Image Processing using CUDA

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# Project background and purpose

## Introduction

In this project I’ll be demonstrating the difference between image processing algorithms on the CPU and GPU by comparing the difference in time and in the variance in the results of each algorithm.

## Objectives

By the end of the project, I’ll hopefully will demonstrate how the GPU preforms differently and will further my knowledge in developing algorithms for parallel processing.

## Scope

For this project will be using a library that already an image parser to allow me to load and save images, as well as image processing algorithms to help me test and benchmark the algorithms I create.

## Deliverables

The results of this project will be a set of different image processing algorithms written for both the CPU and GPU as well as images that have gone through these algorithms and the performance differences between the algorithms on the CPU and GPU.

## Constraints

For this project the computer running the program will have to contain a CUDA compatible GPU.

# Project rationale and operation

## Project benefits

This project will help better the understanding between algorithms that run on the CPU and the GPU as well as understanding the benefits of moving certain procedures to the GPU form the CPU and keeping other on the CPU.

## Project operation

For this project I will implement the waterfall methodology of production. I’ll designate the order I will make my algorithms and document my finings after testing/running.

## Options

There is a variety of languages that I can use to program CUDA such as C++, python and others. There are also many different libraries for those languages that enable the loading of images as well as image processing like OpenCV and Cimg.

## Risk analysis

What risks might affect the outcome of your project or its stakeholders? How severe are they, and what steps will you take to mitigate against them?

Delete the red paragraphs and replace this one with your content (use the “Normal” paragraph style).

## Resources required

For this project I require a computer with a Nvidia GPU. I have access to the such computer at home and in case of the machine getting broken I also have access to the High Performance lab at the university.

# Project methodology and outcomes

## Initial project plan

## Tasks and milestones

Present a realistic task list for the entire project, broken down to a suitable level of detail. Indicate milestones against which progress can be monitored. Make sure you include all the deliverables you mentioned earlier.

Delete the red paragraphs and replace this one with your content (use the “Normal” paragraph style).

## Schedule Gantt chart

Present a Gantt chart showing a schedule for all tasks, milestones and deliverables. Show dependencies amongst tasks. If you are intending to use SCRUM or other agile methods, be sure to go to the lectures involving project planning. Your time plan should cover the entire period of your project (and will therefore include the PDD preparation as a task and the PDD itself as a deliverable).

Delete the red paragraphs and replace this one with your content (use the “Normal” paragraph style).

## Project control

How will you manage the project day-to-day? How will its performance be monitored? How will you judge if it has been successful?

Delete the red paragraphs and replace this one with your content (use the “Normal” paragraph style).

## Project evaluation

How will you evaluate the project’s artefacts and overall outcomes? What user evaluation will you do? Do not underestimate the importance of this, and include clear details of how you will do the evaluation.

Delete the red paragraphs and replace this one with your content (use the “Normal” paragraph style).

# References

List any sources you have used for your background and introduction here. Make sure you use the proper referencing format.

Delete the red paragraphs and replace this one with your content (use the “Normal” paragraph style).

# Appendix a

You may use one or more appendices to add useful reference information which may be relevant to other sections of the report. Do not use appendices simply as a way of writing more than will fit into the main document word count. If you don't need any appendices, then delete this whole section

Delete the red paragraphs and replace this one with your content (use the “Normal” paragraph style).