Image Compression using Quadtree

User Manual

Module installation:

Pip commands to install the necessary libraries

Windows	MAC OS
Numpy: pip install numpy **PIL:** pip install pillow	**Numpy:** pip3 install numpy **PIL:** pip3 install pillow

Alternative: Command prompt

1. Copy the modules listed below into a text file and save it as **requirements.txt**

   cycler==0.10.0
   kiwisolver==1.3.2
   numpy==1.21.2
   Pillow==8.4.0
   pyparsing==2.4.7
   python-dateutil==2.8.2
   six==1.16.0

2. Open cmd
3. Enter the following command: **pip install -r requirements.txt**

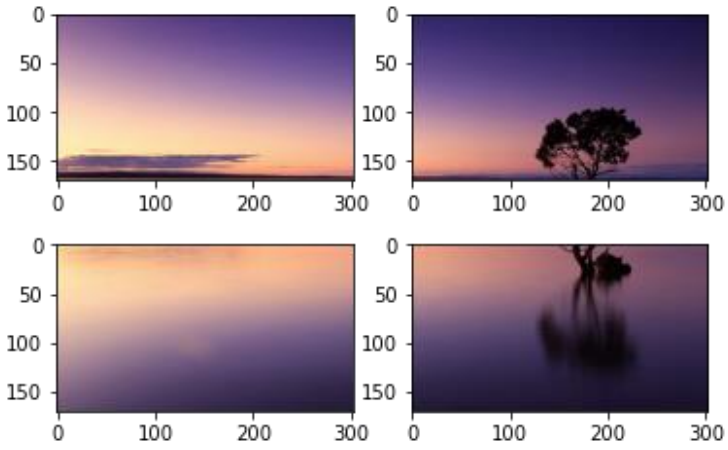
Brief description of each function:

import_image(): Imports an image from the system

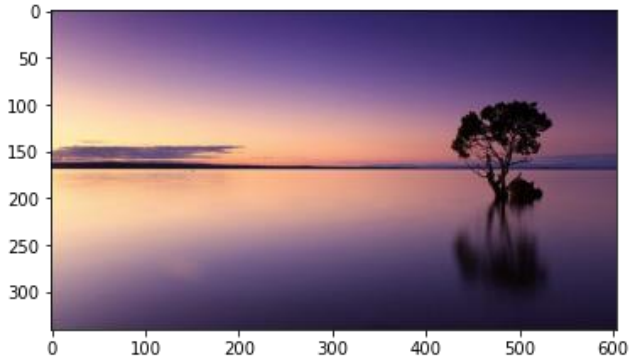
img_size(): Calculates and returns the image size in Kilo Bytes (KB)

img_save(): Saved the compressed image

split_image(): Splits the image into four quadrants

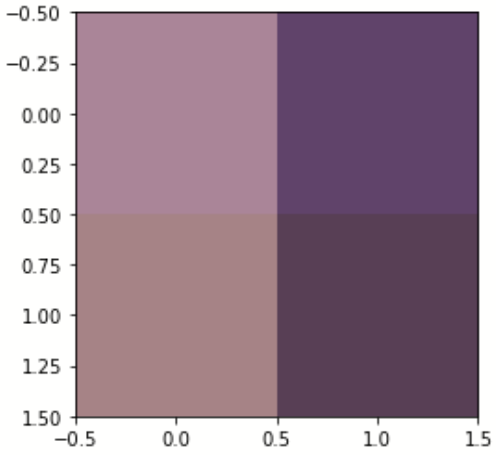


concatenate_image(): Reconstructs the full image from the four split quadrants



checkEqual(): Checks if all the four quadrants of the image are equal

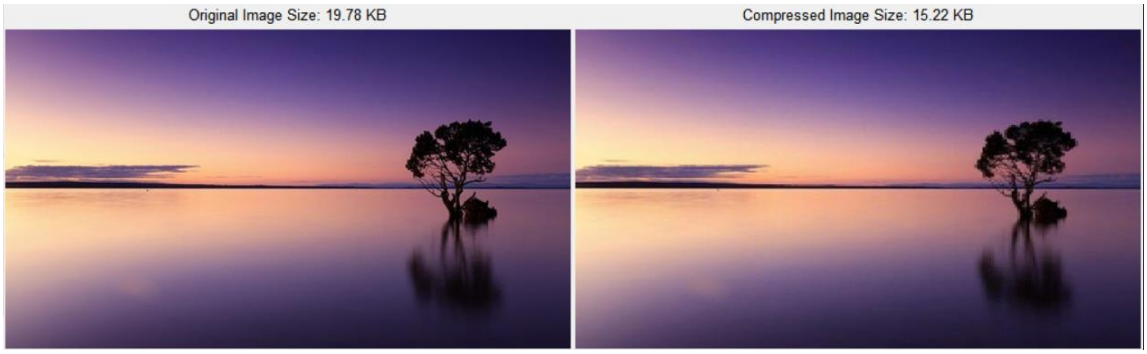
calculate_mean(): Calculate the mean color of four quadrants of the image



insert(): Recursively traverses the tree at each level

get_image(): Returns concatenated image

compress_image(): Compresses the image based on input threshold and saves the image in the same directory as this python file



How to use the application for image compression:

Place both files (compress_image.py and GUI.py) in the same folder and then run GUI.py. This should open up a new window similar to Fig. 1

Fig. 1

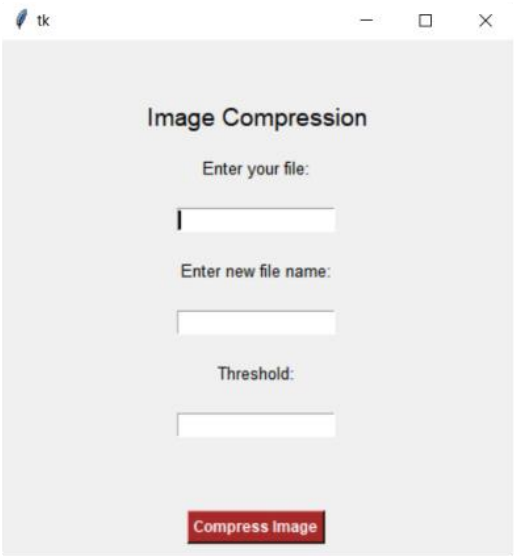
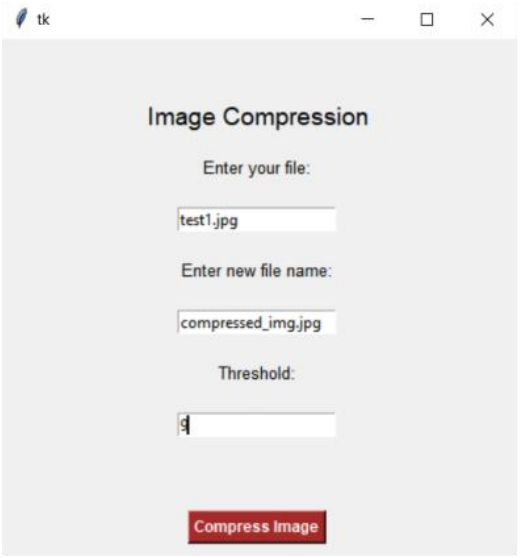
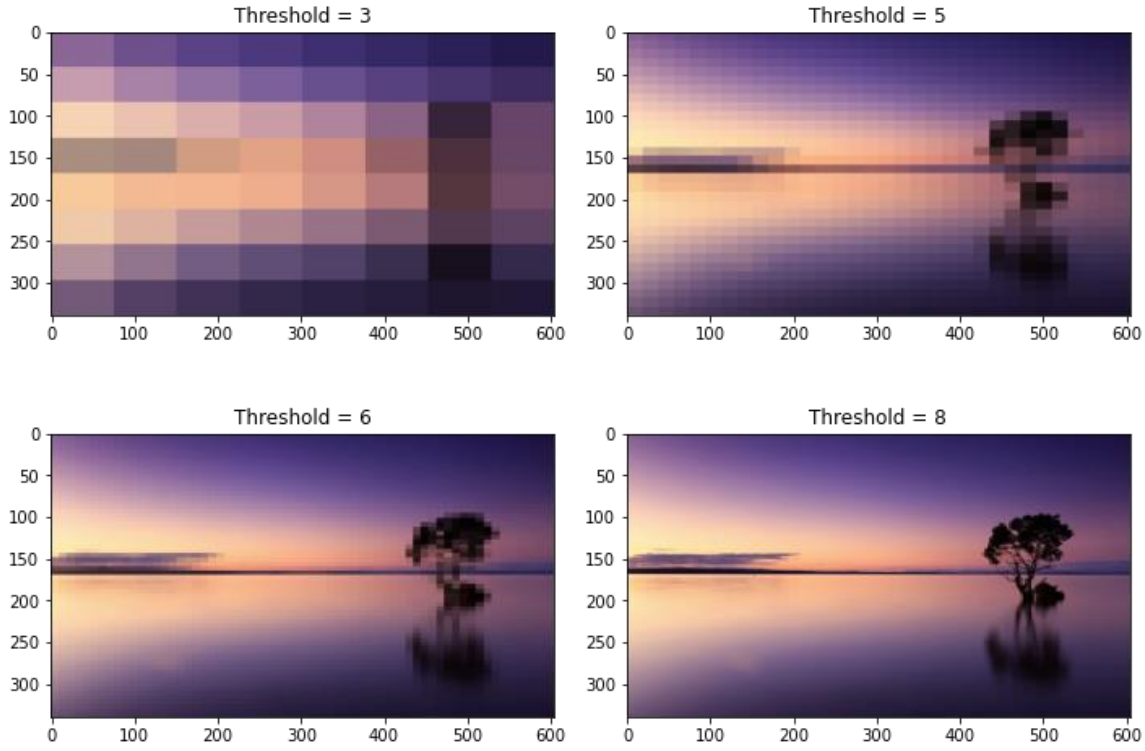


Fig. 2



- Input file format (Enter your file)
  - Reads the image file from the specified path.
  - Path **need not be provided** if the image is located in the same directory as the code
  - **File extension must be provided (Fig. 2)**
  - **Example:** C:\Users\XYZ\Desktop\image.jpg
- Saving the file (Enter new file name):
  - Saves the image file to the specified path.
  - Path **need not be provided** if the image needs to be saved in the same directory as the code; filename should suffice.
  - **File extension must be provided (Fig. 2)**
  - **Example 1**: C:\Users\XYZ\Desktop\image.jpg
  - **Example 2**: image.jpg (Image will be saved in the same directory as the code)
- Threshold:
  - Sets the degree of compression.
  - Acceptable input range: 0 – 9
  - Floating-point numbers result in an error

DISCLAIMER: We do not recommend saving the image as a PNG file since it increases the size of the compressed image. We suggest saving the image as a JPG file.



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