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Performance Impact of Hardware Accelerators and Schedulers on Modern Computing

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***Abstract* - The research paper analyzes the applications, benefits, and possible downsides of the numerous hardware accelerators and scheduling methods in a thorough evaluation. It examines the productive gains by schedulers as well as the performance and energy benefits of the hardware accelerators in machine learning. Furthermore, research offers a qualitative evaluation of these approaches to overcome practical computing difficulties. The research aims to highlight workload-specific optimization strategies by reviewing the body of existing literature and providing accurate reviews, with the ultimate goal of maximizing hardware utilization and minimizing system hazards. Essentially, the paper offers a comprehensive guide that aims to help scholars overcome the complexities of modern computing and fully realize the potential of computational acceleration approaches. This research explains how to use hardware accelerators and schedulers to optimize computing performance.**

Keywords: Hardware Accelerator, Scheduler, Parallelism, Computer Architecture, System Performance.

I. INTRODUCTION

Hardware accelerators, schedulers, and parallelism implementations have been used to improve system performance during recent advancements in computational technology. Each of these improvements needs to account for bottlenecks, including memory and power usage, to ensure a net positive benefit. By analyzing architecture decisions being made, this study intends to document the most effective strategies and system configurations for minimizing these pitfalls. Key metrics will be discussed, including raw performance (throughput, latency), energy consumption, and resource utilization. By comparing and contrasting various combinations of accelerating technology against the above metrics, a confident optimal recommendation can be reached for what should be implemented in future systems.

II. BACKGROUND

In the dynamic world of modern computing, where every microsecond counts, the goal of peak performance is a never-ending process. This research study goes into the complex world of schedulers, hardware accelerators, and parallelism implementation, attempting to understand the massive impact on the efficiency of modern computing systems. With the constantly evolving technology and the unpredictable computational challenges from emerging fields of machine learning to the complicated interconnected network, there is a crucial demand for fresh approaches to improve system performance.

According to Semiconductors.org and Investopedia.com, the major players working on developing these performance-enhancing technologies are Samsung, Taiwan Semiconductor Company, NVIDIA Corporation, and Intel Corporation [7][8]. As more options for parallelized and optimized technology reach consumer markets, the ideal combination of system components has become more complex.

Despite this context, the study involves a detailed examination of the complicated