

19CSE367 Digital Image Processing

SARATH TV

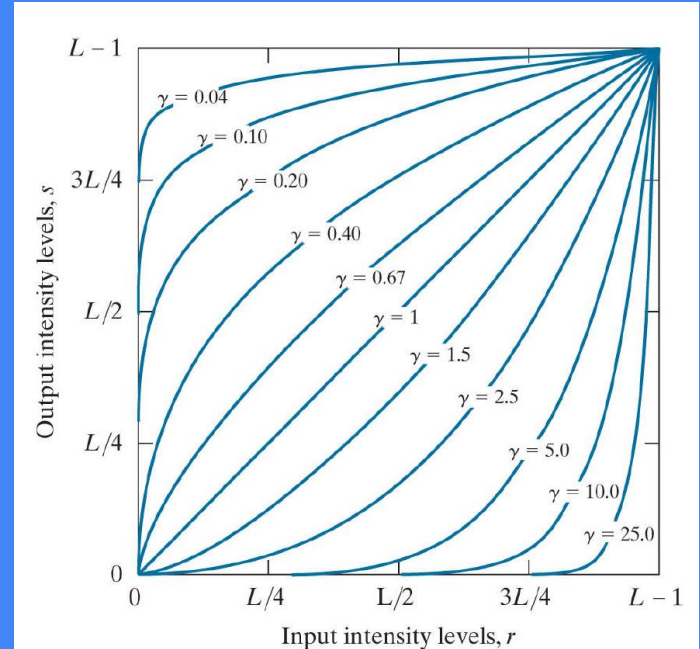
Last lecture

- Intensity Transformations
- Log Transformations

Power-Law Transformations

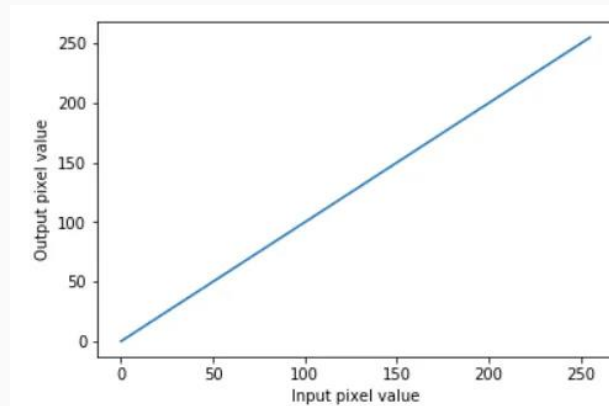
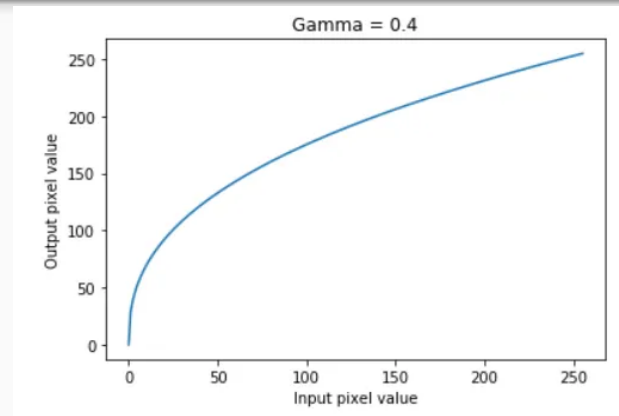
- $s = c * r^\gamma$

- $c, \gamma \rightarrow$ positive constants
- “Gamma Correction”
- For fractional (small) values of gamma, the power law curves map narrow range of dark input values to wider range of output values
- And opposite for higher values of input levels.
- $\gamma > 1$ and $\gamma < 1$ have opposite effects.

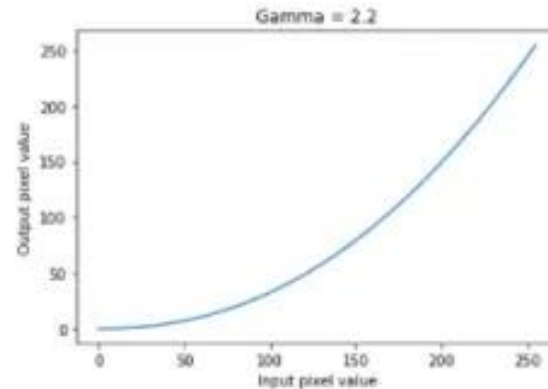
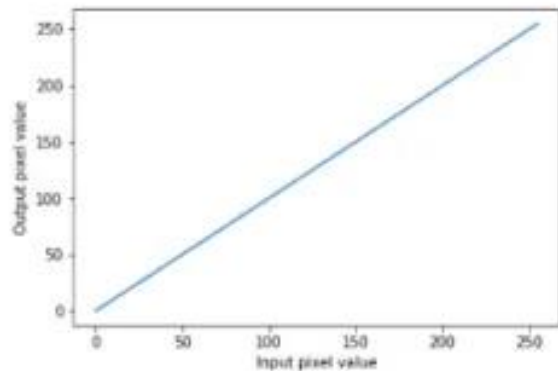


But why this transformation??

- Human perception of brightness- power function
- More sensitive to changes in the dark compared to the bright.
- But camera follows linear relationship.
- The actual problem arises when we display the image.
- all display devices have Intensity to voltage response curve which is a power function with exponents(Gamma) varying from 1.8 to 2.5

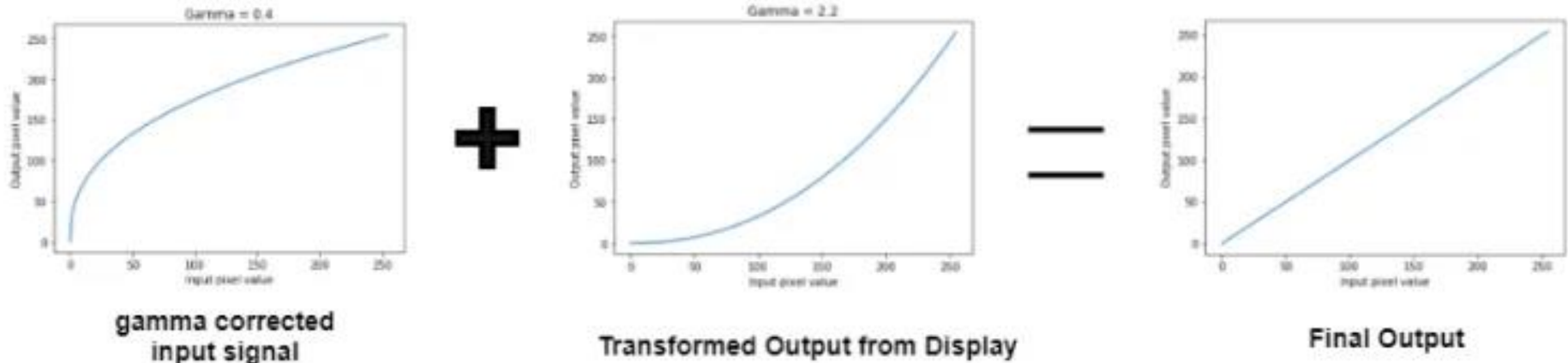


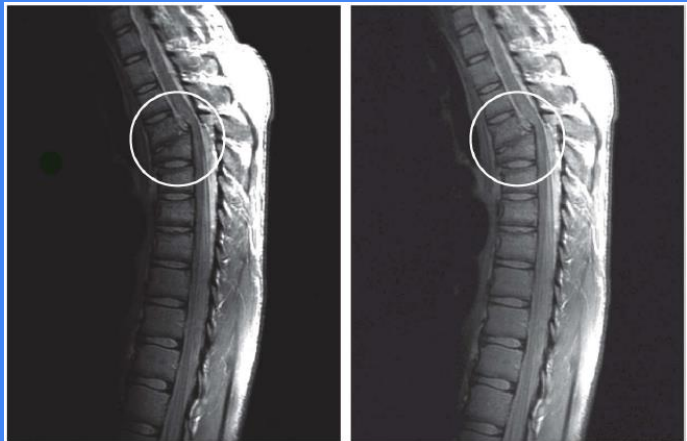
- for any input signal, the output will be transformed by gamma because of non-linear intensity to voltage relationship of the display screen.
- This results in **images that are darker than intended**.



Transformed Output from Display

- To correct this, we apply gamma correction to the input signal (we know the intensity and voltage relationship we simply take the complement)
- This input cancels out the effects generated by the display and we see the image as it is.





Aerial image



Corrected image(Gamma=3)



Corrected image(Gamma=4)



Corrected image(Gamma=5)



THANK YOU!