Fast and Errorless Chips

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Exact Computing: Errorless and Faster

SciSci Research is an accelerated computing chip design company building the world's first fast, perfect-precision accelerator chip, the exact processing unit (EPU). SciSci is building the EPU to efficiently perform exact arithmetic without rounding error, thanks to a novel alternative number representation and architecture that offers a major improvement over floating-point arithmetic.

Scaling AI has required getting more FLOPS out of GPUs. NVIDIA's greatest source of scaling has been lower-precision number representation, which is needed for speed due to the precision/speed tradeoff from which floating-point suffers. However, low-precision is unlikely to scale AI significantly further. SciSci has a new number representation that goes in the opposite direction: replacing floating-point with exact arithmetic.

SciSci's will end the tradeoff between speed and precision once and for all, and outperform GPUs/TPUs in the AI compute market, by building fast, perfect-precision chips.

Performance Advantages

- *Errorless Compute*: **Perfect precision** compute, saving $\sim$ **10**% precision per operation compared to 8-bit floating-point and $\sim$ **100**% compared to 4-bit

- *Fast Compute*: $\sim$ **15×** speed gain *per operation per ALU* over floating-point, scaling massively for a highly multi-core EPU. This efficiency owes to a simpler architecture for arithmetic operations, as well as novel parallelization unlocks from exact arithmetic.

- *Ease of Manufacturing and Use*: The EPU architecture doesn't require new hardware or newfangled memory designs, shrinking the timelines for manufacturing and software development. The novel number representation gets abstracted away in software, so users don't need to know it to use it, just like developers don't need to understand binary to write code.