2025 DESIGN AND VERIFICATION™ DVCON CONFERENCE AND EXHIBITION TAIWAN

Taming the Waveform Tsunami: Agentic AI for Smarter Debugging

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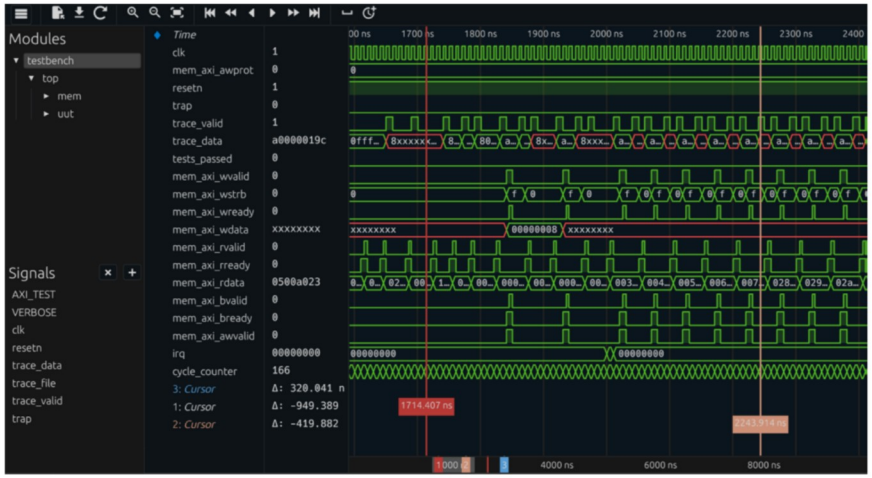
accellera SYSTEMS INITIATIVE

Challenges with Waveform Debugging

- **Waveforms dumped by modern systems are large, time consuming to debug**

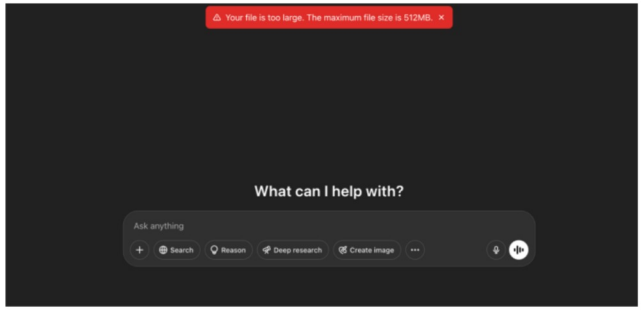
- **Debugging requires intimate knowledge of signal relationships**



How do Engineers debug today?

- **Waveform Viewing Software / Signal Tracing** ← Driven by engineer, only localization
- **Anomaly Detection / Pattern Recognition** ← Only signal data, not flexible
- **Formal Tools** ← Doesn't scale to larger systems

What are AI Agents?



AI Agents are Large Language Models (LLMs) which can take <u>action</u>

LLMs	Agents
✗ Mistakes propagate with each prediction	✓ Self corrects by producing its own verified feedback
✗ Reactive (user driven)	✓ Self directed
✗ No intelligent context selection	✓ Intelligently decides on context

Standard LLMs have no hope to understand waveforms!

Waveform Agent

Autonomously carries out the end-to-end debugging workflow.

"Why is this test case failing?"

Finding the needle in the haystack:

- Waveform Agent will use tools to extract specific relevant segments of the waveform involved in the test case failure

Signal Context Understanding

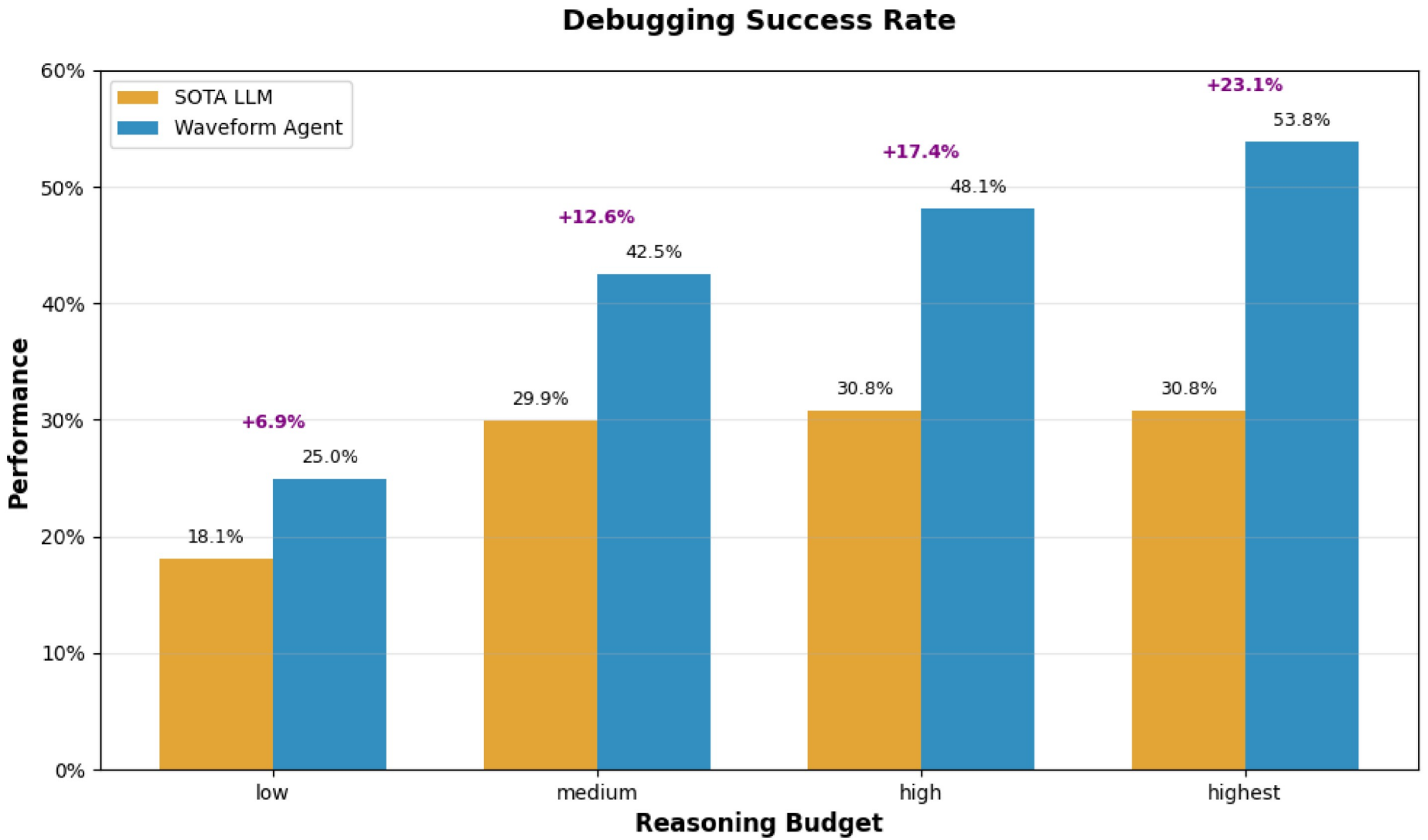
- It conducts automatic signal tracing, cross referencing with how each signal is used in the design
- The agent doesn't stop at localization.

★ Scalable

★ Flexible

★ Automatic

Live Waveform Agent Demo


Debugging Success Rate
SOTA LLM
Waveform Agent
Performance
60%
50%
40%
30%
20%
10%
0%
18.1%
25.0%
+6.9%
29.9%
42.5%
+12.6%
30.8%
48.1%
+17.4%
30.8%
53.8%
+23.1%
low
medium
high
highest
Reasoning Budget

Using Waveform Agent in Practice

- Fully autonomous bug triaging
- Waveform agent integration to nightly regressions

Contact us at our website: https://chipagents.ai/