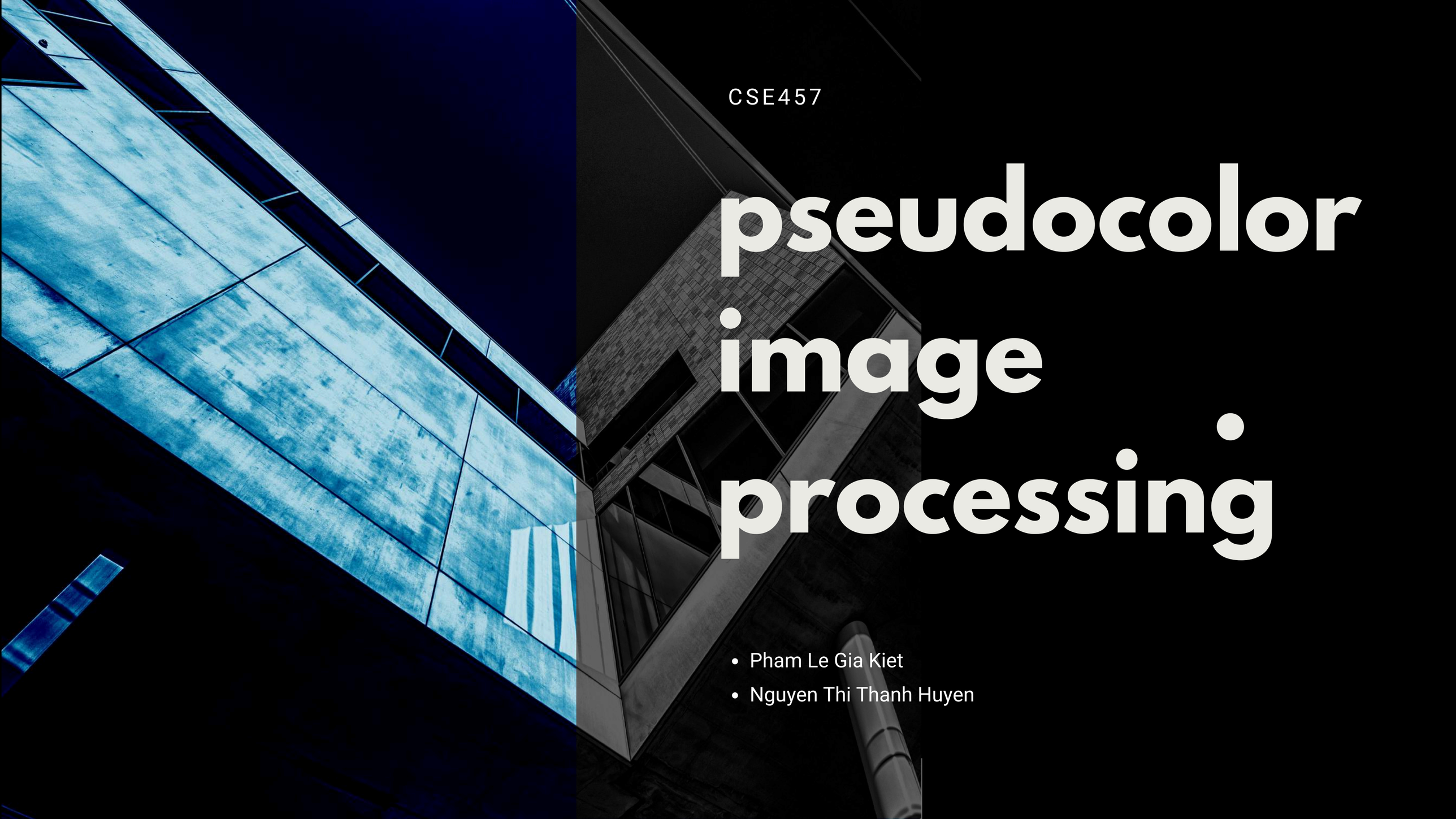


CSE457

# pseudocolor image processing


- Pham Le Gia Kiet
- Nguyen Thi Thanh Huyen

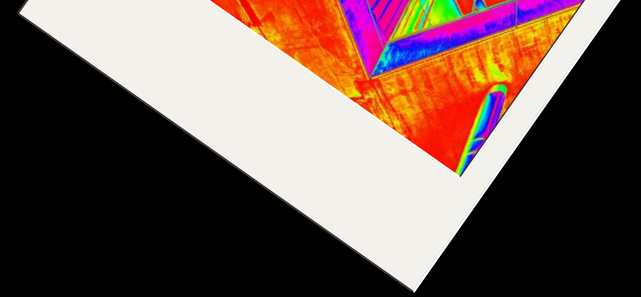
CSE457

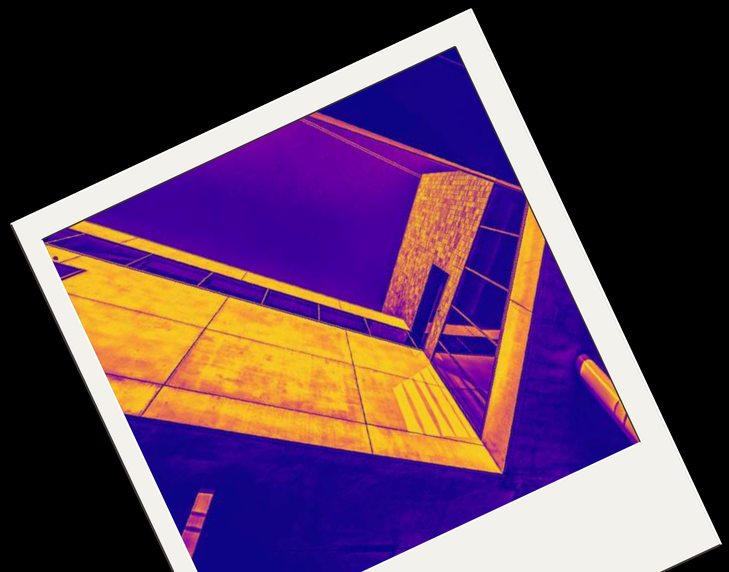

- Pham Le Gia Kiet
- Nguyen Thi Thanh Huyen


# what is pseudocolor ?

# what is pseudocolor ?

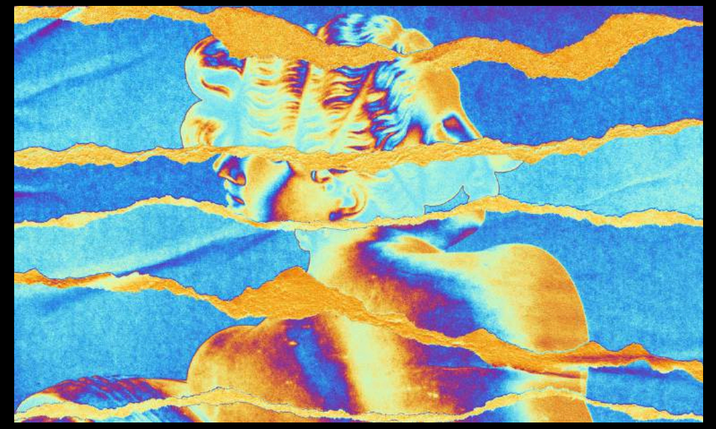
Pseudo-color is a method of representing image data by mapping brightness values to corresponding colors.





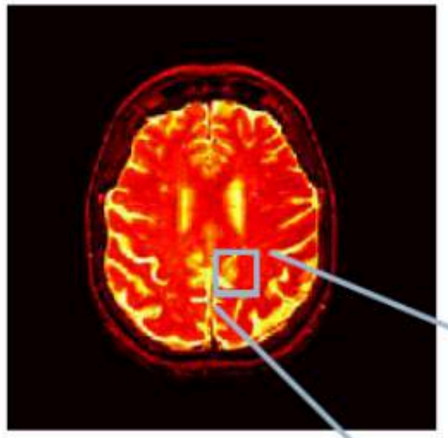
## WHY PSEUDO COLORING?

The principal of pseudo coloring is to make a grayscale image better for human visualization and interpretation.



# what is pseudocolor ?

# pseudocolor - index image



Color Table

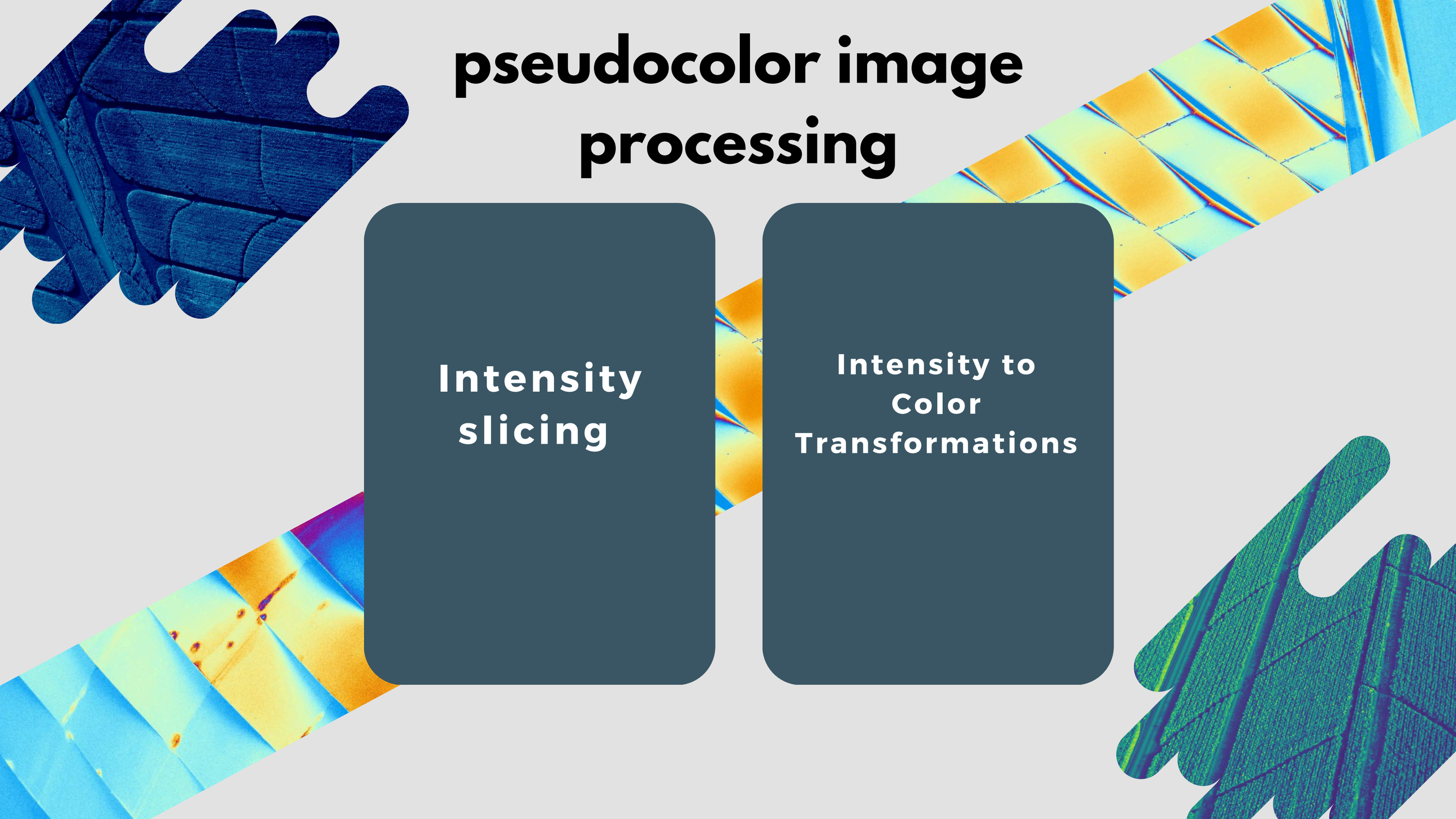
| Index No. | Red component | Green component | Blue component |
|---|---|---|---|
| 1 | 0.1 | 0.5 | 0.3 |
| 2 | 1.0 | 0.0 | 0.0 |
| 3 | 0.0 | 1.0 | 0.0 |
| 4 | 0.5 | 0.5 | 0.5 |
| 5 | 0.2 | 0.8 | 0.9 |
| … | … | … | … |

$$\begin{bmatrix} 1 & 4 & 9 \\ 6 & 4 & 7 \\ 6 & 5 & 2 \end{bmatrix}$$

Index value

Each pixel contains index number poiting to a color in a color table

# pseudocolor image processing



**Intensity slicing**

**Intensity to Color Transformations**

# intensity slicing

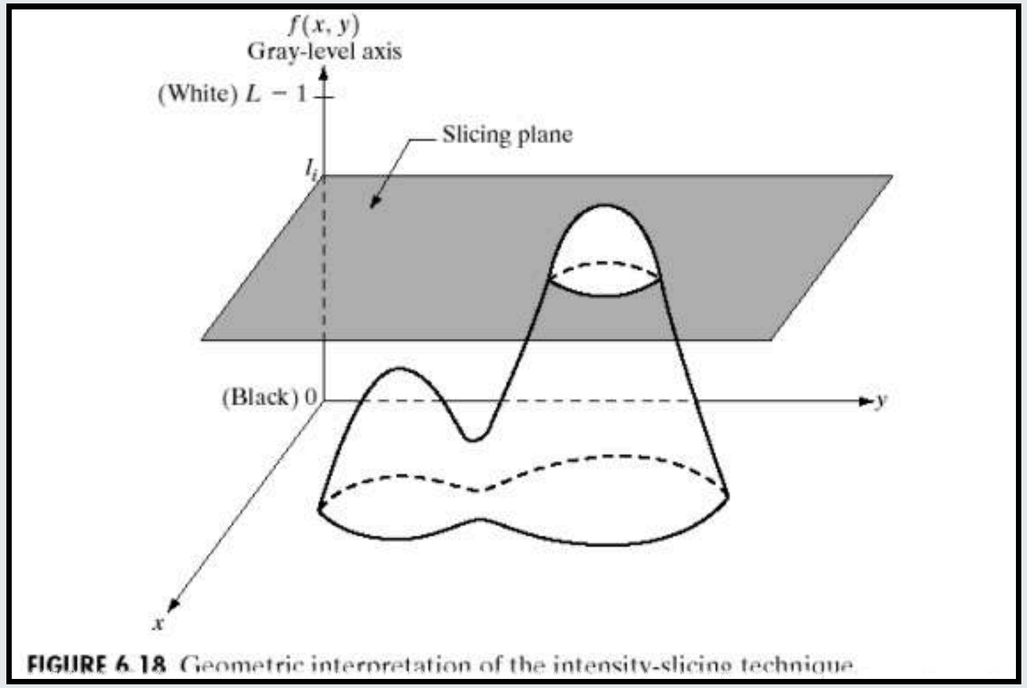


FIGURE 6.18 Geometric interpretation of the intensity-slicing technique

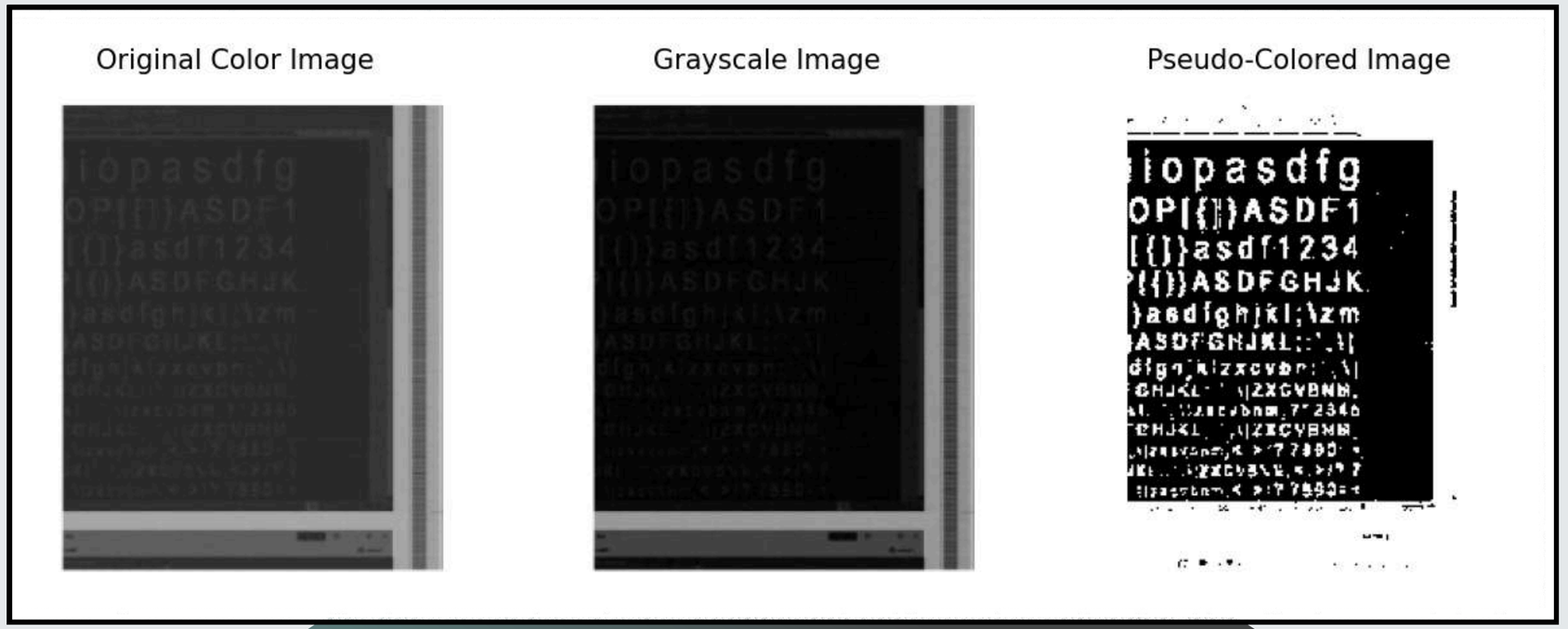
Also called density slicing and color coding and is a piece wise linear function.

• If an image is interpreted as a 3-D function, the method can be viewed as one of placing planes parallel to the coordinate plane of the image; each plane then “slices” off the function in the area of intersection.

# intensity slicing

## Main purpose:

**Separate or create a new image by selecting a specific intensity range from the original image and assigning a fixed intensity value to all pixels within that range.**



# intensity slicing

**It is commonly used to emphasize or separate specific features in the image, such as detecting object edges.**

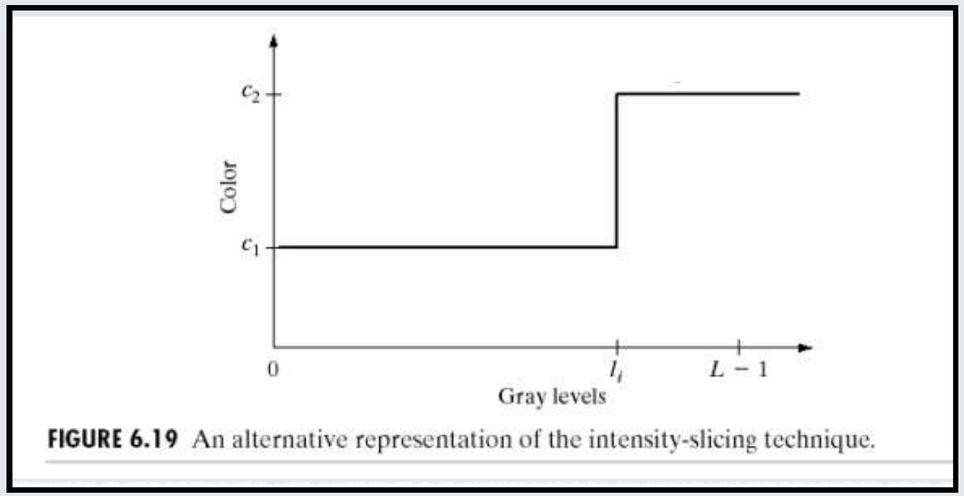
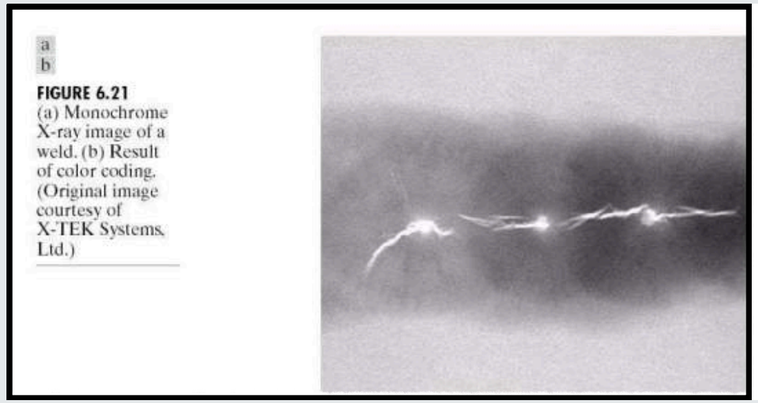
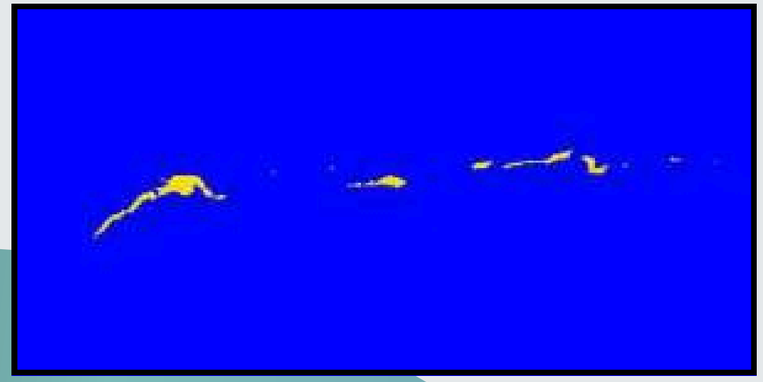



**FIGURE 6.19** An alternative representation of the intensity-slicing technique.



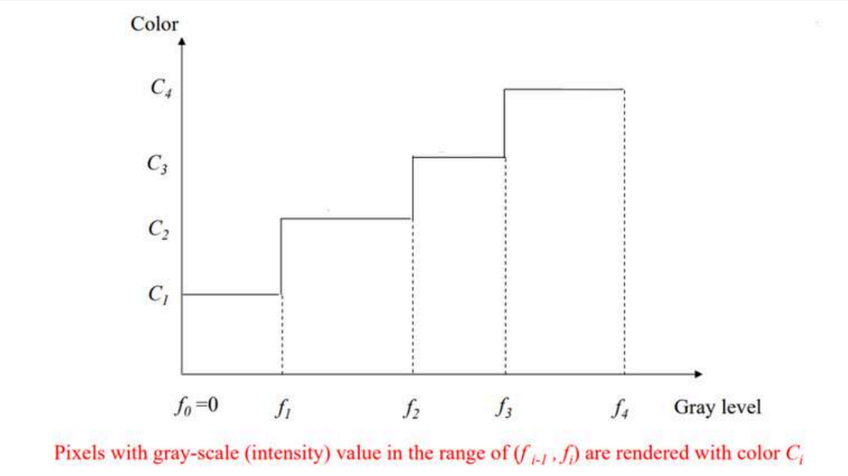
a
b

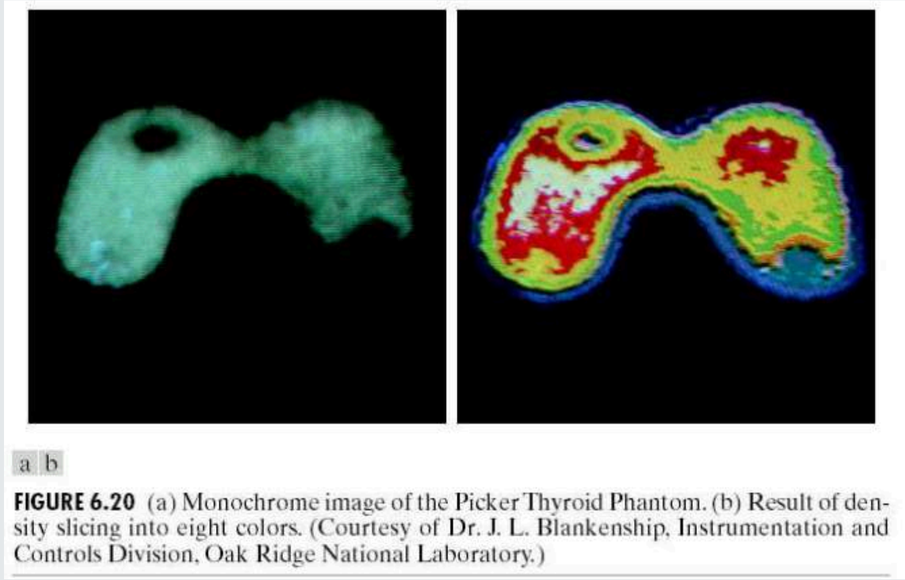
**FIGURE 6.21**
(a) Monochrome X-ray image of a weld. (b) Result of color coding. (Original image courtesy of X-TEK Systems, Ltd.)



# intensity slicing

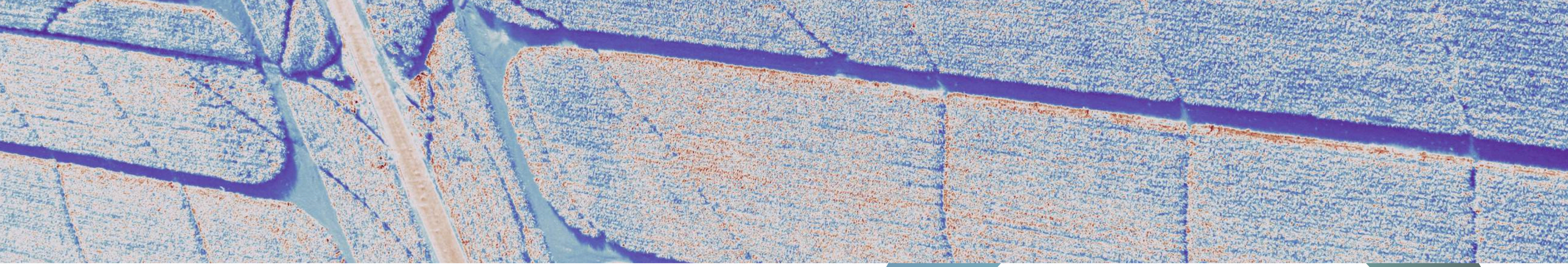
**It is commonly used to emphasize or separate specific features in the image, such as detecting object edges.**



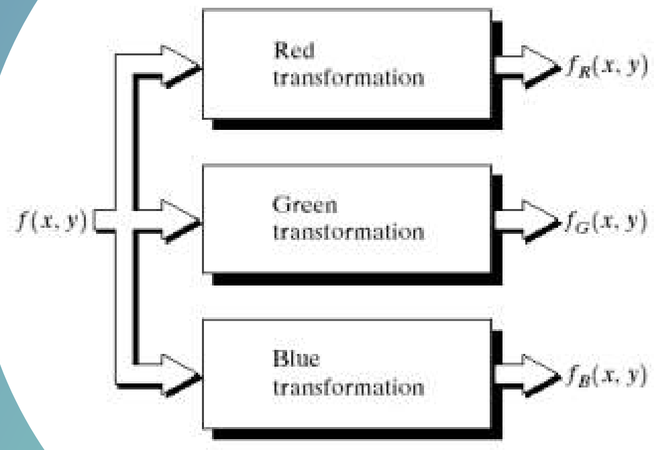



a b

**FIGURE 6.20** (a) Monochrome image of the Picker Thyroid Phantom. (b) Result of density slicing into eight colors. (Courtesy of Dr. J. L. Blankenship, Instrumentation and Controls Division, Oak Ridge National Laboratory.)



# intensity of color transformation




Perform three independent transformations on the intensity of any input pixel

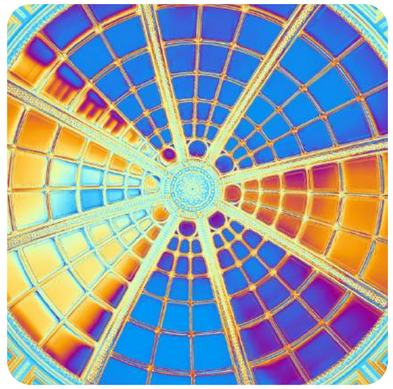
Three results are then fed separately into the red, green, and blue channels of a color television monitor.

This produces a composite image whose color content is modulated by the nature of the transformation functions.

# categories of color image processing

## color map

## rgb





DeepGreen



Ocean



Cividis

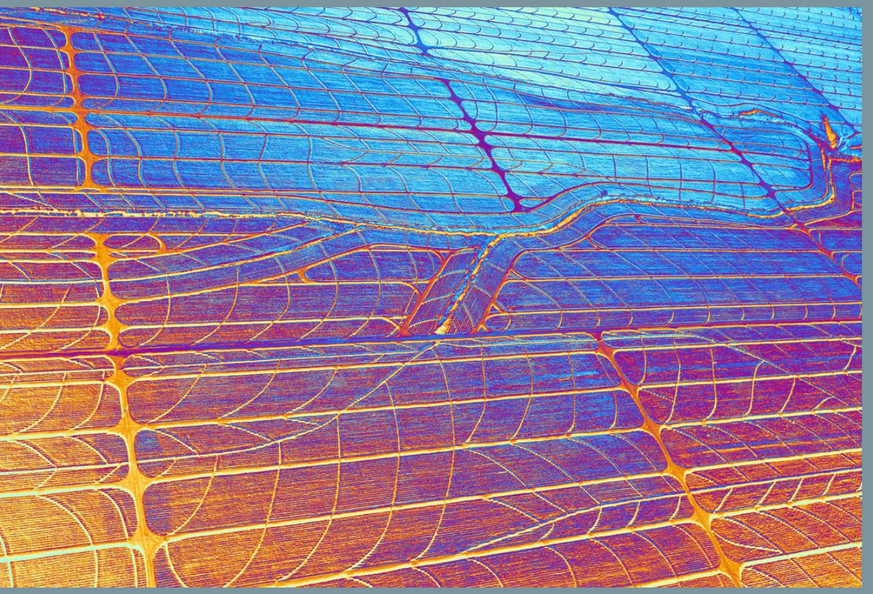
# color map image processing

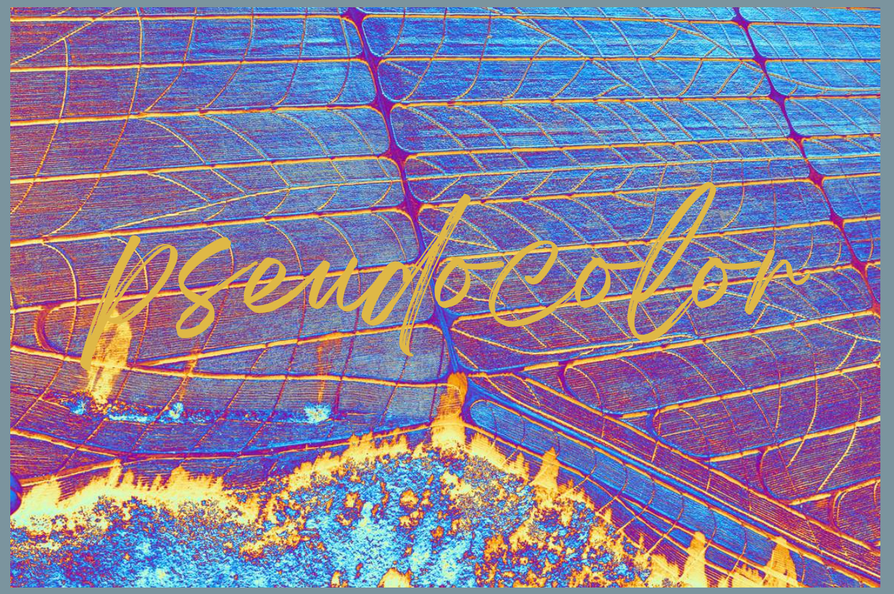
It is a predefined color map is used from the OpenCV library

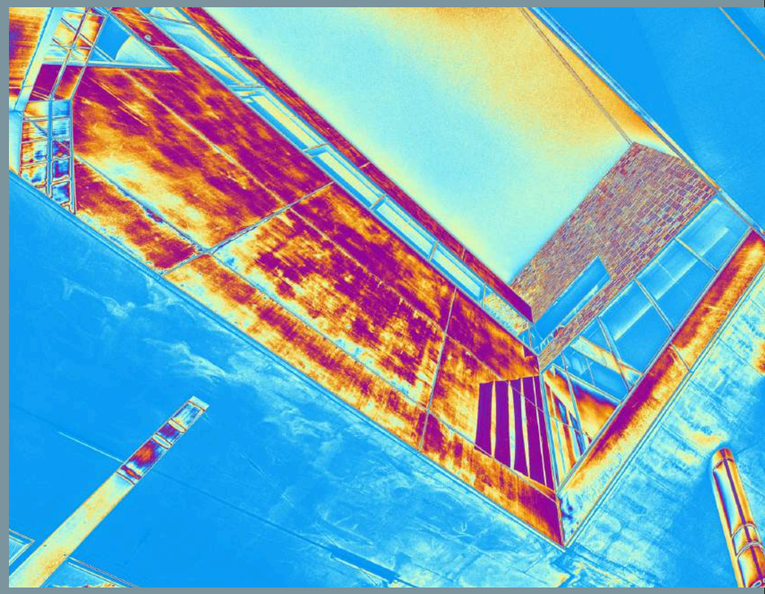
Each color map corresponds to a specific algorithm or criterion.

These color maps are applied to grayscale images to generate various color representations.

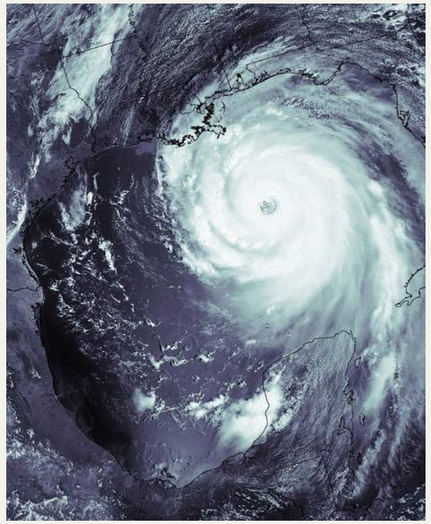
# rgb transformation

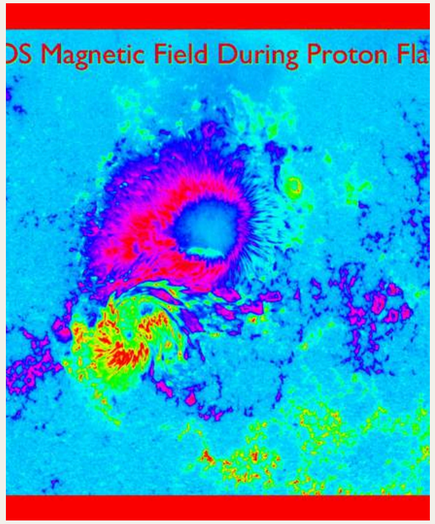




In the case of RGB image, colors are added to R, G, and B channels separately and the combination of R, G, and B channels gives the interpretation of the pseudocolor image.



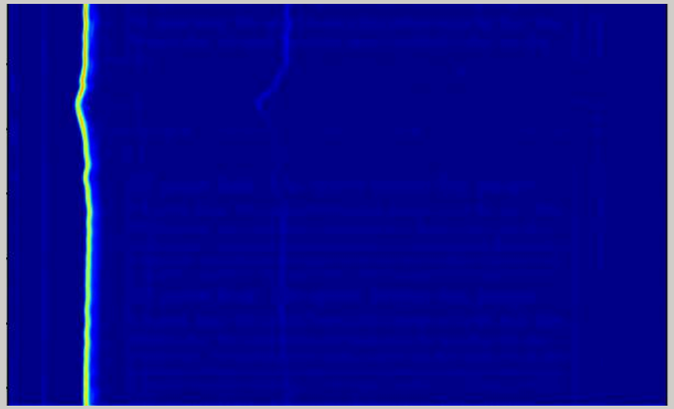


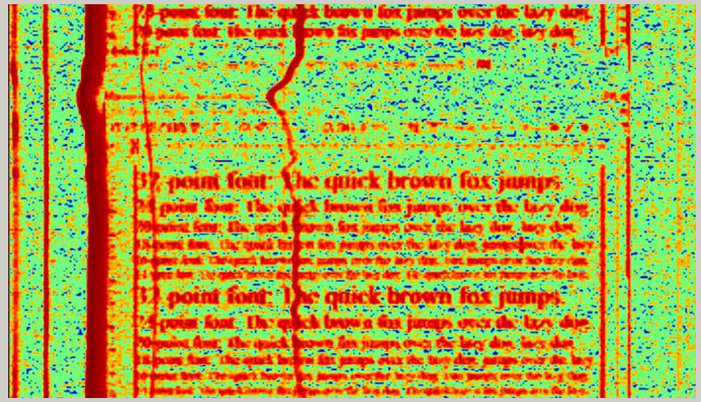

*pseudocolor*

**function**

# image enhancement function

**Making details more discernible or emphasizing specific aspects of the image for analysis or presentation purposes.**



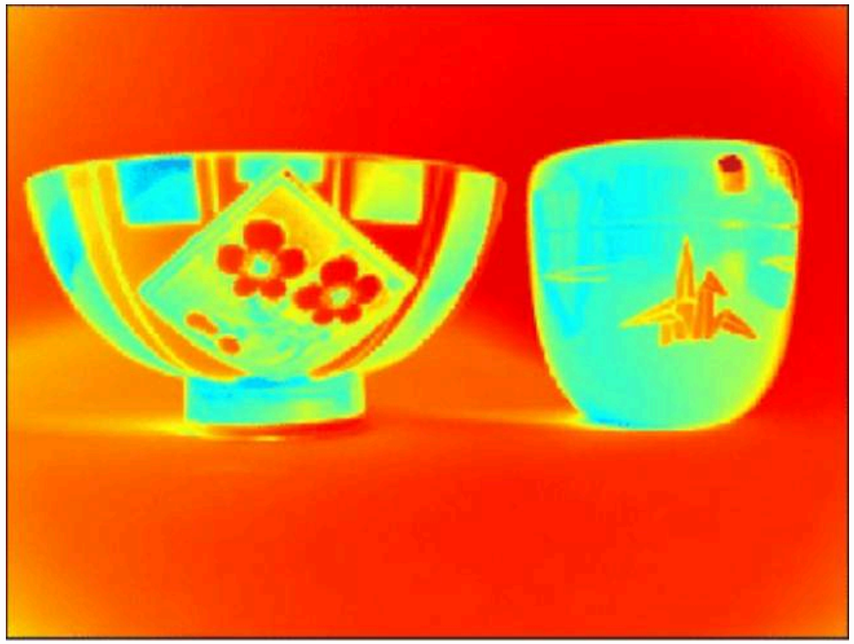


Original image

After applying the pseudo-coloring algorithm using the “Jet” color palette

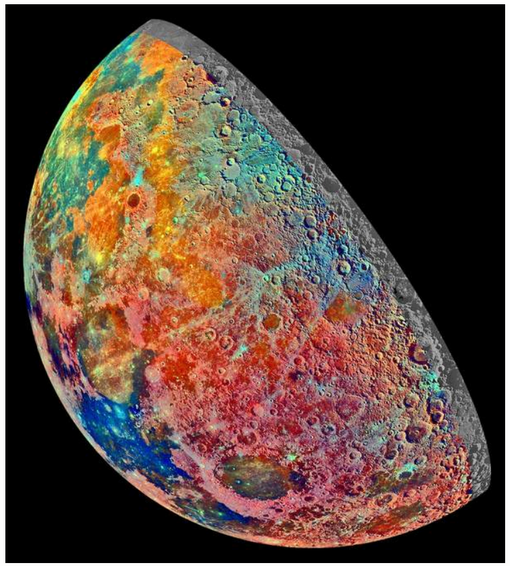
Images after applying the pseudo-coloring algorithm

## FEATURE EXTRACTION



Extract specific features from images by highlighting them in distinct colors

## ARTISTIC RENDERING



In artistic applications: creating visually striking images by assigning colors in a creative or aesthetic manner.

# Enhanced Visualization

This is particularly useful in medical imaging, remote sensing, and microscopy, where it can help identify structures or anomalies that might not be easily discernible in grayscale.

fig1. An ordinary angiogram image

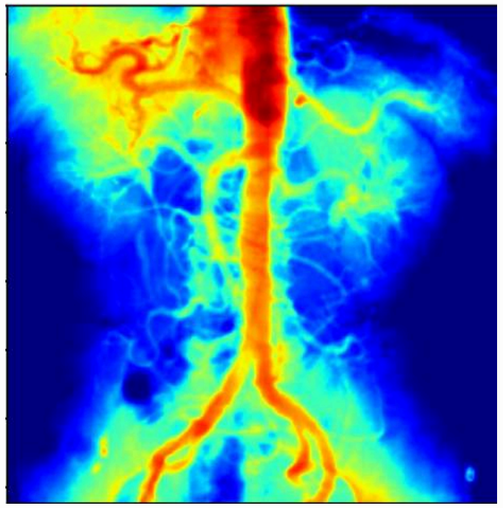
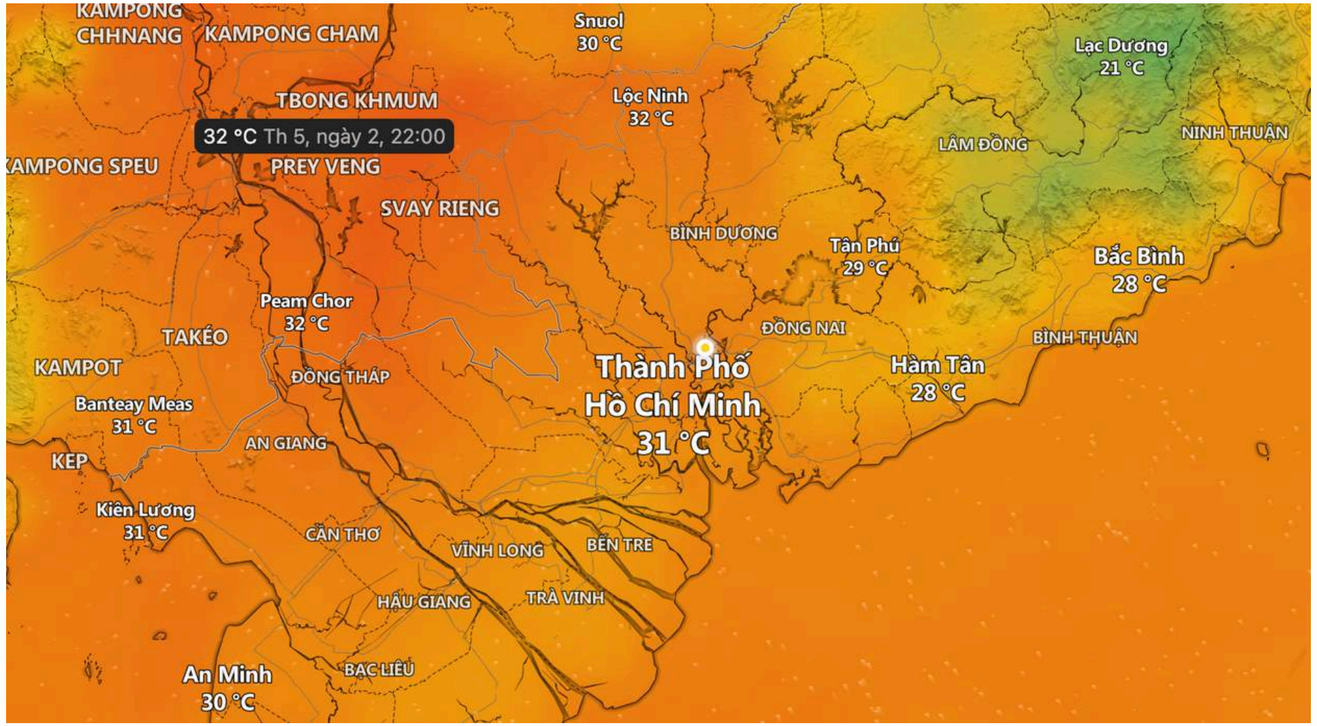


fig2. After using pseudo coloring clearly increases the visual quality of low contrast vessels

# function

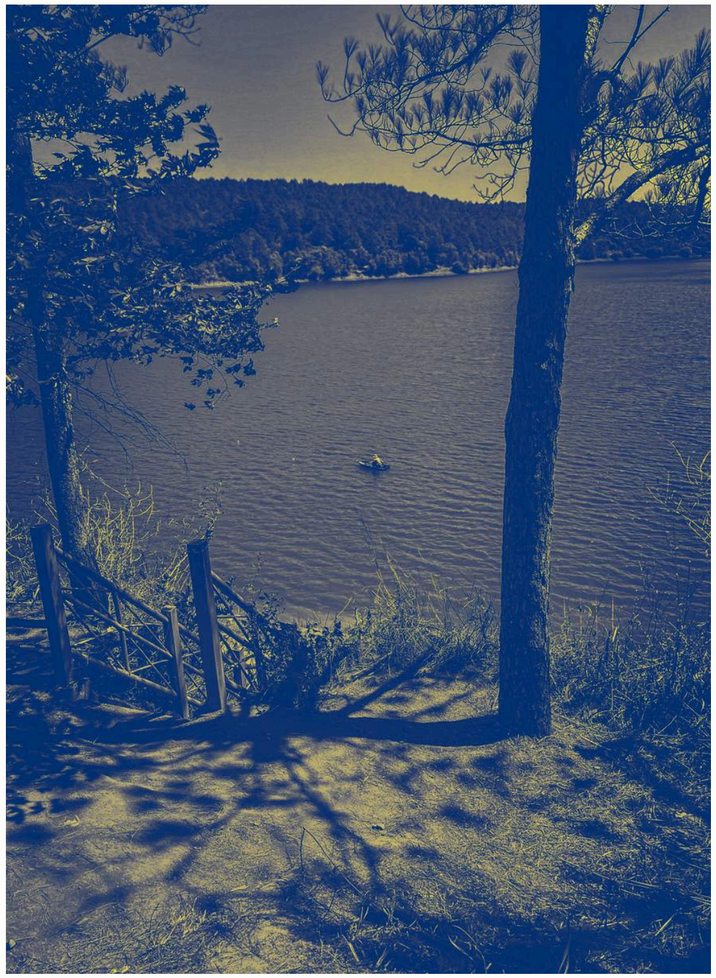


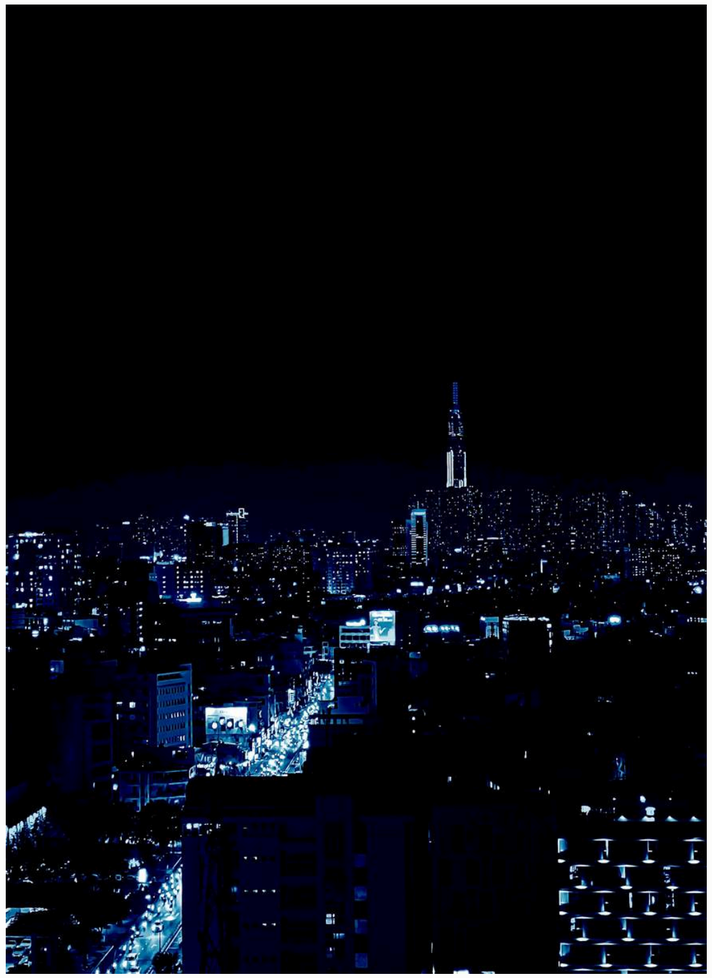


Data Representation: represent data parameters such as temperature, elevation, pressure, or velocity. By assigning specific colors to different data ranges, scientists and analysts can quickly interpret and analyze complex datasets.

CSE457


- Pham Le Gia Kiet
- Nguyen Thi Thanh Huyen

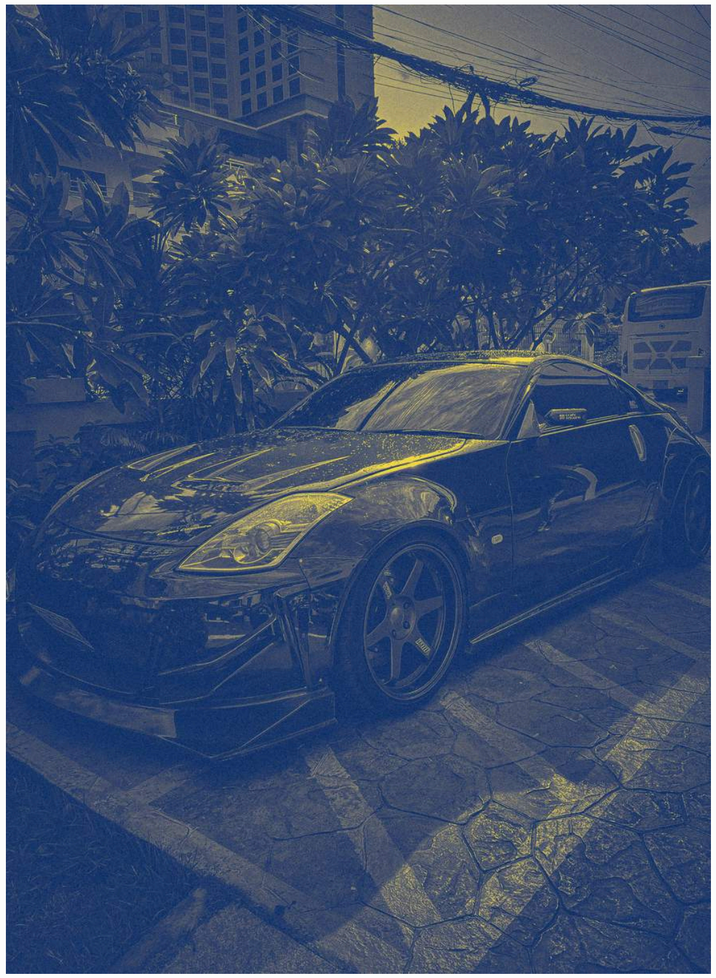


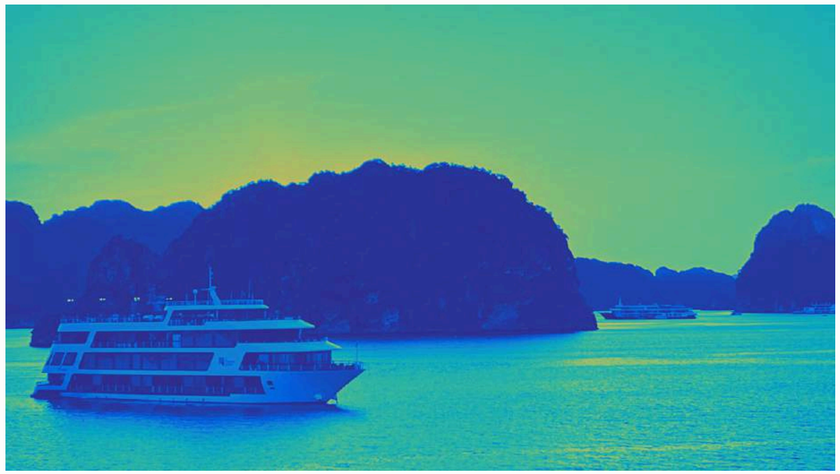
CSE457

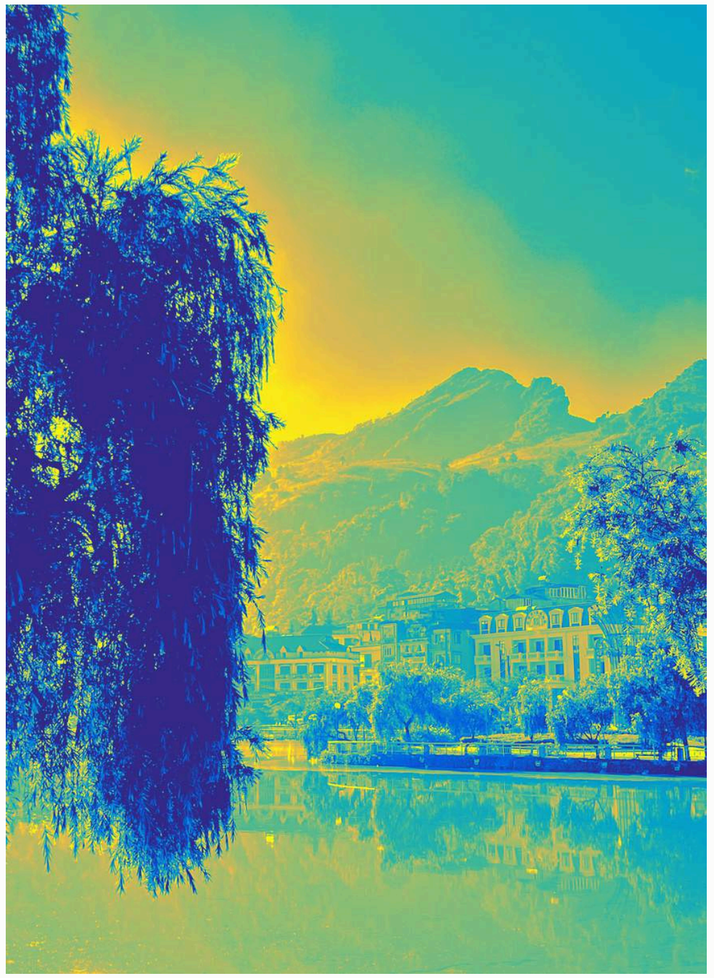

- Pham Le Gia Kiet
- Nguyen Thi Thanh Huyen


CSE457


- Pham Le Gia Kiet
- Nguyen Thi Thanh Huyen





# Thank You !

CSE457

- Pham Le Gia Kiet
- Nguyen Thi Thanh Huyen