COMMENTARY

Satyan L. Devadoss: What writers can learn from mathematicians on collaborating with new technology like AI

By Satyan L. Devadoss
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Writers Guild of America members picket outside Fox Studios on May 2, 2023, in Los Angeles. Getting control of the use of artificial intelligence is a central issue for striking actors and writers. (Ashley Landis/AP)

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September is usually filled with weary groanings and anxious energy as summer comes to its official end. But this year has found a new level of anguish, for in just a few months' time, artificial intelligence tools have moved from novel party tricks to automated all-purpose machines. And unlike 20th century tech, these statistical computers are wielding a knife to careers requiring high levels of education, with impact far beyond schools and businesses.

The current strike by the Screen Actors Guild-American Federation of Television and Radio Artists is but one example, in which computational control of writers' words and actors' images lies at the heart of battle.

Since computers are ideally suited for analyzing formulas and crunching digits, it stands to reason that math is the most vulnerable to the rise of AI. But instead of pushing back, mathematicians have decided to embrace the machines. In fact, we are helping create and advance machine-learning itself. Algorithms fueled by math are unraveling large and complex data previously thought to be unassailable. Math is now more valued than ever, coveted in nearly every sector of the job market.

But mathematicians have paid a heavy price for these rewards. As AI moves beyond numbers and equations into the realms of words and images, the lessons we have learned can hopefully be a warning, helping this generation navigate a rapidly shifting landscape.

The partnership between math and machine didn't happen overnight. The summer of 1976 heralded the announcement of the solution to a 125-year-old math puzzle: Four colors were enough to shade the regions of any map, real or imagined, where regions sharing a common border have different colors. The proof itself was several

hundred pages long and partly consisted of a catalog of nearly 2,000 cases, each involving up to 500,000 logical options. Impossible to be verified by hand, it required more than 1,000 hours of exhaustive analysis by a computer.

Of course, calculations aren't new to math; they've been a part of our discipline since antiquity. But this was the first major result of mathematics to need help outside humankind. This sudden dependency on machines was deeply unsettling. It divided our community and forced mathematicians to reevaluate core philosophies: Should machine-aided endeavors be genuine mathematics, or should they be some new form of truth altogether?

Today, even with significant reductions in the complexity of cases, the four-color theorem continues to demand computer-aided calculations. But mathematicians are no longer troubled. A half-century of time has blurred the once-hard line in the sand. Now, machines have firmly transitioned from being computers to collaborators of mathematics.

But this partnership is producing heartbreaking consequences.

Mathematicians have always been proud to dwell in the realm of abstract ideas, from tiling 7D space to unearthing new twin primes. With our heads mostly in the clouds, we were able to play freely with ideas without worry of consequence or fallout. But with our embrace of computational power, even mathematics tucked away in obscure and technical corners is finding its way to real-world applications at an alarming rate. While this has given us profound influence, we're caught off

guard for the darker ramifications that come with our entanglements with technology: rampant data collection, targeted market saturation, surveillance capitalism, algorithm bias and the magnitude of hidden environmental costs. Suddenly, all our works are becoming weaponized, and like atomic bomb developer J. Robert Oppenheimer, we find ourselves ill-prepared.

More subtle, yet equally alarming, is the unraveling of the mathematics endeavor itself. Mathematicians don't regard our occupation as a technological activity for the manufacturing of formulas but as a quintessentially human enterprise. We view unsolved math problems as intricate toy puzzles and are overjoyed when we unlock their hidden mysteries. Our community isn't simply looking for answers but the wondrous beauty of transcendent truths, eager to share with anyone willing to listen.

Mathematician Francis Su notes that the very act of creating math fulfills our basic longings for play — meaning, permanence, truth, beauty and community. For the treasure of mathematics is not just our collection of magnificent theorems but also the cultivation of virtues crucial for human flourishing.

And as we relegate machines to create mathematics, we become less human. This is but part of a larger story concerning tech's impact on humanity, as social scientist Sherry Turkle warns of loneliness and distraction, while philosopher Charles Taylor cautions against loss of purpose and meaning. For at great cost, we have chosen utility over beauty, efficiency over understanding, and a digital world over an embodied life.

Today, AI is rapidly moving beyond numbers and equations into uncharted domains. With this change, new power will be offered to anyone interested. But we can ill afford to look back at this time 50 years from now and plead ignorance, for the lessons of mathematics have taught us that partnership with machines should be weighed with wisdom. Otherwise, flourishing will no longer be a human issue but a technological one.

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