Converting and Visualizing an Image as Raw RGB Data

Today's task focused on using FFmpeg and Python to convert an image file into a raw RGB file without a header, then visualizing this RGB data with Python. Below is a detailed outline of the steps taken and the knowledge gained.

1. Converting Image to Raw RGB with FFmpeg

The first step was to convert an image file (r.png) into a raw RGB format, which is an uncompressed format without a file header. This was achieved using the following FFmpeg command:

```
ffmpeg -i r.png -f rawvideo -pix_fmt rgb24 r.rgb
```

This command:

- **Input (-i r.png)**: Specifies the original image file.
- **Format (-f rawvideo)**: Sets the output format to raw video, stripping the file header.
- **Pixel Format (-pix_fmt rgb24)**: Defines the pixel format as RGB24, meaning each pixel has 3 bytes (one for each color channel: red, green, and blue).
- **Output (r.rgb)**: The resulting file is a raw RGB file without any header.

This generated r.rgb, which contained only raw pixel data in RGB format.

2. Reading and Visualizing the Raw RGB Data in Python

Before using Python to convert the RGB file, you first need to determine the image resolution with the following command:

```
ffprobe -v error -select_streams v:0 -show_entries stream=width,height -of csv=p=0 r.png
```

replace width and height in python (this code is uploaded named read_rgb)

```
import numpy as np

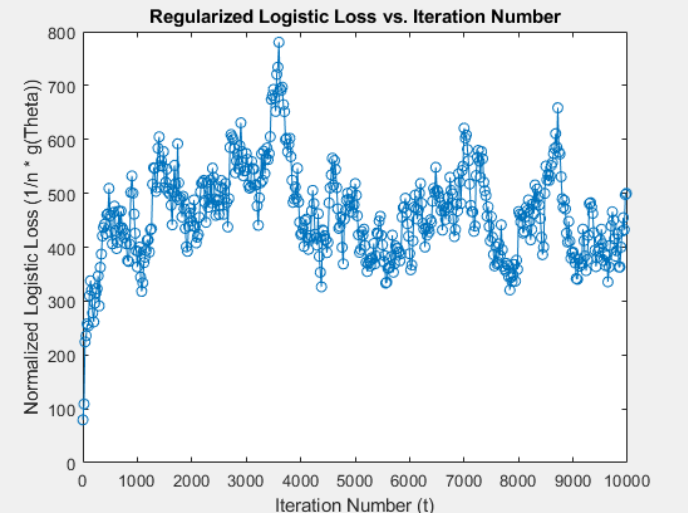
width = 549
height = 409

with open('r.rgb', 'rb') as f:
    rgb_data = np.fromfile(f, dtype=np.uint8)

rgb_data = rgb_data.reshape((height, width, 3))

with open("all_pixels.txt", "w") as f:
    for row in rgb_data:
        for pixel in row:
            f.write(f"{pixel[0]}, {pixel[1]}, {pixel[2]}\n")
```

Using this png file (r) as example (uploaded as r.png)



And we have a text file output each single pixels' rgb data like this (uploaded as all_pixels)

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```

Each pixels in r.rgb has convert to rgb data.