Next Generation AI Computing

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Artificial intelligence is driving breakthrough after breakthrough across industry, public life, and the sciences. Yet, despite these achievements, today's AI systems face two critical challenges: limited reliability and immense energy demands.

This lecture approaches these issues from a computational perspective. We will examine the fundamental constraints of current AI technology, including problems of computability, the energy inefficiency of digital hardware, and the phenomenon of complexity blowup when solving PDEs. The discussion will then shift to emerging computing paradigms such as neuromorphic and analog computing, which promise a radical rethinking of how AI is built and operated. These approaches could pave the way toward AI systems that are not only vastly more energy efficient, but also inherently more robust, reliable, and trustworthy.