CSC 412: Multithreaded Image Focusing Application Report

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1 Introduction

This report outlines the development process of the Multithreaded Image Focusing Application for CSC 412. The assignment involved implementing a stack focusing program capable of processing multiple images to produce a single, focused output image, leveraging the power of multithreading.

2 Design Decisions

The project was approached with two main goals: efficiency and accuracy. Key decisions included:

- **Language Choice**: C++ was chosen for its advanced threading capabilities and robust handling of low-level operations.
- **Threading Library**: Both pthread and C++ thread class were used in different versions to compare performance and usability.
- **Synchronization Strategy**: Employed mutex locks for synchronization, with a gradual approach from no synchronization to multiple locks.

3 Interpretation of Specifications

Focus was placed on creating a reliable and efficient multithreaded solution, prioritizing core requirements of multithreading and image processing.

4 Limitations

Key limitations include handling only TGA image files and specific command-line arguments, with challenges in processing pixels near image borders.

5 Subset of Requirements

Focused on implementing a subset of features, emphasizing on demonstrating multithreading in image processing effectively.

6 Extra Credit: script06.sh

Developed ‘script06.sh‘ for extra credit, a script that automates the execution of the stack focusing program with various command-line arguments.

7 Conclusion

The project was a significant learning experience in multithreading, synchronization, and practical application development, providing insights into parallel computing and synchronization strategies.