Assessment Task October 2024

In this assignment, you will create a web-based image dithering application that showcases your skills in web development, image processing, and algorithm implementation. The goal is to build an interactive tool that allows users to upload an image and apply various dithering effects with customisable parameters.

Dither is an intentionally applied form of noise used to randomise quantisation error, preventing large-scale patterns such as color banding in images. Dither is routinely used in processing of both digital audio and video data, and is often one of the last stages of mastering audio to a CD https://en.wikipedia.org/wiki/Dither .

You are required to develop an application featuring a clean and responsive user interface using React, and you may choose any framework such as Next.js, CRA, Gatsby, or Remix. The project can be built using JavaScript or TypeScript. The interface should include an area for image upload and display, a dropdown menu to select different dithering algorithms, controls to adjust dithering parameters, a button to apply the selected effect, and an option to download the processed image. You are not allowed to use any external libraries for image manipulation but can use any UI component library of your choice for building the interface. All operations should be on client-side.

Please implement at least five dithering algorithms. You can study all of the dithering algorithms using this link: https://en.wikipedia.org/wiki/Dither#Algorithms.

The core of your application will involve handling image upload and display, implementing the dithering algorithms to process the uploaded image, and ensuring that your application can handle various image sizes and formats efficiently. Pay special attention to performance optimisation, particularly when dealing with large images.

For those looking for an extra challenge, consider adding support for color dithering, implementing a real-time preview mode, adding a side-by-side comparison feature for original and dithered images, or including undo/redo functionality for parameter changes. These bonus features will set your project apart and demonstrate your ability to go above and beyond the basic requirements.

Your final submission should include the source code of your application uploaded to a public repo at https://github.com. Additionally, please deploy the application using a free plan from services such as Vercel (https://vercel.com), Netlify (https://www.netlify.com), Railway (https://railway.app), Render(https://render.com), or any similar platform of your choice. Finally, share the links to both your GitHub repository and the deployed application.

This will allow you to demonstrate your development process and problem-solving skills effectively.

Your assessment will be evaluated based on the following criteria:

- functionality (does it meet all the requirements?)
- code quality (is it well-structured, readable, properly commented, and modular?)
- user experience (is the interface intuitive and responsive?)
- algorithm implementation (are the dithering algorithms correctly implemented?)
- creativity (any additional features or unique approaches to solving the problem?)
- and the modularity of your code (is the code broken down into reusable and maintainable components?)