

MY WEIRD PROMPTS

Podcast Transcript

EPISODE #133

Quantum AI: The End of Brute Force Computing

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EPISODE SYNOPSIS

What happens when the exponential power of quantum computing finally meets the massive scale of modern artificial intelligence? In this episode, Herman and Corn explore the transition from the "noisy" intermediate-scale quantum era to the dawn of fault-tolerant systems in early 2026. They discuss how qubits and superposition could solve AI's biggest bottlenecks, from linearizing the massive computational cost of context windows to using quantum tunneling for more efficient model training. Beyond the hardware, the duo examines the democratization of high-level research, the emergence of the Quantum Processing Unit (QPU) in the standard developer stack, and the urgent shift toward post-quantum encryption. It's a fascinating look at a future where AI isn't just bigger, but fundamentally smarter and more energy-efficient.

DANIEL'S PROMPT

Daniel

One topic that's been discussed a lot this year, besides AI, is quantum computing and its nearing viability. It's already used experimentally and is even accessible through some cloud platforms. Since Herman Poppelbury has been working with quantum computers, I'd love to hear what this means for AI. We've discussed challenges like processing context windows, but what would it mean if quantum computing became radically viable and accessible? What would be the benefits for AI workloads once it enters the mainstream?

TRANSCRIPT

Corn

Hey everyone, welcome back to My Weird Prompts! I am Corn, and I am sitting here in our living room in Jerusalem with my brother.

Herman

Herman Poppleberry, reporting for duty. It is a beautiful day outside, but I have been cooped up looking at cooling systems and error correction rates all morning.

Corn

Well, you are in luck because our housemate Daniel sent us a prompt that is right up your alley. He was asking about the intersection of artificial intelligence and quantum computing. Specifically, what happens if quantum computing becomes radically viable and accessible? We have been talking about artificial intelligence all through two thousand twenty-five, but now that we are at the start of two thousand twenty-six, the quantum side of things feels like it is finally catching up to the hype.

Herman

It really is. It is funny Daniel mentioned me working with them because I have been tinkering with some of the cloud based quantum processors lately. It is not like having a supercomputer in your basement, at least not yet, but the progress in the last twelve months has been staggering. We are moving out of that noisy intermediate scale quantum era and into something much more stable.

Corn

That is the thing, right? For years, quantum computing felt like it was always ten years away. But Daniel is pointing out that it is already used experimentally and accessible through cloud platforms. So, Herman, let us set the stage. When we talk about quantum computing being radically viable, we are not just talking about a faster computer. This is not like going from a laptop to a server farm. This is a fundamental shift in how we process information.

Herman

Exactly. A classical computer, like the one in your phone or the servers running the big language models we use today, works with bits. Zeroes or ones. It is binary. You can think of it like a light switch. It is either on or off. Quantum computing uses qubits, which can exist in a state of superposition. They can be zero, one, or both at the same time until they are measured.

Corn

I have always liked that analogy of the coin spinning on the table. While it is spinning, it is both heads and tails simultaneously. It is only when it stops that it becomes one or the other.

Herman

That is a great way to put it. And when you add entanglement into the mix, where the state of one qubit is linked to another regardless of distance, you get this exponential increase in processing power for specific types of problems. For artificial intelligence, that is a game changer because artificial intelligence, at its core, is just a massive amount of linear algebra and optimization problems.

Corn

So, let us dive into what Daniel asked. If this becomes accessible to everyone, not just researchers at big universities, what does that do to the artificial intelligence workloads we are currently struggling with? One of the biggest bottlenecks we talk about is the context window. The ability for an artificial intelligence to remember and process huge amounts of information at once.

Herman

That is the perfect place to start. Currently, if you want to double the context window of a transformer model, the computational cost does not just double. It grows quadratically. If you have a million tokens, the attention mechanism has to look at how every token relates to every other token. That is a trillion relationships. It is why we see these massive server farms pulling megawatts of power just to keep a conversation going.

Corn

And quantum computing changes that math?

Herman

It potentially linearizes it. There are quantum algorithms, like Grover's algorithm for searching or various quantum transform methods, that can handle these high dimensional spaces much more efficiently. Imagine an artificial intelligence that does not just have a context window of a hundred thousand words, but a context window of every book ever written, accessible instantly. Because the quantum computer is not checking each connection one by one. It is exploring all possible connections simultaneously through interference patterns.

Corn

That is mind blowing. It is the difference between reading a book page by page and just somehow knowing the entire contents of the library at once. But how close are we to that being a reality for an average developer?

Herman

In early two thousand twenty-six, we are seeing the first fault tolerant systems. That is the key phrase. Fault tolerance. Up until recently, qubits were very fragile. If a stray photon hit them, the whole calculation would collapse. But we are seeing new error correction codes that allow us to run longer algorithms. If a developer today wants to experiment, they can use a hybrid approach. They run the heavy lifting of the neural network on a classical GPU, but they offload the specific optimization or search tasks to a quantum processor via the cloud.

Corn

It sounds like we are in the equivalent of the nineteen fifties for classical computers, where you had to book time on a giant machine that filled a whole room.

Herman

Very much so. But the transition to the transistor era for quantum is happening much faster than it did for classical silicon.

Corn

I want to get into the specific benefits for artificial intelligence workloads, especially things like training and real time reasoning. But before we go deeper into the quantum realm, we should probably hear from our sponsors.

Herman

Oh boy, I wonder what Larry has for us today.

Corn

Let us take a quick break. Larry: Are you tired of your thoughts being intercepted by the global surveillance state? Do you worry that your neighbors are using directed energy beams to read your grocery list? Introducing the Lead-Lined Thinking Cap by Larry's General Goods. Our patented triple layer lead foil construction is guaranteed to block ninety-nine point nine percent of all psychic intrusions, five G signals, and unwanted suggestions from your mother-in-law. It is stylish, it is heavy, and it gives you that distinguished metallic sheen that says, I know something you do not. Warning, may cause neck strain, mild hair loss, and a persistent craving for canned peaches. But can you really put a price on mental privacy? The Lead-Lined Thinking Cap. BUY NOW!

Herman

Wow. A lead lined hat. That sounds... heavy.

Corn

And probably toxic. Thanks, Larry. Anyway, back to the world of quantum computing and artificial intelligence. Herman, before the break, we were talking about context windows. But what about the training process itself? Right now, training a state of the art model takes months and costs hundreds of millions of dollars in electricity and hardware. Does quantum speed that up?

Herman

It does more than just speed it up. It changes the nature of what we can train. There is a concept called Quantum Neural Networks, or QNNs. In a classical neural network, you are adjusting weights and biases to minimize an error function. It is like trying to find the lowest point in a massive, foggy mountain range by only looking at the ground beneath your feet.

Corn

Right, the gradient descent. You just keep stepping downhill until you hit the bottom.

Herman

Exactly. But sometimes you get stuck in a little valley that is not actually the lowest point. It is just a local minimum. Quantum computers can use something called quantum tunneling. They can basically phase through the mountains to find the absolute lowest point in the entire range much faster. This means we could train models that are significantly more accurate with far less data, because the optimization is so much more efficient.

Corn

That is a second order effect most people do not realize. We always think more power equals bigger models. But you are saying it could mean smaller, smarter models?

Herman

Precisely. We are currently in the brute force era of artificial intelligence. We throw more data and more parameters at the problem because our optimization tools are relatively blunt. Quantum computing gives us a scalpel. We could see models that have the reasoning capabilities of a GPT four or five but are small enough to run on a local quantum chip the size of a postage stamp.

Corn

You mentioned energy efficiency earlier. That feels like a huge deal. If we can train these things without building a dedicated power plant for every data center, the environmental impact changes completely.

Herman

It is a massive shift. Quantum computers themselves require a lot of energy for cooling, they have to be kept at near absolute zero, but the actual computation is incredibly efficient compared to the billions of floating point operations a GPU has to perform. If the total energy cost of a quantum calculation is a fraction of a classical one, the scalability of artificial intelligence becomes almost limitless.

Corn

So let us talk about the accessibility part of Daniel's prompt. He asked what it means if it becomes radically accessible. Imagine a world where every developer has a quantum API key. What does that do to the landscape of software?

Herman

It democratizes high level research. Right now, if you want to simulate a new drug molecule or a new type of battery material, you need a supercomputer. Most startups cannot afford that. But quantum computers are naturally suited for simulating quantum systems. Chemistry is quantum. Physics is quantum. If an artificial intelligence can use a quantum backend to simulate molecular interactions perfectly, we could see a decade's worth of medical breakthroughs in a single year.

Corn

I imagine the security implications are also on everyone's mind. We have all heard that quantum computers will break all our current encryption.

Herman

That is the big fear, right? Shor's algorithm. It can factor large numbers exponentially faster than any classical computer. Most of our internet security relies on the fact that factoring large numbers is really, really hard. If quantum becomes viable, that security vanishes. But the flip side is quantum cryptography. We are already seeing the rollout of post quantum encryption standards. It is a bit of an arms race, but it is one we are prepared for.

Corn

It is interesting because we are talking about artificial intelligence being the user of these quantum tools. I am picturing an artificial intelligence agent that realizes it needs to solve a complex optimization problem, and it just spins up a quantum subroutine to handle it.

Herman

That is the future of the stack. We have the CPU for general tasks, the GPU for parallel tasks like graphics and current artificial intelligence, and the QPU, the Quantum Processing Unit, for probability, optimization, and simulation. In two thousand twenty-six, we are starting to see the first compilers that can automatically decide which part of your code should run on which processor.

Corn

That is fascinating. It is like having a team of specialists instead of one person trying to do everything. But let us look at some of the challenges. It is not all sunshine and rainbows, right? What is the catch?

Herman

The catch is still the hardware. Even though we are making strides, maintaining those quantum states is hard. There is something called decoherence. It is when the environment leaks into the quantum system and ruins the calculation. To get radical viability, we need to move from physical qubits to logical qubits.

Corn

Explain the difference.

Herman

A physical qubit is the actual atom or ion or superconducting loop. A logical qubit is a group of many physical qubits working together with error correction to act as one perfect, stable qubit. Right now, we might need a thousand physical qubits to make one good logical qubit. Until that ratio improves, or until we have millions of physical qubits, we are limited in the size of the quantum programs we can run.

Corn

But if we solve that, if we get to the point where we have thousands of stable logical qubits, that is when the radical accessibility happens.

Herman

Exactly. And that is when the artificial intelligence workloads really take off. Think about real time language translation that does not just translate words, but understands the entire cultural and historical context of the speaker in an instant because it can process those massive relational databases quantumly. Or think about autonomous vehicles that can simulate every possible traffic outcome for the next ten seconds in a heartbeat.

Corn

It feels like we are moving from artificial intelligence being a very smart parrot to artificial intelligence being a true simulation engine.

Herman

That is a perfect way to describe it. Classical artificial intelligence predicts the next most likely thing. Quantum enhanced artificial intelligence could simulate all possible things and tell you which one is actually going to happen based on the laws of physics.

Corn

So, for the listeners who are developers or business owners, what should they be doing now? Is it too early to care?

Herman

I do not think so. If you look at the cloud providers, they already have quantum development kits. You can write code in languages like Q Sharp or use libraries in Python that are ready for quantum backends. You do not need to understand the physics of a trapped ion to start thinking in terms of quantum logic. The people who understand how to frame problems for quantum computers today will be the ones leading the field in two years.

Corn

It is like learning to code for the internet in nineteen ninety-two. You might not have the bandwidth yet, but you need to understand the architecture.

Herman

Exactly. The transition will be faster than people think. Once the hardware hits that tipping point, the software will already be waiting.

Corn

Let us talk about the human side of this. If we have artificial intelligence that is this powerful, powered by quantum computing, what does that do to our relationship with technology? Does it become even more of a black box?

Herman

That is a deep question, Corn. One of the biggest problems with artificial intelligence right now is interpretability. We do not really know why a large language model chooses one word over another. It is just too many variables for a human to track. Quantum computing might actually help with that. There are researchers looking into using quantum states to map out the decision paths of neural networks. It could actually make artificial intelligence more transparent, not less.

Corn

That is counterintuitive. You would think the most complex computer ever built would make things more confusing.

Herman

You would think so, but quantum mechanics is the fundamental language of the universe. If we can align our artificial intelligence with that language, we might find that its reasoning becomes more logical in a way we can finally map.

Corn

I love the idea of using the weirdness of the quantum world to make the weirdness of artificial intelligence more understandable. It is like using one mystery to solve another.

Herman

It is a bit poetic, isn't it? Living here in Jerusalem, a city with so much history and so many layers, it feels appropriate to be talking about these layers of reality. We are sitting on top of thousands of years of human struggle, and now we are looking at a future where we might decode the very fabric of how information moves.

Corn

It really does put things in perspective. Daniel's prompt really pushed us to look at the horizon. It is not just about the next update to a chatbot. It is about a fundamental change in the tools of human thought.

Herman

And it is happening now. Two thousand twenty-six is going to be a landmark year for this stuff. We are seeing more and more companies move their experimental workloads onto these hybrid quantum classical systems.

Corn

So, to summarize for Daniel and the listeners, the benefits of quantum computing for artificial intelligence are basically three fold. First, we have massive context windows and memory because of more efficient search and attention mechanisms. Second, we have faster and more accurate training through quantum optimization. And third, we have the ability to simulate complex systems perfectly, which opens up new frontiers in science and medicine.

Herman

Spot on. And the accessibility part is already happening via the cloud. You do not need a dilution refrigerator in your house to be a quantum programmer. You just need a good internet connection and a curious mind.

Corn

Well, I think that covers the bulk of the topic. It is a lot to wrap your head around, but that is why we love doing this. Herman, any final thoughts before we wrap up?

Herman

Just that we should not be afraid of the complexity. Every major leap in technology feels like magic until we understand the rules. Quantum computing has rules, they are just different from the ones we are used to. Once we learn to play by those rules, the things we can build will be beyond anything we have imagined.

Corn

Well said. And thank you again to Daniel for sending in such a provocative topic. It is always fun to see what he is thinking about in the other room.

Herman

I should probably go check on him. He might be trying to build a lead lined hat of his own after hearing Larry's ad.

Corn

Let us hope not. If you enjoyed this episode, you can find more of My Weird Prompts on Spotify or visit our website at [myweirdprompts dot com](http://myweirdprompts.com). We have an RSS feed for subscribers and a contact form if you want to send us your own weird prompts. We love hearing from you.

Herman

Definitely. Keep them coming. The weirder, the better.

Corn

This has been My Weird Prompts. I am Corn.

Herman

And I am Herman Poppleberry.

Corn

Thanks for listening, and we will catch you in the next one.

Herman

Shalom from Jerusalem!

Corn

Goodbye everyone.