Assignment 2

February 10, 2025

1 Pixel-wise contrast enhancement

1.1 Gray scale Image

```python
def gamma_transform(image, gamma):
    # Normalize to [0,1]
    image = image.astype(np.float32) / 255.0
    # Apply gamma correction
    corrected = np.power(image, gamma)
    # Convert back to [0,255]
    return (corrected * 255).astype(np.uint8)
```

A gamma=1 is equals to the original gray-scale picture, a gamma less than 1 makes dark regions brighter, and gamma larger than 1 darkens bright regions. This affects image contrast and detail visibility.
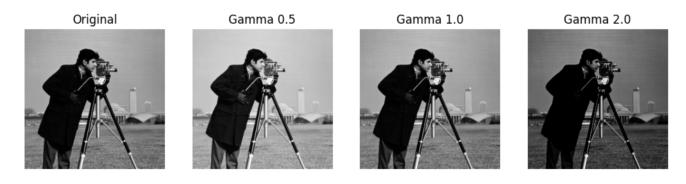

Figure 1: Pixel-wise contrast enhancement on a gray scale picture

2 Reverb Convolution

3 Image filtering and enhancement

4 Histogram-based processing