



NUMPY.

Lab. Assignment #1

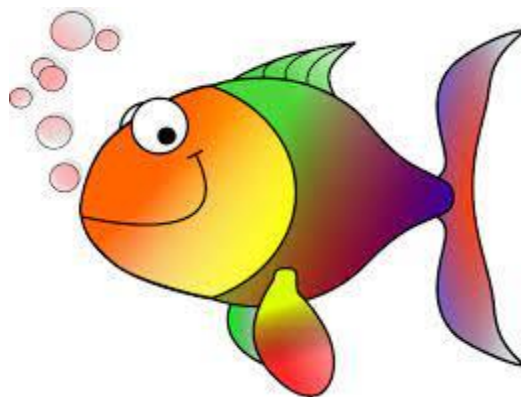
Instructor: Dr. Ha Viet Uyen Synh.

Software: Python, NumPy & OpenCV

1. Color Reduction

Write a program to make a color space reduction of a greyscale image by using the formula following.

$$\text{Grayscale} = 0.299R + 0.587G + 0.114B$$



HappyFish.png

2. Brightness and contrast adjustment

In this kind of image processing transform, each output pixel's value depends on only the corresponding input pixel value. Two commonly used point processes are multiplication and addition with a constant: $g(x) = \alpha f(x) + \beta$. The parameters $\alpha > 0$ and β are often called the gain and bias parameters; sometimes these parameters are said to control contrast and brightness respectively.

You can think of $f(x)$ as the source image pixels and $g(x)$ as the output image pixels. Then, more conveniently we can write the expression as: $g(i, j) = \alpha \cdot f(i, j) + \beta$ where i and j indicates that the pixel is located in the i -th row and j -th column.

Ex:

$$\alpha = 2.2 \text{ and } \beta = 50$$

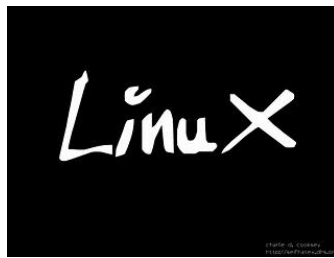


Lena.jpg

The result

3. Blending two images

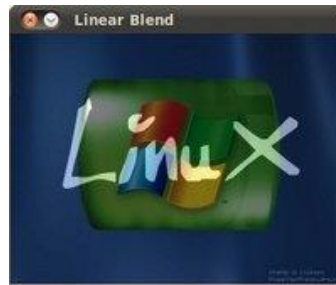
Implement the linear blend operator used to perform a temporal cross-dissolve between two images or videos $g(x) = (1 - \alpha)f_0(x) + \alpha f_1(x)$ where varying α from $0 \rightarrow 1$.



LinuxLogo.jpg



WindowLogo.jpg



The result