[Foundation for Advancement of Science and Technology & National University of Computer and Emerging Sciences (FAST NUCES)]
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PROJECT PROPOSAL

[Parallel image Compression Algorithms]

Members:

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I. Summary

In this project, we will work on creating and optimizing algorithms that can distribute the computational workload across multiple processing units or cores or can use shared memory and the fork-join model to process images, potentially leading to faster compression times. These approaches are particularly valuable in the era of multi-core processors and high-performance computing. Ultimately, the project aims to provide faster and more efficient image compression solutions that can benefit a wide range of industries and technologies reliant on digital imagery.

II. Introduction

Our task is to solve image compression through parallel techniques and compare the results using different paradigms of programming. We will also compare our solution with well-known image compression applications like WinRAR and 7ZIP.

III. Needs/Problems

The idea of image compression is very crucial as the size of the image depends on how long it will take to transfer between to computers, whether it be over a shared memory or over a distributed memory. Furthermore, due to the increase in quality of images in recent years, images are even more bulky and saturated than they were before. This results in slow and undesirable rates of image compression. Therefore, we will use parallel programming to solve this issue.

IV. Goals/Objectives

The objectives of this project are simple yet diverse. We will create a program that compresses images, and then modify the code to perform parallel using different methods, which include but are not limited to OpenMP, MPI, CUDA C, etc. Then we will compare the results (time taken) of each result.

V. Procedures/Scope of Work

We will be working on C/C++ and including the libraries that add the functionality of parallel programming, which are OpenMP, MPICH, and also converting standard C/C++ to CUDA C/C++.

VI. Timetable

We will break the project into 5 parts indicating the amount of time we have in terms of weeks; here is a detailed view:

	IMPLEMENTATION TIME				
ACTIVITY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
Design of Data Structures and Algorithms	✓				
Implementation of Serial Code		✓			
Implementation of OpenMP		✓			
Implementation of MPICH			✓		
Implementation of Other parallel structures				✓	✓
Comparison of programs		✓	✓	✓	✓
Improvement of Project	✓	✓	✓	✓	✓

VII. Key Personnel

Client	[FAST NUCES Department of Computer Science]
Supervisor	[Syed Faisal Ali]
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Team	[Mohammad Yehya], [Daniyal Haider], [Mahad Munir]
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VIII. Evaluation

Evaluation will be done on the basis of comparison between programs (OpenMP, MPICH, etc.). Time taken from each program and result of compression will also be taken into account.