Maxwell’s Demon, Schrodinger’s Cat, and Broca’s Brain: Gate keepers to the Future of Computing

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Abstract:
The computer revolution, rolling past its fifty-year march as one of the most significant advancements of human civilization, has been enabled by a confluence of breakthroughs in science and engineering: Boolean logic, information theory, transistor and the integrated circuits, micro-architecture, and algorithms implemented in hardware and software. This revolution known by the moniker Moore’s Law has evidently slowed leading to the question of how computing of the future will evolve. In addition, software-based artificial intelligence is considered to be a game changer in most of the fields. On the flip side, the challenges facing the human civilization and the planet are formidable including the disparate health problems in the developed and developing worlds, environmental degradation, and depletion of conventional energy/material resources. However, these two seemingly disparate challenges provide opportunities for the human ingenuity to address. But in order to enable this, we may need to go back to the future and question what computing is (or should be) and how we could use this understanding to connect the different dots. In this presentation, I will propose that this revolution is gated by the known principles of science, together with the constraints imposed by engineering and technology. The quest for and the handling of information might become the unifying theme for a new vision on what computing will evolve into as a discipline. I will also conclude with a few perspectives on how to traverse this journey that could evolve computing to endless possibilities from a few beginnings.