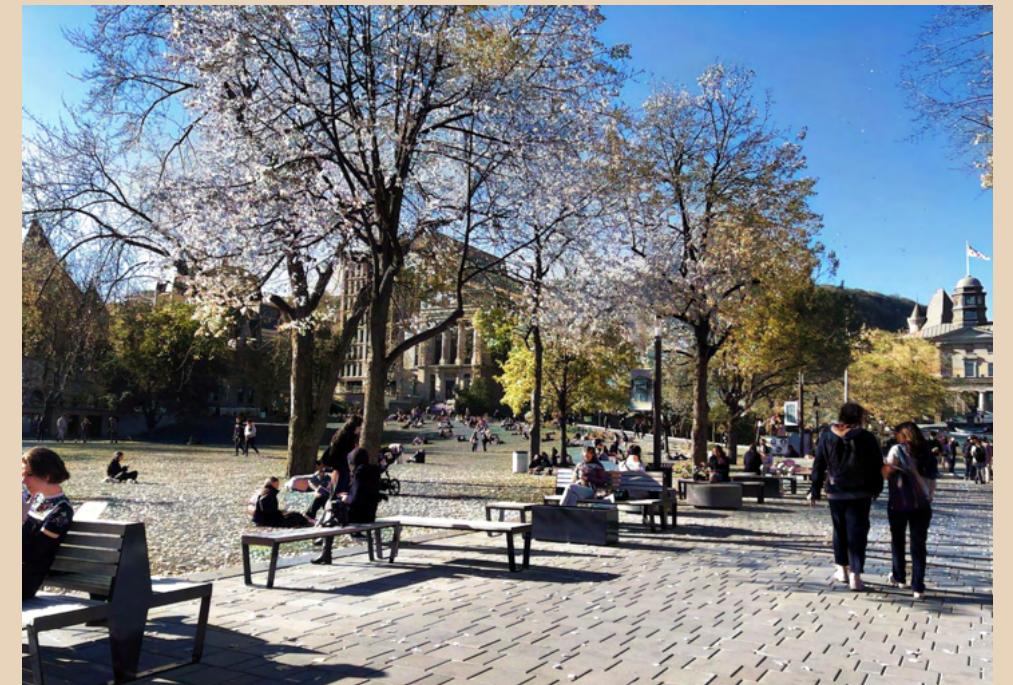
IMAGE SOURCE

Apple iPhone 8
Wide Camera - 28 mm f1.8
12 MP . 4032x3024 . 3.5 MB
ISO 20 | 0 ev | 1/842 s

COLORIZATION



Before



After

Image colorization is one technique to add style to a photograph or apply a combination of styles. Additionally, image colorization can add color to photographs that were originally taken in black and white (e.g. left-hand side photo provided here).

P.S. for the sake of testing this technique, the original colored photo (added to the zip file) has been turned into black and white first. Although the output is perfectly changed into a realistic colored shape, the result is still different from the original colored version of the photo.

IMAGE SOURCE

Apple iPhone 8

Wide Camera - 28 mm f1.8

12 MP . 4032x3024 . 3.5 MB

ISO 20 | 0 ev | 1/842 s

COLORIZATION



Before



After

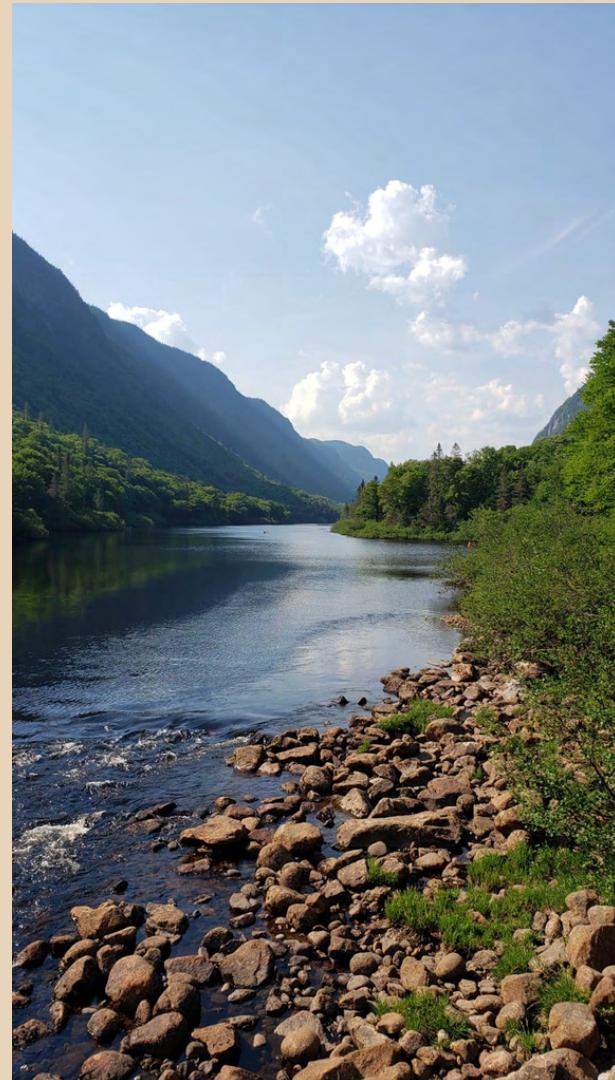
Image colorization is one technique to add style to a photograph or apply a combination of styles. Additionally, image colorization can add color to photographs that were originally taken in black and white (e.g. left-hand side photo provided here).

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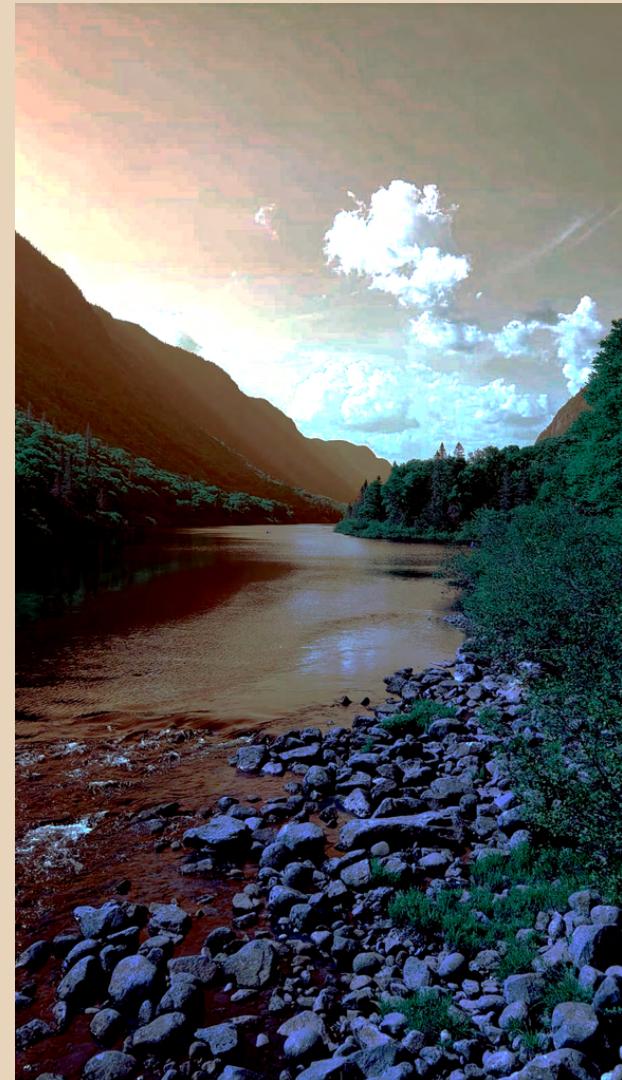
IMAGE SOURCE

Samsung SM-G960W
4.30 mm f2.4
4032x2268 . 3.97MB
ISO 50 | 1/1300 s | No flash
White balance Auto

COLOR CORRECTION



Before



After

Color correction is a process that uses color gels, or filters, to alter the overall color of the light.

The change of color in this example gives a new perspective to the audience's point of view.

Technique source: <https://medium.com/swlh/image-processing-with-python-histogram-manipulation-on-digital-images-d4fb426d3513>

IMAGE SOURCE

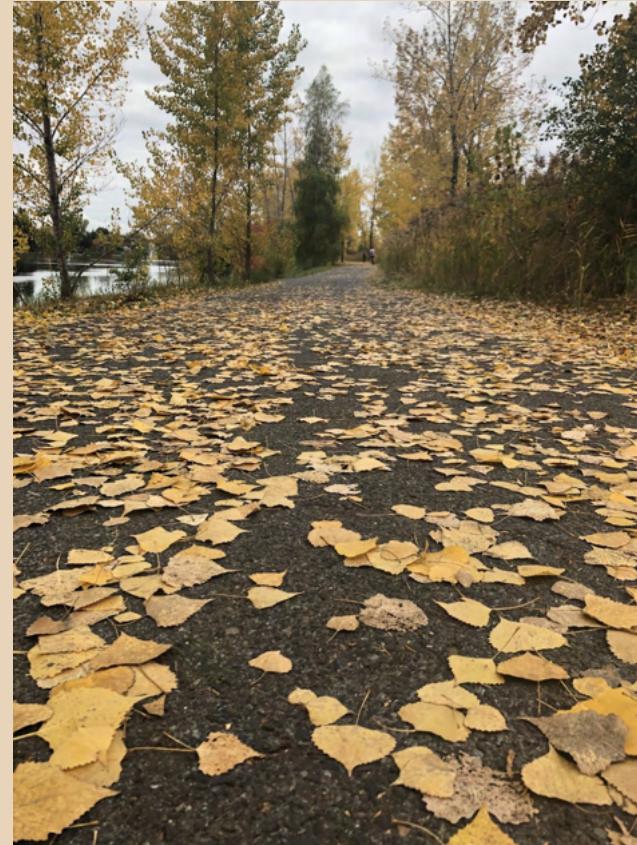
Apple iPhone 8

Wide Camera - 28 mm f1.8

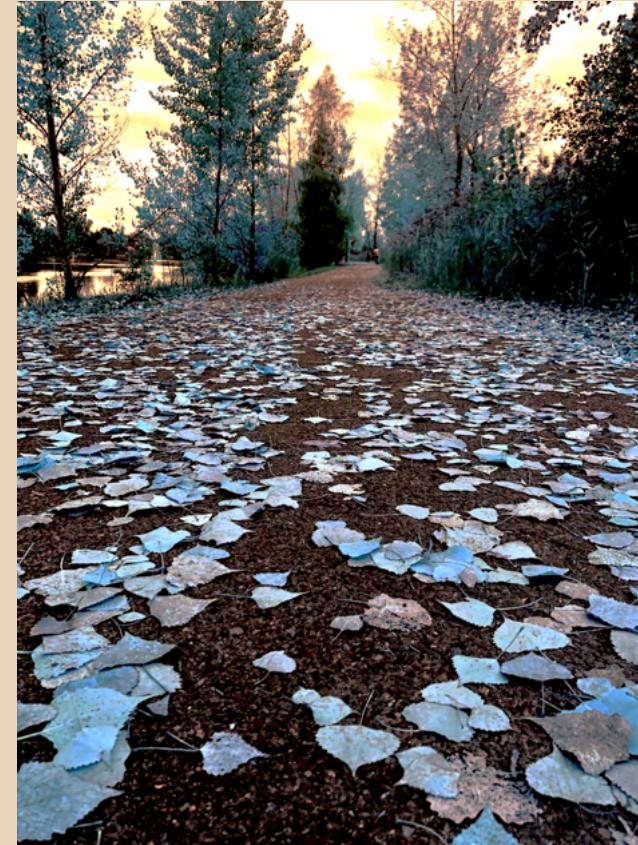
12 MP . 3024 x4032 . 3.1 MB

ISO 20 | 0 ev | 1/179 s

COLOR CORRECTION



Before



After

Color correction is a process that uses color gels, or filters, to alter the overall color of the light.

The change of color in this example gives a new perspective to the audience's point of view.

Technique source: <https://medium.com/swlh/image-processing-with-python-histogram-manipulation-on-digital-images-d4fb426d3513>

IMAGE SOURCE

Apple iPhone 8

Wide Camera - 28 mm f1.8

12 MP . 4032x3024 . 1.4MB

ISO 640 | 0 ev | 1/20 s

BOKEH



Before



After

Bokeh is a word with Japanese origins which defines the way the lens renders out-of-focus points of light. Good Bokeh gives a background without any hard edges or sharpness, keeping the focus of the audience to the point of attention as opposed to the background.

Technique source:

1) https://docs.bokeh.org/en/latest/docs/user_guide/data.html

2) <https://www.kapwing.com/resources/how-to-create-a-bokeh-effect-in-your-photos/>

IMAGE SOURCE

Apple iPhone 8

Wide Camera - 28 mm f1.8

12 MP . 4032x3024 . 3MB

ISO 20 | 0 ev | 1/1000 s

BOKEH



Before



After

Bokeh is a word with Japanese origins which defines the way the lens renders out-of-focus points of light. Good Bokeh gives a background without any hard edges or sharpness, keeping the focus of the audience to the point of attention as opposed to the background.

Technique source:

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2) <https://www.kapwing.com/resources/how-to-create-a-bokeh-effect-in-your-photos/>

IMAGE SOURCE

Apple iPhone 5s

Back Camera – 29 mm f2.2

8 MP . 3264x2448 . 3.2MB

ISO 32 | 0 ev | 1/805 s

BLURRING



Before



After

In image processing, a Gaussian blur (also known as Gaussian smoothing) is the result of blurring an image by a Gaussian function. It is a widely used effect in graphics software to reduce image noise and detail.

Technique source: <https://www.geeksforgeeks.org/opencv-python-program-to-blur-an-image/>

IMAGE SOURCE

Apple iPhone 8

Wide Camera - 28 mm f1.8

12 MP . 4032x3024 . 1.8MB

ISO 25 | 0 ev | 1/2667 s

BLURRING



Before



After

In image processing, a Gaussian blur (also known as Gaussian smoothing) is the result of blurring an image by a Gaussian function. It is a widely used effect in graphics software to reduce image noise and detail.

Technique source: <https://www.geeksforgeeks.org/opencv-python-program-to-blur-an-image/>