

Lab 06 - Image Filtering

Prelab

Before starting the lab, read through this entire document. Then review how Matplotlib can be used to display images. The Matplotlib documentaiton on showing images with `plt.imshow()` is found here: https://matplotlib.org/api/_as_gen/matplotlib.pyplot.imshow.html. Also be familiar with Python's `input()` function and `if / elif / else` selection structures.

Lab

In this lab assignment, you will show a user an image and solicit input from the user regarding how to modify the image. Based on the user's input, you will re-display the image with modifications.

The image the user will modify is below:



stinkbug.png

The image can be found on-line here: https://matplotlib.org/users/image_tutorial.html

Images can be displayed using Python and Matplotlib. The code cell below demonstrates how to read and display an image with Matplotlib. Ensure the image you want to display is in the same directory as as the Jupyter notebook that contains the code.

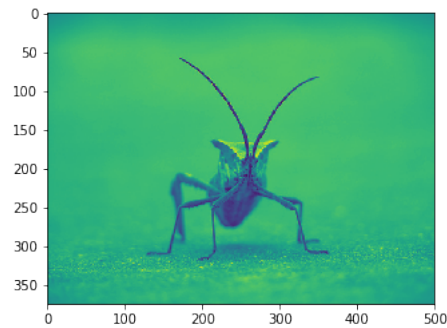
```
In [1]: import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline

image = plt.imread('stinkbug.png')

fig, ax = plt.subplots()
ax.imshow(image)

plt.show()
```

The `stinkbug.png` image is a gray scale image, but Matplotlib renders it as a color image. We can include an extra argument in the `ax.imshow()` method to choose a different color map. A list of all the possible



color maps can be found in the Matplotlib documentation (https://matplotlib.org/examples/color/colormaps_reference.html).

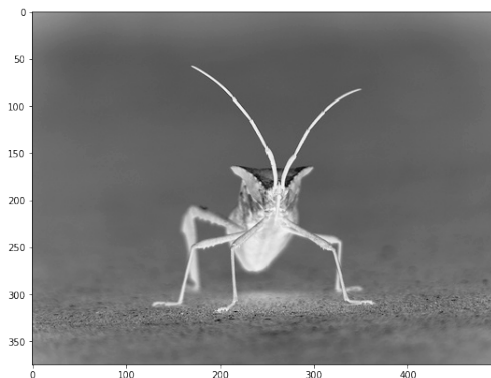
The code cell below demonstrates how to use a custom color map to display the image.

```
In [2]: import numpy as np
import matplotlib.pyplot as plt

image = plt.imread('stinkbug.png')

fig, ax = plt.subplots(figsize=(9,9))
ax.imshow(image, cmap='Greys')

plt.show()
```



Construct a script that tells a user their possible colormap options. Then use Python's `input()` function to ask the user for their preferred a color map. Give the user the options of:

- Greys
- gist_earth
- ocean
- terrain

Next, ask the user if they want gridlines. Finally ask the user if they want tick labels. After the user selects all of the options, show the user the image based on their preferences.

The code below demonstrates how the script might function:

Your color maps options are: Greys, gist_earth, ocean or terrain

Please select a color map:

terrain

Do you want grid lines? (yes or no):

yes

Do you want tick labels? (yes or no):

no

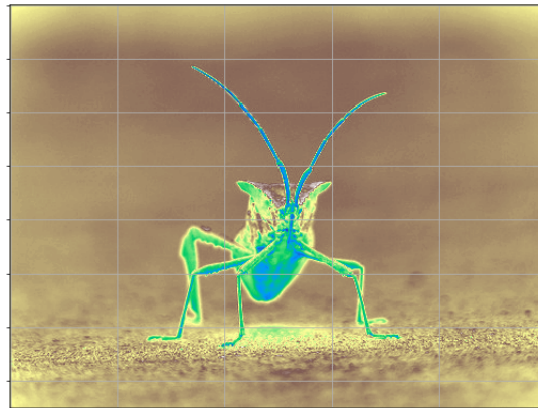


Image terrain colormap, no gridlines, no tick labels

Deliverables

Each student's submission for the lab should be one Jupyter notebook .ipynb-file. Run your Jupyter notebook as a user and select terrain as the colormap, yes gridlines and no ticklabels. Show the resulting image. Upload to the appropriate D2L drop box.

lab6.ipynb

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