# Qwenputer: A Working Computer Processor Built Inside Alibaba's Qwen AI Model

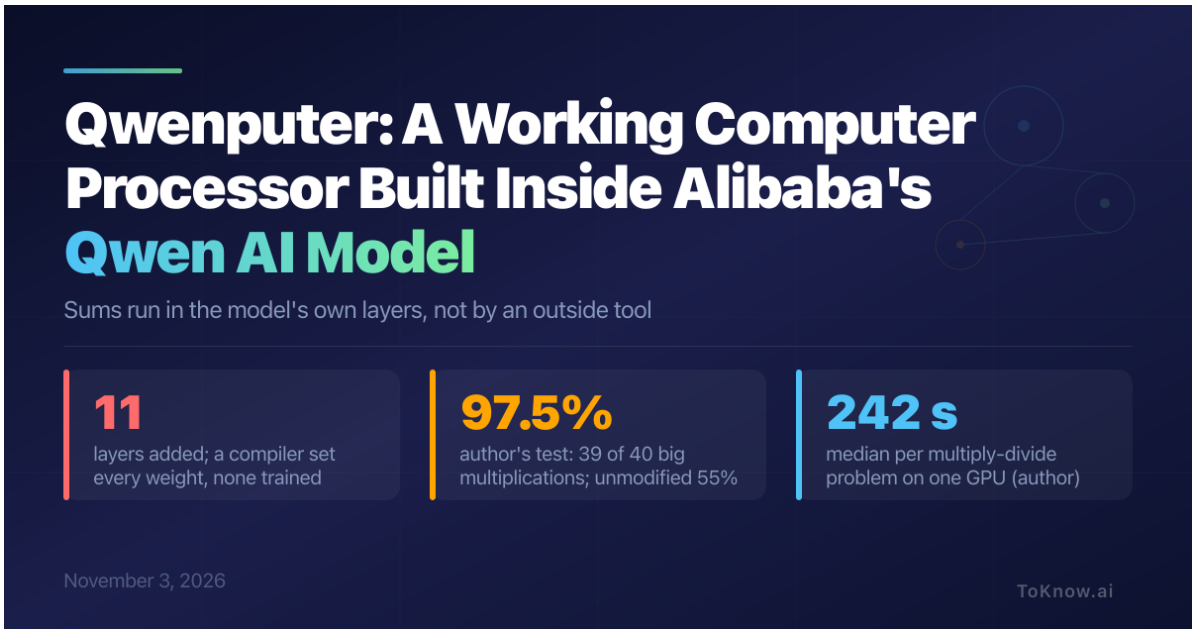
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Qwenputer is an open-source research project that builds a working computer processor into a language model's layers, so sums run inside the model instead of going to an outside calculator. It is for researchers asking where a model ends and a computer begins. Its developer added 11 layers (processing stages) to Alibaba's 4-billion-parameter Qwen3.5-4B. Instead of training, a compiler program computed every weight in them, the numbers that set what a layer does.

They form a 32-bit RISC-V processor, an open chip design. Its memory is the grid of numbers that one of Qwen's standard layer types, Gated DeltaNet, updates as it reads text. The added layers answer Qwen's calculator requests within one forward pass (one trip through the model).

On 40 big multiplications from DeepMind's maths dataset, the author reports Qwenputer got 39 right (97.5%), against 22 (55%) for unmodified Qwen. Unmodified Qwen with an outside tool got all 40. Across five sets the built-in computer stayed within one problem of the tool: ahead on two, level on two, behind on one. About 230,000 processor outputs matched a reference machine, and the author says the misses were Qwen's own slips. One outside user reported 195 of the 200 right on a Tesla V100 GPU, against the author's 196.

On the author's Nvidia L4 GPU, one calculator call takes 0.5 to 1 second, and mixed multiplication and division problems took a median of 242 seconds. A tiny story-writing model run on the processor needs about 41 seconds per word piece.

Read More: Qwen3.5, the model family Qwenputer builds on and a study of what an unchanged language model can already do in one pass

Sources:

- Qwenputer (GitHub)
- RV32 design notes and measurements (GitHub)
- Qwen3.5-4B-Qwenputer model card (Hugging Face)
- Qwen3.5-4B model card (Hugging Face)
- Report: Qwenputer on a Tesla V100 (GitHub issue)

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