

Inference at the edge: tuning compression parameters for performance

Deliverable 1: Final year Dissertation

Bsc Computer Science: Artificial Intelligence

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DECLARATION

I, Sam Fay-Hunt confirm that this work submitted for assessment is my own and is expressed in my own words. Any uses made within it of the works of other authors in any form (e.g., ideas, equations, figures, text, tables, programs) are properly acknowledged at any point of their use. A list of the references employed is included.

Signed:Sam Fay-Hunt.....

Date:10/12/2020.....

Abstract: *Abstract here*

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1 Introduction

- *Introduce terminology - Inference, neural network model, pruning, layers, channels, filters*
- *Introduce models to be used - high level conceptual representation of the models*
- *Introduce hypothesis*
- *Describe research aims*
- *Define project objectives*
- *Describe how this work contributes to further research*

2 Background

- *Adapt from D1*
- *rewrite with more of a focus on the concrete channel and pruning methodology used*
- *Would be good to include wandb bayse hyperparam optimisation details*

3 Methodology

3.1 Overview

- *Questions to be addressed*
- *Metrics to be measured - why*

3.2 Conceptual Process

- *Sensitivity analysis - filter/channel selection and layer interdependencies*
- *Filter pruning implementation - Theory*
- *Channel pruning implementation - Theory*
- *Retraining pruned model*

3.3 Filter and channel selection

Link back to selected model - concrete examples of process described in previous section

- *Filter selection (visual representation of filters)*
- *Channel selection (visual representation of channels)*
- *Discussion of pruning consequences (and recovery) - \hat{c} top1/top5 before retraining and after*

3.4 Engineering/implementation details

- *High level overview of physical system - justify need for multiple training agents*
- *Benchmarking setup - openvino + benchmark (getting latency/throughput)*
- *Pruning & retraining setup - Distiller (Pruning & training)*
- *Data processing - wandb + data visualisation steps*

4 Evaluation

4.1 Evaluation of experimental design

- *Duration of training*
- *volume of data gathered*
- *(im)practicalities - power consumption?*
- *limitations - single optimisation metric*
- *Criticism of methodology*

4.2 Evaluation of results

- *Summary of results per model/dataset*
- *Deep dive into results, detailed visualisations of accuracy & latency tradeoffs (maybe example with poor quality sensitivity analysis vs higher quality layer selection)*
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5 Conclusion

5.1 Further work

- *Suggested improvements for methodology*
- *Next steps*

5.2 Discussion

- *Discuss results*

A Back matter

A.1 References