

Energy-efficient On-chip Al Accelerators



What It Is

Traditional methods of managing memory and computing power in computer chips don't work efficiently with AI accelerators because they need new strategies to improve performance and reduce energy consumption.

Our latest project is strategically developed to advancing energy-efficient computing by integrating specialized AI hardware, known as "on-chip AI accelerators," into system-on-chip (SoC) platforms. By developing innovative strategies and leveraging advanced simulation tools, the project aims to optimize memory and processor interactions. It is paving the way for faster, energy-efficient, and sustainable AI-based systems.

The Problem It Solves

The project addresses the challenges of optimizing energy and performance efficiency in system-on-chip (SoC) platforms that integrate AI accelerators. Traditional cache management strategies designed for multiprocessor systems with CPUs are inadequate for AI-accelerator platforms due to these accelerators' unique, predictable behaviors. This project seeks to develop new methods for performance-energy optimization in AI-accelerator-based SoCs while maximizing performance in next-generation AI-based computing systems.

The Technology It Uses

Simulation Infrastructure Development

The development of a detailed simulation infrastructure to faithfully create and explore various execution scenarios.

Performance-Energy Optimization Strategies

The proposal and evaluation of strategies for performance-energy optimisation of Al-accelerator based computing platforms.





Key Goals

- System-on-Chip (SoC) Integration: The system-on-chip (SoC) integration of AI accelerators creates on-chip heterogeneous computing systems to optimise performance and energy.
- Custom Al Hardware Optimization: Developing strategies to optimize the interaction between custom-designed Al accelerators and traditional computing components like processor cores and memory.
- **Simulation Infrastructure:** Development of a detailed simulation framework to replicate various execution scenarios and analyze performance-energy trade-offs.



THANK YOU!

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