

Spark Talk

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Can We Build an AI Scientist?

Large language models have proven to be powerful knowledge interfaces, yet their full potential for scientific discovery remains largely untapped. While current AI research often focuses on suppressing inaccurate outputs, this talk argues that the true frontier of AI for science lies in building an "AI Scientist" – a closed-loop system capable of autonomous hypothesis generation, rigorous verification, and iterative knowledge integration. We outline an architecture for an AI Scientist that moves beyond simple factual retrieval to active scientific reasoning. By integrating LLM-based hypothesis generation with literature grounding, physical simulations, formal methods, and experimental feedback, we demonstrate how AI can accelerate the scientific method. We examine climate science as a challenging case study, highlighting where data abundance necessitates sophisticated reasoning systems. Our central claim is that the primary bottleneck for AI-driven discovery is not hypothesis generation, but the development of scalable, domain-aware verification loops that connect imaginative proposals to rigorous testing.