Toward a counter-narrative to human obsolescence

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Humans and machines think differently by design. Humans arguably embody the most sophisticated neural networks in the known universe, which serve as powerful predictive engines that increase survival. Human neural networks became so complex that they manifested abstraction and symbolic processing, which made possible spoken and written language. But anyone who has attempted to train a neural networks to learn a logical rule knows that's almost as difficult as getting a robot to have feelings. Indeed these highly complex humans finally invented simple electronic calculators 70 years ago to quickly do the arithmetic we had not evolved to do.

Today's computers are extremely fast programmable version of those calculators. They are symbol manipulators, and we are still networks of nodes. Indeed, just as we can engage in simple symbolic processing using our massive neural networks, today's symbolic computers can emulate simple neural networks (relative to human brains). But we are still fundamentally different, and that difference affords a fruitful collaboration opportunity between humans and machines. Here we entertain the emerging discipline of hybrid intelligence.

Ten years after leading the predecessor to this workshop, which in 2014 informed the initial U.S. agenda for human computation (CCC workshop report), I am struck simultaneously by how much we have accomplished and the poverty of our impact. There is no question that we have found ways to leverage the power of crowds to accelerate scientific discovery. We have created vocational pathways for cognitive laborers that are priming a new thinking economy. We have even made our methods repeatable and begun building a literature that serves as a foundation for future work.

Contrast this, however, with the pervasive societal impact of generative AI platforms like DALL-E and ChatGPT. Even though they appeared only within the last couple of years, it is already difficult to imagine a world without them. Unfortunately, a fearful public narrative has coevolved with the emergence of these technologies that anticipates a bleak future for humanity - one in which jobs are usurped and AI steadily gains control.

This situation creates in me a sense of urgency, both to introduce a plausible counter-narrative and to take immediate steps to make good on it. Fortunately, such a counter-narrative exists: *hybrid intelligence, which combines the complementary strengths of humans and AI to achieve unprecedented capabilities, can embed human-based governance in its goal-direct behaviors.*

Key to this counter-narrative is the notion that human cognition is not obsolete, and indeed can be combined synergistically with machine-based intelligence to tackle problems that neither humans alone nor machines alone would be able to solve. Crucially, it conveys the prospect that hybrid intelligence research will seek to guide a coevolution of humans and AI that creates opportunities for contentment and fulfillment while keeping humans in the driver's seat.

But it is not enough to assert this. We must demonstrate both the utility of hybrid intelligence and the feasibility of encoding human influence. Here we can lean on the wisdom of Douglas Engelbart, who, according to Fred Turner "*promulgated a philosophy of 'bootstrapping', in which each experimental transformation of the socio-technical system [...] would feed back into the system itself, causing it to evolve (and presumably to improve).*" In other words, we need to leverage today's best AI and hybrid intelligence methods to design the next generation of those capabilities that provably demonstrates the value of human/machine synergy while preserving human agency.