Data Structures and Algorithms

Project Proposal

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PixelTeam

1 Team members:

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2 Type of data structure:

We are implementing a ***Quad Tree*** which is a type of a tree structure and our application for this structure is ***image compression***. We will be using ***functional programming*** .

In the world of pictures, Quad Trees are like smart organizers. They help make images smaller without losing too much detail. Imagine your picture as a big puzzle. Quad Trees break the puzzle into smaller pieces and only keep the important ones, like the colors and shapes that make your picture special. This way, we can save space on our computers or phones without making the picture look too different. It's like having a tidy and organized photo album that doesn't take up too much room!

By employing the '***Pillow***' library also known as '***PIL***' for image handling, the program takes an original ***'.jpg'*** image as input, transforming it into a 2D array of pixel values. The Quad Tree is then constructed recursively, creating a hierarchical structure for image segmentation. During compression, the Quad Tree is traversed to collect color information, enabling the creation of a compressed image. The program supports loading and saving of both original and compressed images in '.jpg' format, simplifying the image processing procedure where the original image will be as it was and a new image will be made. We might use the library ***numpy*** for some list based calculations.

So in total our work is to use the array, which the library will make for us, to make a Quad Tree and it's traversal for the compression. By the end of the program the library will be again used to save the image. The library will be only used for the image related functions that we will explore further.