1 Previous Dissertation Reviews

When reading previous dissertations, I tried to read a range of papers, to maximise their benefit to me. Firstly, I chose to read a paper that was strongly related to my own, *'High Performance Computer Vision'* by Benjamin Eagan[1]. This paper has the same topic, Computer Vision, as my own. As such, I could learn a good amount about any hints or difficulties found with Computer Vision in the high performance domain. My next choice was *'Parallelization and Optimization of a Tax and Benefits Model'* by Thomas McClintock[2]. This has almost no relation to Where's Wally, being a simulation of how taxes affect various groups of people. Thus, I could learn from this the general things that I should note in order to complete this project efficiently. However, my previous two papers were both on the list of dissertations which achieved a distinction. I therefore chose to read another paper, *'Novel energy efficient compute architectures on the path to Exascale'* by Ioan Corneliu Hadade[3]. From this paper, I could compare the differences between a paper that achieves a distinction, and one that achieves something between that and a pass. Hopefully I could extract that which makes the difference, and then attempt to do the same.

1.1 High Performance Computer Vision

Eagan's paper mostly deals with two topics; object tracking in real time videos, and disparity mapping. The first is useful for having more natural human-computer interactions. The second is for allowing computers to map 3D areas from 2D images. These are not the areas of computer vision that I will be concerning myself with, but are still in the general domain.

The good qualities of the paper were apparent, presumably leading to the distinction grade it received. The quality of English throughout the paper was entirely understandable. The figures included were engaging, and generally it was easy to grasp what they were showing. The nature of the project that Eagan had chosen also strongly highlighted the importance of Risk Assessment. When choosing an algorithm to use, Eagan was very thorough in explaining why it was the optimum choice.

However, I felt that the paper also had a few failings. The introduction section felt quite long, and took quite a while to get around to basic message of the section. This message was roughly "Supercomputers are not used for Computer Vision because they are too expensive to run, but cheaper methods would be". I also felt that the explanation of the project goals was obfuscated within the lengthy introduction. Many figures were of processed images, but there were no figures of the original, making it hard to see the true effectiveness of the code. Some figures also showed errors in the processing. It would be useful if these captions briefly explained what caused these errors. Finally, some of the lines in the graphs included were very hard to distinguish from each other. The makes the plots somewhat indecipherable.

The paper also contained other things that I had not considered myself. These are neither good, nor bad, but their impact should be considered.

- The paper it written in something very close to default LaTeX.
- Within the introduction, were standard definitions of speed-up and efficiency.
- Includes a list of figures and tables

- Each section is concluded with a brief summary of what came before
- Eagan chose to use the HSV colour scheme over the RGB scheme.
- Benchmarking in computer vision is not standardised yet

1.2 Parallelization and Optimization of a Tax and Benefits Model

In this paper, McClintock solves the problem of parallelising a tax and benefits model for varying groups of people. This was done using dynamic programming of the optimal choice problem. This is very far from my own domain of work; McClintock is starting with serial code, and he is optimising explicitly mathematical algorithms.

This paper was very well written, the start is engaging and the acknowledgements seem genuine. This made me a lot more likely to read the details of the paper. The problem was established well in the introduction, and equally the method used was explained well. Terms in the mathematical equations were explained, making the maths much more understandable. McClintock was honest about the crashes that happened in his program, and the results are clear. The graphs, in particular, are very easy to read, and well created.

There were some flaws with this paper though. Some of the tables presented were not captioned, and so could be confused. The choice of new pages was not always optimal either, making it somewhat difficult to read.

Things to consider;

- McClintock uses the inclusive 'we', instead of the passive voice when referring to work done.
- Results that are not immediately useful are located in the appendix.
- The performance gains of changing the number of threads running is given.
- Required to use `THREADPRIVATE` directive, which neither McClintock or his supervisor were familiar with.

1.3 Novel Energy Efficient Compute Architectures on the Path to Exascale

1.4 Conclusions Drawn

References

[1] B. Eagan, "High performance computer vision," Master's thesis, School of Physics And Astronomy, 2012. http://www.epcc.ed.ac.uk/wp-content/uploads/2013/02/Submission-1138832.pdf.

[2] T. McClintock, "Parallelization and optimization of a tax and benefits model," Master's thesis, School of Physics And Astronomy, 2012. http://www.epcc.ed.ac.uk/wp-content/uploads/2013/02/Submission-1150361.pdf.

[3] I. C. Hadade, "Novel energy efficient compute architectures on the path to exascale," Master's thesis, School of Physics And Astronomy, 2012. http://www.epcc.ed.ac.uk/wp-content/uploads/2013/02/Submission-1146632.pdf.