

Browser tabs: TNHien/Phân tích & Xử lý, test_lab01 - Jupyter Notebo..., 19110315_TrinhNgocHien_..., Google Dich, matplotlib - How can I con...

Address bar: localhost:8888/notebooks/TNHien/Phân%20tích%20và%20xử%20lý%20ảnh/19110315_TrinhNgocHien_DIP%20Lab01.ipynb#và-cân-bằng-histogram,-hiển-thị-ảnh-sau-khi-c

Navigation: XLDC, Web Hỗ Trợ, Latex, Library Genesis, TRANG NHÀ - Tủ S..., Moodle HCMUS, Thư - TRINH NGOC..., Zalo Web, Duolingo - Cách họ..., Sử - web - viethoc.c..., Index of /MTH10316

Jupyter interface: 19110315_TrinhNgocHien_DIP Lab01 Last Checkpoint: a few seconds ago (autosaved) Logout

Menu: File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

Toolbar: Save, Add, Undo, Redo, Up, Down, Run, Stop, Restart, Code

```
In [41]: 1 import numpy as np
2 import pandas as pd
3 import cv2
4 from matplotlib import pyplot as plt
5 from pylab import imread
6 from skimage.color import rgb2gray

In [42]: 1 def imshow(ImageData, LabelData, rows, cols, gridType = False):
2     # Convert ImageData and LabelData to List
3     from matplotlib import pyplot as plt
4     ImageArray = list(ImageData)
5     LabelArray = list(LabelData)
6     if(rows == 1 & cols == 1):
7         fig = plt.figure(figsize=(20,20))
8     else:
9         fig = plt.figure(figsize=(cols*8,rows*5))
10
11     for i in range(1, cols * rows + 1):
12         fig.add_subplot(rows, cols, i)
13         image = ImageArray[i - 1]
14         # If the channel number is less than 3, we display as grayscale image
15         # otherwise, we display as color image
16         if (len(image.shape) < 3):
17             plt.imshow(image, plt.cm.gray)
18             plt.grid(gridType)
19         else:
20             plt.imshow(image)
21             plt.grid(gridType)
22             plt.title(LabelArray[i - 1])
23     plt.show()
24
25 def ShowThreeImages(IM1, IM2, IM3):
26     imshow([IM1, IM2, IM3], ["Image 1", "Image 2", "Image 3"], 1, 3)
```

Windows taskbar: A/C, 11:39 PM, ENG

Browser tabs: TNHien/Phân tích & Xử lý, test_lab01 - Jupyter Notebo..., 19110315_TrinhNgocHien_..., Google Dich, matplotlib - How can I con...

Address bar: localhost:8888/notebooks/TNHien/Phân%20tích%20%26%20Xử%20lý%20ảnh/19110315_TrinhNgocHien_DIP%20Lab01.ipynb#và-cân-bằng-histogram,-hiển-thị-ảnh-sau-khi-c

File Explorer: XLDC, Web Hỗ Trợ, LaTeX, Library Genesis, TRANG NHÀ - Tủ S..., Moodle HCMUS, Thư - TRINH NGOC..., Zalo Web, Duolingo - Cách họ..., Sử - web - viethoc.c..., Index of /MTH10316

Jupyter 19110315_TrinhNgocHien_DIP Lab01 Last Checkpoint: a minute ago (autosaved) Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

In [42]:

```
1 def imshow(ImageData, LabelData, rows, cols, gridType = False):
2     # Convert ImageData and LabelData to List
3     from matplotlib import pyplot as plt
4     ImageArray = list(ImageData)
5     LabelArray = list(LabelData)
6     if(rows == 1 & cols == 1):
7         fig = plt.figure(figsize=(20,20))
8     else:
9         fig = plt.figure(figsize=(cols*8,rows*5))
10
11     for i in range(1, cols * rows + 1):
12         fig.add_subplot(rows, cols, i)
13         image = ImageArray[i - 1]
14         # If the channel number is less than 3, we display as grayscale image
15         # otherwise, we display as color image
16         if (len(image.shape) < 3):
17             plt.imshow(image, plt.cm.gray)
18             plt.grid(gridType)
19         else:
20             plt.imshow(image)
21             plt.grid(gridType)
22         plt.title(LabelArray[i - 1])
23     plt.show()
24
25 def ShowThreeImages(IM1, IM2, IM3):
26     imshow([IM1, IM2, IM3], ["Image 1", "Image 2", "Image 3"], 1, 3)
27 def ShowTwoImages(IM1, IM2):
28     imshow([IM1, IM2], ["Image 1", "Image 2"], 1, 2)
29 def ShowOneImage(IM):
30     imshow([IM], ["Image"], 1, 1)
31 def ShowListImages(listImage, row, col):
32     listCaption = []
33     for i in range(len(listImage)):
34         listCaption.append(str(i))
35     imshow(listImage, listCaption, row, col)
```

Windows taskbar: A/C, 11:39 PM

TNHien/Phân tích & Xử lý ×test_lab01 - Jupyter Notebo... ×191110315_TrinhNgocHien_ ×Google Dịch ×matplotlib - How can I con... ×+

<>⌂VPNI🌐localhost:8888/notebooks/TNHien/Phân%20tích%20%26%20Xử%20lý%20ảnh/191110315_TrinhNgocHien_DIP%20Lab01.ipynbvà-cân-bằng-histogram,-hiển-thị-ảnh-sau-khi-c🔗📷💜▶️❤️🏠🔄📄↓☰

XLDCWeb Hỗ TrợLatexLibrary GenesisTRANG NHÀ - Tú S...Moodle HCMUSThư - TRỊNH NGỌC...Zalo WebDuolingo - Cách họ...Sử - web - viethoc.c...Index of /MTH10316

jupyter191110315_TrinhNgocHien_DIP Lab01Last Checkpoint: a minute ago (autosaved)

Python 3

FileEditViewInsertCellKernelWidgetsHelp

📁+🔍📄⬆️⬇️▶️Run⏮️↺▶️Code🗑️


Câu 1:

Tạo ảnh grayscale

In [43]:


```
1 # Read Image
2 image_color = imread("kitty.jpg")
3 # Convert Image into Gray
4 image_gray = cv2.cvtColor(image_color, cv2.COLOR_RGB2GRAY)
5
6 # Display Image
7 ShowTwoImages(image_color, image_gray)
```

Image 1



01002003004000100200300400500600700

Image 2



01002003004000100200300400500600700

Tạo ảnh HSV và hiển thị các kênh hue, saturation và value

A/C⌨️🔊ENG11:40 PM

TNHien/Phân tích & Xử lý × test_lab01 - Jupyter Noteb × 19110315_TrinhNgocHien_ × Google Dich × matplotlib - How can I con ×

localhost:8888/notebooks/TNHien/Phân%20tích%20%26%20Xử%20lý%20ảnh/19110315_TrinhNgocHien_DIP%20Lab01.ipynb#và-cân-bằng-histogram,-hiển-thị-ảnh-sau-khi-c

XLDC Web Hỗ Trợ Latex Library Genesis TRANG NHÀ - Tủ S... Moodle HCMUS Thư - TRINH NGOC... Zalo Web Duolingo - Cách họ... Sử - web - viethoc.c... Index of /MTH10316

jupyter 19110315_TrinhNgocHien_DIP Lab01 Last Checkpoint: 2 minutes ago (autosaved) Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

+

↺

↻

↗

↘

▶ Run

■

↺

▶▶

Code

Tạo ảnh HSV và hiển thị các kênh hue, saturation và value

In [44]:

```
1 # Convert Image into HSV color spaces
2 image_hsv = cv2.cvtColor(image_color, cv2.COLOR_BGR2HSV)
3
4 # Show each channel H , S and V
5 ShowThreeImages(image_hsv[:, :, 0], image_hsv[:, :, 1], image_hsv[:, :, 2])
```

Image 1

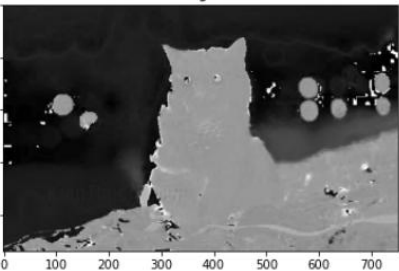


Image 2

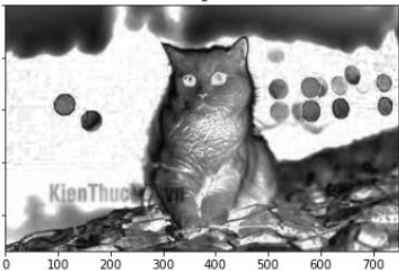
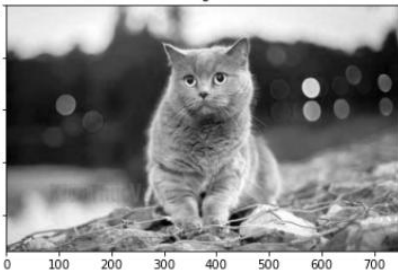


Image 3



In [45]:

```
1 # Show each channel R, G, and B
2 ShowThreeImages(image_color[:, :, 0], image_color[:, :, 1], image_color[:, :, 2])
```

Image 1




Image 2



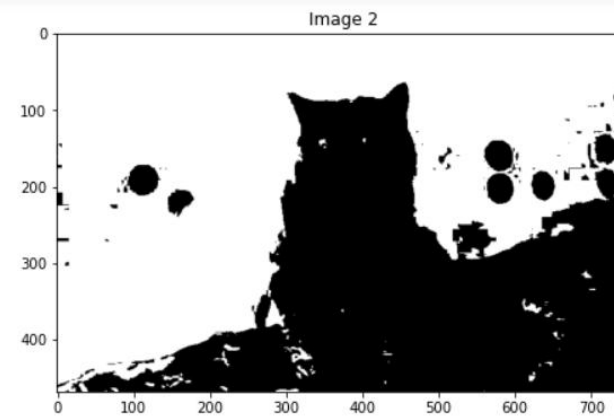
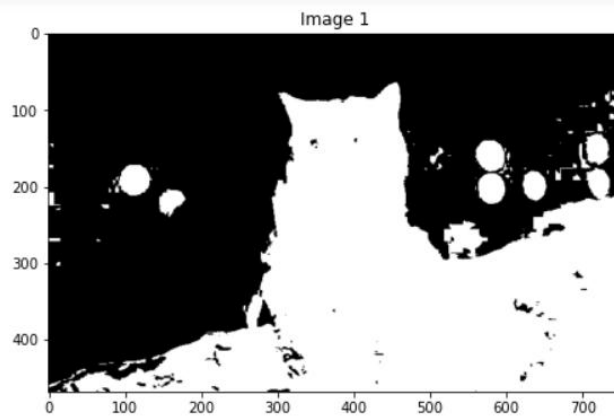


Image 3

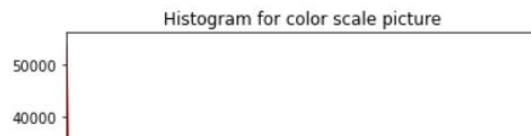


The screenshot displays a web-based Jupyter Notebook environment. The browser's address bar shows the URL: localhost:8888/notebooks/TNHien/Phân tích & Xử lý / test_lab01 - Jupyter Notebo... / 19110315_TrinhNgocHien_... / Google Dịch / matplotlib - How can I con... / +. The notebook's title bar indicates the file name: 19110315_TrinhNgocHien_DIP Lab01, with a last checkpoint time of 2 minutes ago (autosaved). The interface includes standard menu items (File, Edit, View, Insert, Cell, Kernel, Widgets, Help) and a toolbar with icons for saving, adding cells, zooming, and running code. The main workspace contains a code cell with Python code for histogram analysis and thresholding. Below the code, two plots are shown side-by-side. The left plot, titled 'Histogram for gray scale picture', is a histogram of the hue channel with a red dashed vertical line at x=50. The right plot, labeled 'Image 2', is currently blank. The Windows taskbar at the bottom shows various application icons and the system clock indicating 11:41 PM.



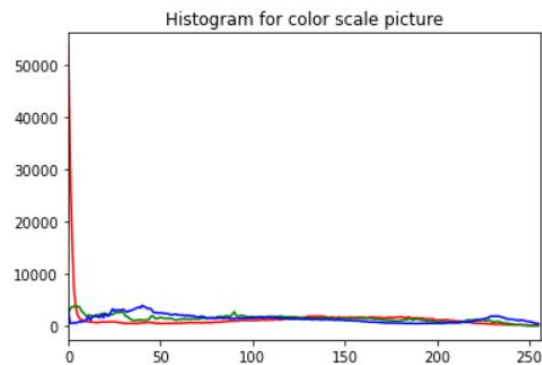
Hiển thị histogram của 3 kênh màu h,s,v và r,g,b

```
In [47]: 1 color = ('r', 'g', 'b')
2 for channel,col in enumerate(color):
3     histr = cv2.calcHist([image_color],[channel],None,[256],[0,256])
4     plt.plot(histr,color = col)
5     plt.xlim([0,256])
6 plt.title('Histogram for color scale picture')
7 plt.show()
```

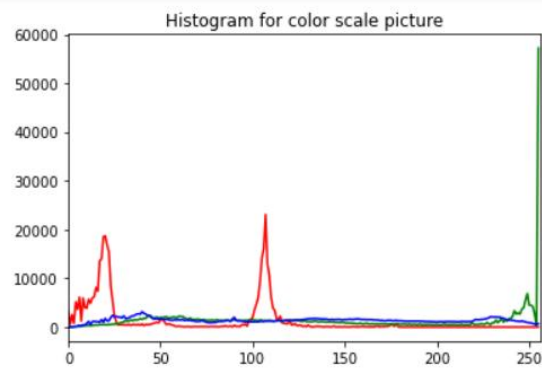


Hiển thị histogram của 3 kênh màu h,s,v và r,g,b

```
In [47]: 1 color = ('r', 'g', 'b')
2 for channel,col in enumerate(color):
3     histr = cv2.calcHist([image_color],[channel],None,[256],[0,256])
4     plt.plot(histr,color = col)
5     plt.xlim([0,256])
6 plt.title('Histogram for color scale picture')
7 plt.show()
```



```
In [48]: 1 color = ('r', 'g', 'b')
2 for channel,col in enumerate(color):
3     histr = cv2.calcHist([image_hsv],[channel],None,[256],[0,256])
4     plt.plot(histr,color = col)
5     plt.xlim([0,256])
6 plt.title('Histogram for color scale picture')
7 plt.show()
```

Câu 2

Tạo ảnh xám từ ảnh màu

```
In [75]: 1 # Read Image
          2 image_color = imread("corgi.jpg")
          3
          4 # Convert Image into Gray
          5 image_gray = cv2.cvtColor(image_color, cv2.COLOR_RGB2GRAY)
          6
          7 # Display Image
          8 ShowTwoImages(image_color, image_gray)
```



TNHiên/Phân tích & Xử lý

test_lab01 - Jupyter Noteb

19110315_TrinhNgocHien_

Google Dịch

matplotlib - How can I con

+

localhost:8888/notebooks/TNHiên/Phân%20tích%20%26%20Xử%20lý%20ảnh/19110315_TrinhNgocHien_DIP%20Lab01.ipynb#và-cân-bằng-histogram,-hiển-thị-ảnh-sau-khi-c

XLDC

Web Hỗ Trợ

Latex

Library Genesis

TRANG NHÀ - Tú S...

Moodle HCMUS

Thư - TRỊNH NGỌC...

Zalo Web

Duolingo - Cách họ...

Sử - web - viethoc.c...

Index of /MTH10316

jupyter

19110315_TrinhNgocHien_DIP Lab01

Last Checkpoint: 5 minutes ago (autosaved)

Logout

File

Edit

View

Insert

Cell

Kernel

Widgets

Help

Trusted


Python 3

+

Run


Code

Image 1



0 50 100 150 200 250 300 350 400 450 500

Image 2




0 50 100 150 200 250 300 350 400 450 500

Làm mờ ảnh

In [76]:


```
1 # Create Blurred Image
2 from skimage.filters.rank import median
3 from skimage.morphology import disk
4
5 image_blurred = median(image_gray, disk(10))
6 ShowTwoImages(image_gray, image_blurred)
```

Image 1



0 50 100

Image 2



0 50 100

Windows Taskbar

A/C

ENG 11:43 PM

TNHien/Phân tích & Xử lý ×test_lab01 - Jupyter Noteb ×19110315_TrinhNgocHien_ ×Google Dich ×matplotlib - How can I con ×

localhost:8888/notebooks/TNHien/Phân%20tích%20%26%20Xử%20lý%20ảnh/19110315_TrinhNgocHien_DIP%20Lab01.ipynb#và-cân-bằng-histogram,-hiển-thị-ảnh-sau-khi-c

XLDCWeb Hỗ TrợLatexLibrary GenesisTRANG NHÀ - Tủ S...Moodle HCMUSThư - TRỊNH NGỌC...Zalo WebDuolingo - Cách họ...Sử - web - viethoc.c...Index of /MTH10316

jupyter19110315_TrinhNgocHien_DIP Lab01Last Checkpoint: 5 minutes ago (autosaved)

Logout

FileEditViewInsertCellKernelWidgetsHelp

TrustedPython 3

+

Run

Code

Image 1


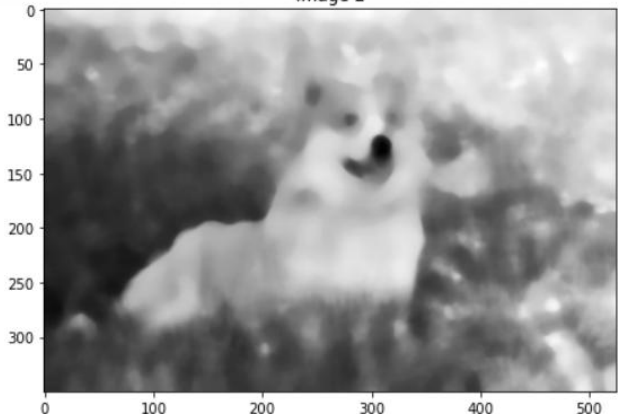


Image 2



Làm nhiễu ảnh

In [77]:

```
1 # Create Noise Image
2 noise = np.random.random(image_gray.shape)
3 image_noise = image_gray.copy()
4 image_noise[noise > 0.99] = 255
5 image_noise[noise < 0.01] = 0
6
7 ShowThreeImages(image_gray, noise, image_noise)
```

Image 1




Image 2



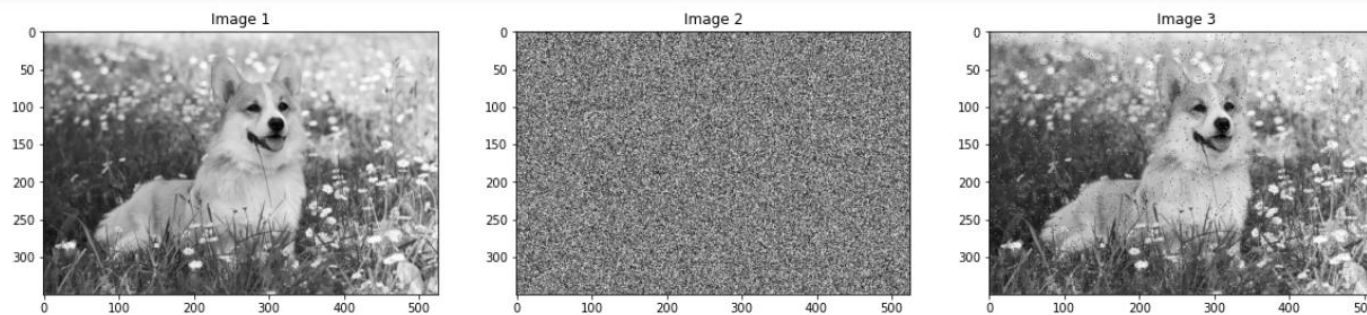


Image 3



Windows taskbar with icons for File Explorer, Edge, and other applications.

A/C ^ 🔌 🖨️ 📶 ENG 11:44 PM



Hiển thị histogram của ảnh xám và cân bằng histogram, hiển thị ảnh sau khi cân bằng

```
In [78]: 1 from skimage import data, exposure
2 image_equalization = exposure.equalize_hist(image_gray)
3 image_equalization = np.float32(image_equalization * 255)
4 ShowTwoImages(image_gray, image_equalization)
5
6 hist = cv2.calcHist([image_gray],[0],None,[256],[0,256])
7 plt.hist(image_gray.ravel(),256,[0,256])
8 plt.title('Histogram before equalization')
9 plt.show()
10
11 hist = cv2.calcHist([image_equalization],[0],None,[256],[0,256])
12 plt.hist(image_equalization.ravel(),256,[0,256])
13 plt.title('Histogram after equalization')
14 plt.show()
```



TNHiên/Phân tích & Xử lý

test_lab01 - Jupyter Noteb

19110315_TrinhNgocHien_

Google Dich

matplotlib - How can I con

localhost:8888/notebooks/TNHiên/Phân%20tích%20%26%20Xử%20lý%20ảnh/19110315_TrinhNgocHien_DIP%20Lab01.ipynb#và-cân-bằng-histogram,-hiển-thị-ảnh-sau-khi-c

XLDCWeb Hỗ TrợLatexLibrary GenesisTRANG NHÀ - Tủ S...Moodle HCMUSThư - TRINH NGOC...Zalo WebDuolingo - Cách họ...Sử - web - viethoc.c...Index of /MTH10316

jupyter19110315_TrinhNgocHien_DIP Lab01Last Checkpoint: 5 minutes ago (autosaved)

Logout

FileEditViewInsertCellKernelWidgetsHelp

TrustedPython 3

RunCode

Image 1



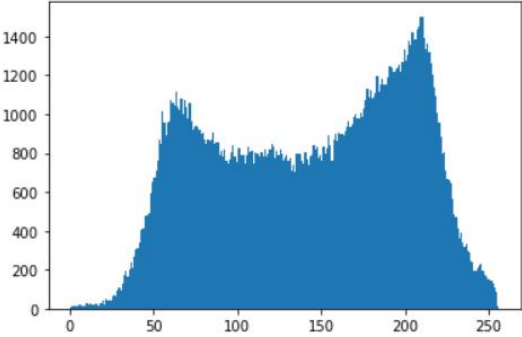



Image 2



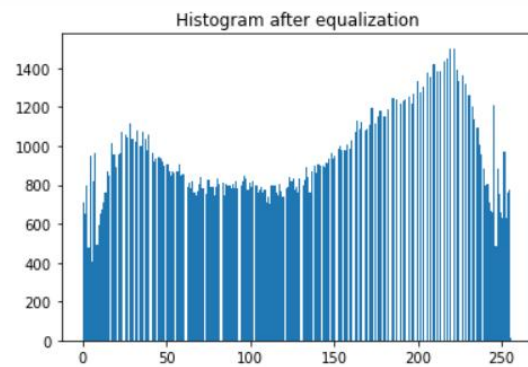
Histogram before equalization



Histogram after equalization



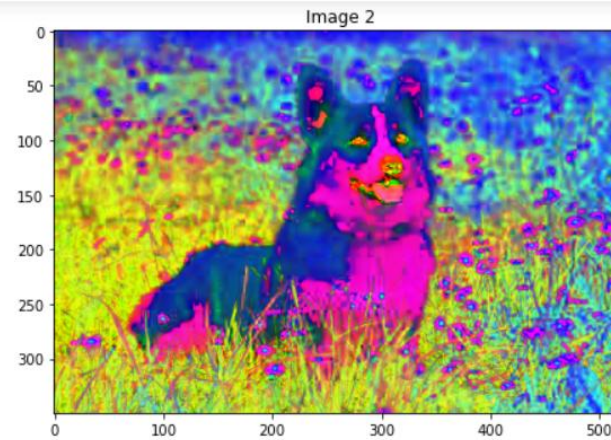
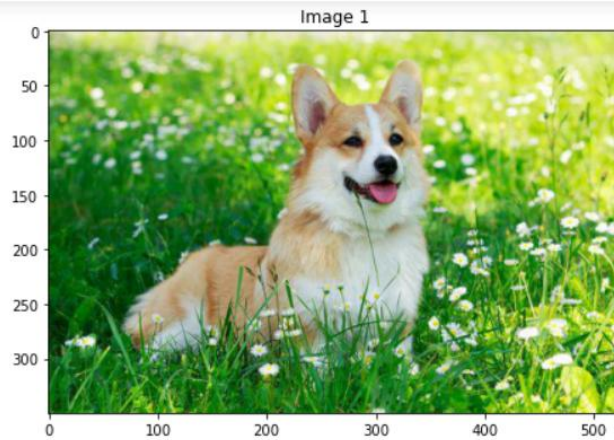
Windows taskbar with various application icons and system tray information including A/C, network, volume, and the time 11:44 PM.



Cân bằng 3 kênh màu hsv cùng lúc và hiển thị ảnh kết quả sau khi cân bằng

```
In [79]: 1 # Convert Image into HSV color spaces
2 image_hsv = cv2.cvtColor(image_color, cv2.COLOR_RGB2HSV)
3 # Apply histogram equalization
4 channel = 0
5 image_hsv[:, :, channel] = cv2.equalizeHist(image_hsv[:, :, channel])
6 channel = 1
7 image_hsv[:, :, channel] = cv2.equalizeHist(image_hsv[:, :, channel])
8 channel = 2
9 image_hsv[:, :, channel] = cv2.equalizeHist(image_hsv[:, :, channel])
10 # Show image after euqalization hsv
11 ShowTwoImages(image_color, image_hsv)
```

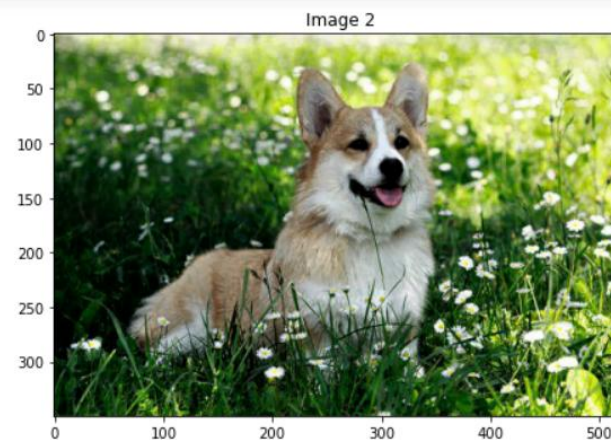
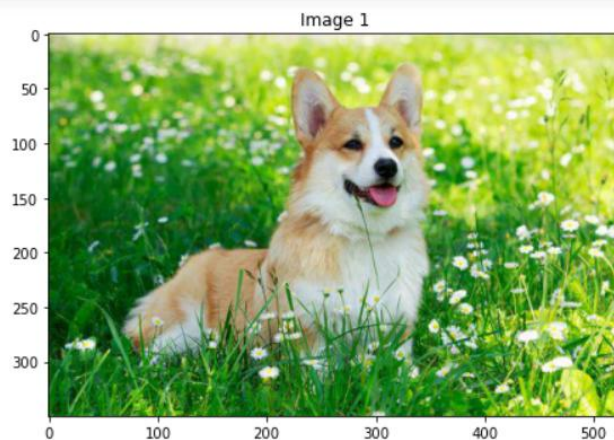




Enhance ảnh bằng cách cân bằng histogram kênh s và v

```
In [82]: 1 image_hsv = cv2.cvtColor(image_color, cv2.COLOR_RGB2HSV)
2
3 channel = 1
4 image_hsv[:, :, channel] = cv2.equalizeHist(image_hsv[:, :, channel])
5 channel = 2
6 image_hsv[:, :, channel] = cv2.equalizeHist(image_hsv[:, :, channel])
7
8 image_enhanced = cv2.cvtColor(image_hsv, cv2.COLOR_HSV2RGB)
9 ShowTwoImages(image_color, image_enhanced)
```





Thực hiện các biến đổi gamma và hiển thị ảnh màu tương ứng

```
In [83]: 1 image_hsv = cv2.cvtColor(image_color, cv2.COLOR_RGB2HSV)
2 img = image_hsv[:, :, 2]
3 gamma = [0.1, 0.5, 1.2, 2.2, 3.2]
4 gamma_corrected_01 = np.array(255*(img / 255) ** gamma[0], dtype = 'uint8')
5 gamma_corrected_02 = np.array(255*(img / 255) ** gamma[1], dtype = 'uint8')
6 gamma_corrected_03 = np.array(255*(img / 255) ** gamma[2], dtype = 'uint8')
7 gamma_corrected_04 = np.array(255*(img / 255) ** gamma[3], dtype = 'uint8')
8 gamma_corrected_05 = np.array(255*(img / 255) ** gamma[4], dtype = 'uint8')
9 ShowThreeImages(image_gray, gamma_corrected_01, gamma_corrected_02)
10 ShowThreeImages(gamma_corrected_03, gamma_corrected_04, gamma_corrected_05)
```

Image 1

Image 2

Image 3

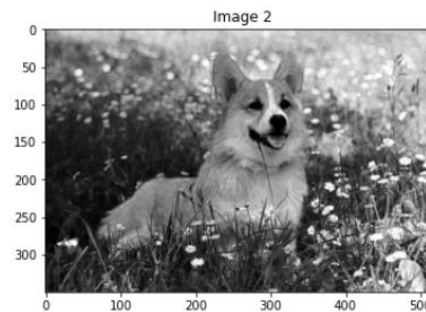
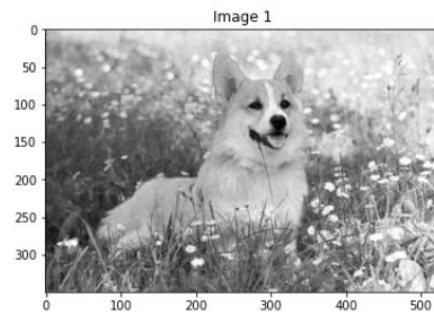
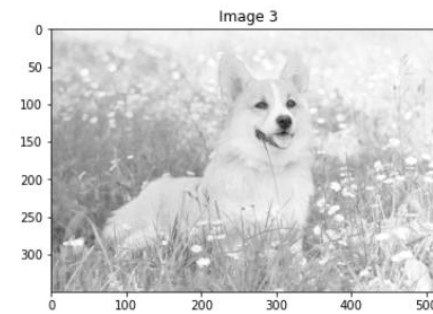
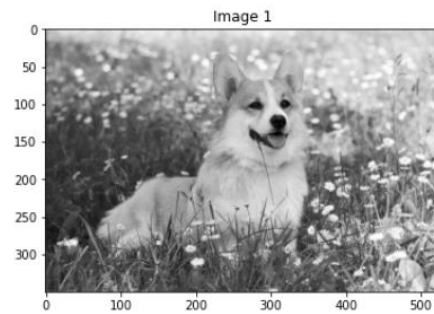




```

6 gamma_corrected_03 = np.array(255*(img / 255) ** gamma[3], dtype = 'uint8')
7 gamma_corrected_04 = np.array(255*(img / 255) ** gamma[3], dtype = 'uint8')
8 gamma_corrected_05 = np.array(255*(img / 255) ** gamma[4], dtype = 'uint8')
9 ShowThreeImages(image_gray, gamma_corrected_01, gamma_corrected_02)
10 ShowThreeImages(gamma_corrected_03, gamma_corrected_04, gamma_corrected_05)

```



Chọn ngưỡng mức tối và ngưỡng mức sáng mà ở đó dưới mức tối sẽ cho tối hơn và trên mức sáng sẽ cho sáng hơn trên kênh màu value trong hsv. Sau đó hiển thị ảnh kết quả sau khi enhance

19110315_TrinhNgocHien_DIP Lab01 Last Checkpoint: 8 minutes ago (autosaved) Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

Chosen threshold level and threshold level brightness at which the level will be better and above the level brightness will be brighter on the color value channel in hsv. After that display the result image after enhance

```
In [84]: 1 def pixelValTransformation(pix, r1, s1, r2, s2):
2         if (0 <= pix and pix <= r1):
3             return (s1 / r1)*pix
4         elif (r1 < pix and pix <= r2):
5             return ((s2 - s1)/(r2 - r1)) * (pix - r1) + s1
6         else:
7             return ((255 - s2)/(255 - r2)) * (pix - r2) + s2

In [85]: 1 image_hsv = cv2.cvtColor(image_color, cv2.COLOR_RGB2HSV)
2         image_hsv_value = image_hsv[:, :, 2]
3
4         hist = cv2.calcHist([image_hsv_value], [0], None, [256], [0, 256])
5         plt.hist(image_hsv_value.ravel(), 256, [0, 256])
6         plt.title('Histogram of Image')
7         plt.show()
8
9         # Define parameters.
10        r1 = 50
11        s1 = 0
12        r2 = 200
13        s2 = 255
14
15        # Vectorize the function to apply it to each value in the Numpy array.
16        pixelVal_vec = np.vectorize(pixelValTransformation)
17        # Apply contrast stretching.
18        contrast_stretched = pixelVal_vec(image_hsv_value, r1, s1, r2, s2)
19
20        image_hsv[:, :, 2] = contrast_stretched
21        image_enhanced = cv2.cvtColor(image_hsv, cv2.COLOR_HSV2RGB)
22
23        ShowTwoImages(image_gray, contrast_stretched)
```

A/C 11:47 PM

TNHiên/Phân tích & Xử lý × test_lab01 - Jupyter Noteb... 19110315_TrinhNgocHien_... Google Dich matplotlib - How can I con... ×

localhost:8888/notebooks/TNHiên/Phân%20tích%20%26%20Xử%20lý%20ảnh/19110315_TrinhNgocHien_DIP%20Lab01.ipynb#và-cân-bằng-histogram,-hiển-thị-ảnh-sau-khi-c

XLDC Web Hỗ Trợ Latex Library Genesis TRANG NHÀ - Tủ S... Moodle HCMUS Thư - TRINH NGOC... Zalo Web Duolingo - Cách họ... Sử - web - viethoc.c... Index of /MTH10316

jupyter 19110315_TrinhNgocHien_DIP Lab01 Last Checkpoint: 9 minutes ago (autosaved) Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

Run Code

```
15 # Vectorize the function to apply it to each value in the Numpy array.
16 pixelVal_vec = np.vectorize(pixelValTransformation)
17 # Apply contrast stretching.
18 contrast_stretched = pixelVal_vec(image_hsv_value, r1, s1, r2, s2)
19
20 image_hsv[:, :, 2] = contrast_stretched
21 image_enhanced = cv2.cvtColor(image_hsv, cv2.COLOR_HSV2RGB)
22
23 ShowTwoImages(image_gray, contrast_stretched)
24 ShowTwoImages(image_color, image_enhanced)
```

Histogram of Image

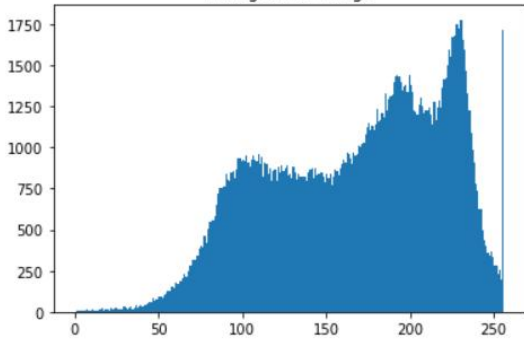


Image 1

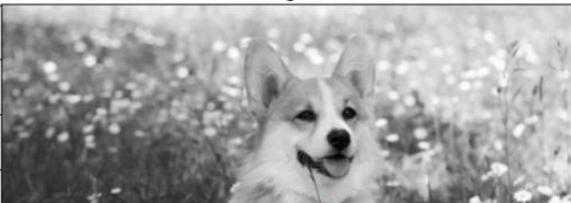



Image 2



Windows Taskbar: File Explorer, Edge, Photoshop, etc. System Tray: A/C, Network, Volume, Date/Time: ENG 11:47 PM

TNHiên/Phân tích & Xử lý

test_lab01 - Jupyter Notebo

19110315_TrinhNgocHien_

Google Dich

matplotlib - How can I com

localhost:8888/notebooks/TNHiên/Phân%20tích%20%26%20Xử%20lý%20ảnh/19110315_TrinhNgocHien_DIP%20Lab01.ipynb#và-cân-bằng-histogram,-hiển-thị-ảnh-sau-khi-c

XLDCWeb Hỗ TrợLatexLibrary GenesisTRANG NHÀ - Tủ S...Moodle HCMUSThư - TRINH NGOC...Zalo WebDuolingo - Cách họ...Sử - web - viethoc.c...Index of /MTH10316

jupyter19110315_TrinhNgocHien_DIP Lab01Last Checkpoint: 9 minutes ago (autosaved)

Logout


FileEditViewInsertCellKernelWidgetsHelp

TrustedPython 3

RunCode


Code

image 1




0501001502002503000100200300400500

image 2




0501001502002503000100200300400500

Image 1



0501001502002503000100200300400500

Image 2



0501001502002503000100200300400500

Windows taskbar with icons for File Explorer, Edge, VS Code, and others.

A/C11:48 PMENG

TNHiên/Phân tích & Xử lý

test_lab01 - Jupyter Notebo

19110315_TrinhNgocHien_

Google Dich

matplotlib - How can I com

localhost:8888/notebooks/TNHiên/Phân%20tích%20%26%20Xử%20lý%20ảnh/19110315_TrinhNgocHien_DIP%20Lab01.ipynb#và-cân-bằng-histogram,-hiển-thị-ảnh-sau-khi-c

XLDC Web Hỗ Trợ Latex Library Genesis TRANG NHÀ - Tủ S... Moodle HCMUS Thư - TRINH NGOC... Zalo Web Duolingo - Cách họ... Sử - web - viethoc.c... Index of /MTH10316

Jupyter 19110315_TrinhNgocHien_DIP Lab01 Last Checkpoint: 9 minutes ago (autosaved)

Logout

File Edit View Insert Cell Kernel Widgets Help

Trusted

Python 3

+

↺

↻

↶

↷

↶

↷

▶ Run

■

↺


↻

▶▶

Code


300

0 100 200 300 400 500



300

0 100 200 300 400 500



In [86]:

```
1 from skimage import feature
2 # sigma help to remove the noisy image in edge detection
3 image_edges_01 = feature.canny(image_gray)
4 image_edges_02 = feature.canny(image_gray, sigma=3)
5 ShowThreeImages(image_gray, image_edges_01, image_edges_02)
```

Image 1

0 50 100 150 200 250 300

0 100 200 300 400 500




Image 2

0 50 100 150 200 250 300

0 100 200 300 400 500

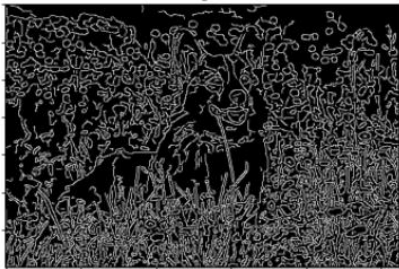



Image 3

0 50 100 150 200 250 300

0 100 200 300 400 500



In []:

1

Windows Taskbar

A/C

ENG 11:48 PM