

The Age of AI

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Three main thrusts behind the success of AI are (1) VLSI (2) big data (with LLM) and deep learning neural networks (NNs). In particular, today's data-driven AI2.0 depends on NNs to help distill massive Data to Knowledge (D2K). Thus, this talk will start with an overview on the technological evolution from MLP (NN1.0), CNN (NN2.0) and transformers (NN3.0). Thereafter, our attention will be shifted to three far-reaching issues regarding the future AI.

First, Neural Architectural Search (NAS) represents a major on-going research front on boosting the power of deep learning. There is abundant biological/empirical evidence suggesting that different neurons possess different types/amounts of information, some relevant but some not. This distinction plays a vital role in pruning of neurons in our XNAS learning paradigm, aiming at structural optimization of MLPs, CNNs, and transformer networks.

Second, we note that AI2.0 can do well on certain tasks but poorly on others. Consequently, a new learning paradigm becomes imperative to help inch closer towards Artificial General Intelligence (AGI). A short-term solution could be some sort of seamless integration merging AI together with and the rich domain knowledge. However, and idealistically speaking, a long-term solution would be a revolutionary learning paradigm to facilitate logical reasoning, scientific inference and, even further, inferring new knowledge from old knowledge (i.e. K2K).

Finally, we note a new standing revised recently by California's Board of Education that "data science as an alternative to algebra diverts students from obtaining mathematical skills required for a broad range of careers". It is a timely endorsement of this talk's main theme that "Math is the Cornerstone of AI".