Image Processing – Assignment 1

# Part 1: Bad Photos

Six image quality issues will be covered. The six issue types that will be covered are:

1. Overexposure
2. Underexposure
3. Motion blur
4. Out of focus
5. Incorrect white balance
6. Noise

## Overexposure

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| **[Original Image:](http://edmonkey.com/wp-content/uploads/2016/10/KEN_1946-over.jpg)** | **Histogram for image:** |
|  | This image suffers from over contrast, and all the details appear to be somewhat faded. |
| **Enhanced image:** | **Histogram for new image:** |
|  | We can improve this image by lowering the brightness, while increasing the contrast. |

## Underexposure

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| --- | --- |
| [**Original Image:**](http://photography.bastardsbook.com/assets/content/images/large/parco-ninfeo-di-nerone-_-7374864048.jpg) | **Histogram for image:** |
|  | This image suffers from underexposure. The majority of details cannot be seen. |
| **Enhanced image:** | **Histogram for new image:** |
|  | With some contrast adjustment and some smoothing, we can make the details of this image much more visible. |

## Motion Blur

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| [**Original Image:**](https://chrismartinphotography.files.wordpress.com/2011/03/downtown-calgary-8750.jpg) | **Histogram for image:** |
|  | This image suffers from motion blur. |
| **Enhanced image:** | **Histogram for new image:** |
|  | This image can be improved by a tiny bit by removing outlier noise, and applying an un-sharp filter. |

## Out of Focus

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| [**Original Image:**](http://www.photographybb.com/versatile/wp-content/uploads/2013/01/assignment-2.jpg) | **Histogram for image:** |
|  | This image suffers from being out of focus, and a lot of the detail appears blurry. |
| **Enhanced image:** | **Histogram for new image:** |
|  | This image can have detail appear more in focus by applying an unsharp-mask, and then performing a soft de-speckle blur. |

## Incorrect White Balance

|  |  |
| --- | --- |
| [**Original Image:**](http://8020.photos.jpgmag.com/2373245_239756_87ddbcb94c_p.jpg) | **Histogram for image:** |
|  | This image suffers from poor white balance, and has too much blue. This can be improved by reducing the steep amount of blue present, |
| **Enhanced image:** | **Histogram for new image:** |
| C:\Users\drew\AppData\Local\Microsoft\Windows\INetCacheContent.Word\white_balance_fixed_2.png | This image can be somewhat improved by reducing the blue channel of the mage. |

## Noise

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| **Original image:** [Example\_lena\_denoise\_noisy](http://boofcv.org/images/1/18/Example_lena_denoise_noisy.jpg) | **Histogram for image:** |
| C:\Users\drew\AppData\Local\Microsoft\Windows\INetCacheContent.Word\noisy.jpg | The image suffers from noise, resulting in the image looking grainy. The graininess can be reduced by applying a smoothing algorithm. |
| **Enhanced image:** | **Histogram for new image:** |
|  | This image can have some speckles removed by applying a blur filter. However which of the two images looks better seems pretty subjective. |