



Data Structures

Image Filtering using Java

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ABSTRACT

Our image processing project showcases the application of various image filters to transform digital images. Developed using Java, this project provides a command-line interface to apply filters such as grayscale, sepia, reflection, and more, allowing users to enhance and manipulate their images with ease.



INTRODUCTION

In the modern digital era, images play an increasingly central role in our lives. They have evolved into potent instruments for conveying messages, artistic creativity, and immersive storytelling. Our attention today is directed toward the captivating realm of image processing, a field that empowers us to modify and elevate the visual content that saturates our daily experiences.



CODE STRUCTURE

Main Class: ImageProcessor

- Responsible for handling command-line arguments and image I/O.
- Utilizes filters from the ImageFilters class.
- Converts images to and from RGBTRIPLE objects.

Filter Implementation: ImageFilters

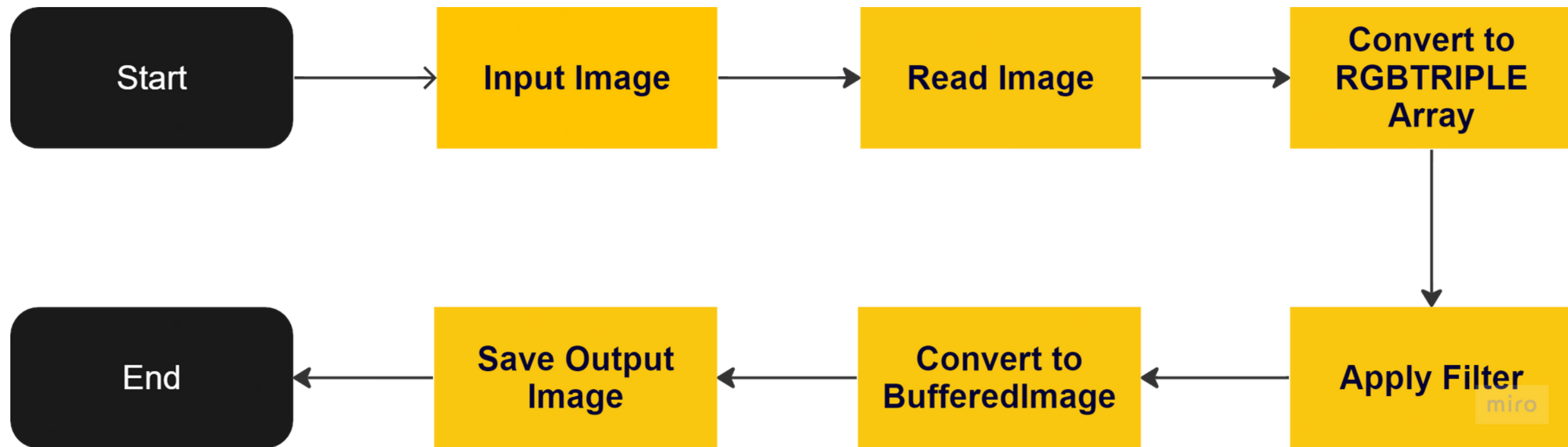
- Contains various filter methods for image transformation.
- Each filter method operates on a 2D array of RGBTRIPLE objects.

Data Structure: RGBTRIPLE Class

- Represents an RGB pixel with red, green, and blue components.
- Used to store and manipulate individual pixel data.



FLOWCHART



DEMONSTRATION

- **Step 1:** Select an input image (e.g., "input.jpg").
- **Step 2:** Open the command prompt or terminal.
- **Step 3:** Enter the following command to apply a filter (e.g., grayscale):
`java ImageProcessor grayscale input.jpg output.jpg`
- **Step 4:** View the output image (e.g., "output.jpg") to see the filter effect.
- **Step 5:** Repeat the process with different filters (e.g., sepia, reflection) to explore various transformations.
- **Step 6:** Witness how each filter enhances or alters the visual appeal of the image.

SCREEN SHOTS

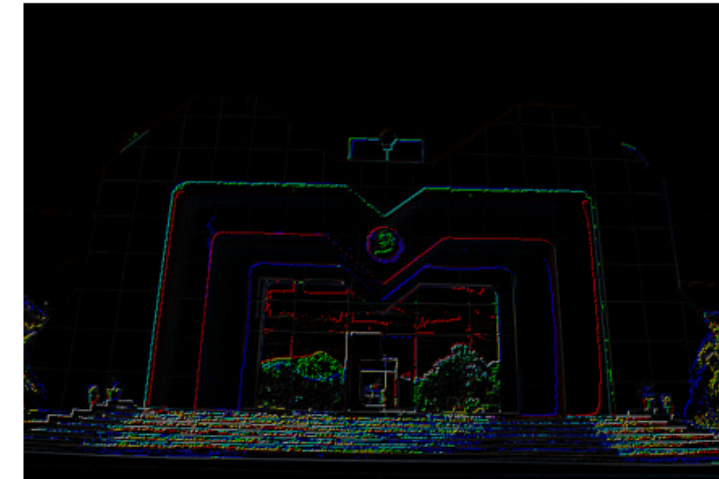
1.GRAYSCALE



2.SEPIA



5.EDGEDETECT



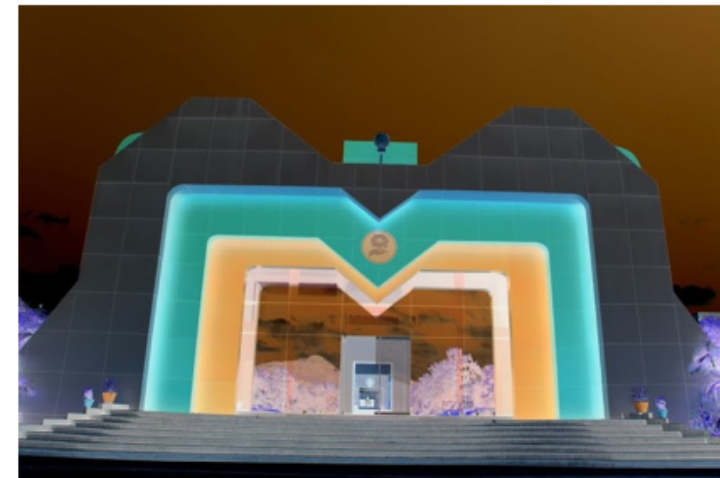
6.PIXELATE



3.REFLECT



4.INVERTCOLORS



7.POSTERIZE



8.NOISE



CONCLUSION

Our image processing project has successfully demonstrated the remarkable impact of various filters on images. From classic grayscale to sepia's warm tones and captivating reflections, the filters have the power to enhance images in diverse ways. Our project also includes filters for edge detection, pixelation, posterization, and noise, each with practical applications. Users have the freedom to customize images to their liking.



Thank
you

The image features the words "Thank you" written in a flowing, brown cursive script. The text is centered and surrounded by a delicate floral arrangement. This includes several purple roses in various stages of bloom, interspersed with sprigs of small purple buds and clusters of green leaves. The entire composition is set against a white rectangular background with rounded corners. This white area is itself set within a larger frame composed of soft, abstract shapes in muted earth tones, including terracotta, beige, and olive green.