Research Proposal Title

IZZMINHAL AKMAL BIN NORHISYAM 242UC240JF 25%
CHOW YING TONG 242UC244NK 25%
CHOONG JIA XUEN 242UC244K1 25%
LIM YU XUAN 251UC18043 25%

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Executive Summary

This includes the problem statement, objectives, research methodology, expected output and significance of output in a summary form.
Keywords: keyword1, keyword2

1 Introduction

The field of artificial intelligence (AI)is experiencing a major boom, best captured by the exponential growth in the computational resources required to train the latest, top-notch models. According to Sevilla and Roldán (2024), between February 2022 and May 2024, the amount of training compute experienced a 4.4x growth per year. The ever-increasing computational demand for training AI models goes hand in hand with the widespread adoption of AI in businesses spanning multiple industries. Maslej et al. (2025) found that 78% of organizations reported using AI in at least one business function, increasing from 55% in 2023 (p. 262).

The increase in computing power behind modern AI relies on millions of physical servers, powered by massive data centers across the globe. Although these sophisticated infrastructures help make training and powering the newest AI models possible, they contribute significantly to the carbon footprint of the AI landscape. As Wu et al. (2022) point out in their research, embodied carbon, referring to the emissions released during the manufacturing of hardware components, represents the largest share of AI's overall carbon emissions (p. 5).

Other than the manufacturing stage, another overlooked aspect when it comes to evaluating the carbon emissions of AI is the end-of-life phase for the same hardware components. Now, especially with the cycle of accelerated hardware obsolescence, the hardware devices that can no longer accommodate the increasing computational demands eventually results in electronic waste (e-waste). This problem poses a gaping hole that humanity has to overcome. Hence, we will attempt to investigate and quantify the scale of the e-waste generated by the AI industry.

2 Problem Statement

This section discusses the problem statement..

3 Research Questions, Hypotheses and Objectives

Minimum of two and maximum of four for each of the research questions, hypotheses, and research objectives. You can use numbering/bullet point to list them out.

4 Literature Review

This section contains analytic discussion of the related research papers.

5 Research Methodology

This section contains a description about the steps involved in research methodology, which also includes the metrics to be used for evaluating the proposed method along with the brief description of the techniques/models/methods/algorithms to be used.

You can use table/figure/image/graph in the report. All figures must have titles.

6 Research Activities and Milestones

Use a flowchart for the research activities and a Gantt chart for the research schedules.

7 Expected Results and Impact

In this section, discussion will be on novel theories/findings/knowledge and the impact on society, nation and/or economy.

References

Maslej, N., Fattorini, L., Perrault, R., Gil, Y., Parli, V., Kariuki, N., Capstick, E., Reuel, A., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Niebles, J. C., Shoham, Y., Wald, R., Walsh, T., Hamrah, A., Santarlasci, L., … Oak, S. (2025, April). *The ai index 2025 annual report* (tech. rep.). Institute for Human-Centered AI, Stanford University. Stanford, CA. https://hai.stanford.edu/assets/files/hai_ai_index_report_2025.pdf

Sevilla, J., & Roldán, E. (2024). Training compute of frontier ai models grows by 4-5x per year [Accessed: 2025-09-19]. https://epoch.ai/blog/training-compute-of-frontier-ai-models-grows-by-4-5x-per-year

Wu, C.-J., Raghavendra, R., Gupta, U., Acun, B., Ardalani, N., Maeng, K., Chang, G., Behram, F. A., Huang, J., Bai, C., Gschwind, M., Gupta, A., Ott, M., Melnikov, A., Candido, S., Brooks, D., Chauhan, G., Lee, B., Lee, H.-H. S., … Hazelwood, K. (2022). Sustainable ai: Environmental implications, challenges and opportunities. *Proceedings of Machine Learning and Systems*, *4*, 795–813.