

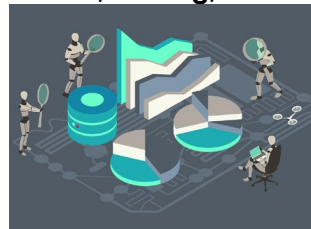
Weekly Discovery

We SHARE to inspire and ignite ideas!

10 - 14 April 2023

ARTIFICIAL INTELLIGENCE

10 Graphs That Sum Up the State of AI in 2023 The AI Index tracks breakthroughs, GPT training costs, misuse, funding, and more

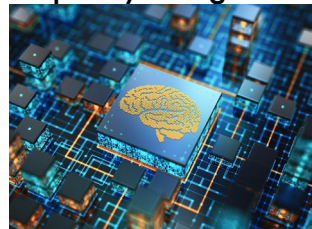


"The Stanford Institute for Human-Centred Artificial Intelligence (HAI) has assembled a year's worth of AI data providing a comprehensive picture of today's AI world, as it has done annually for six years. And I do mean comprehensive—this year's report came in at 302 pages. That's a nearly 60 percent jump from the 2022 report, thanks in large part to the 2022 boom in generative AI demanding attention and an increasing effort to gather data on AI and ethics."

Source: [IEEE](#) (8 April 2023)

ARTIFICIAL INTELLIGENCE

AI Can't Take Over Everyone's Jobs Soon (If Ever) Models are still expensive to run, hard to use, and frequently wrong



"Should we automate away all the jobs, including the fulfilling ones?"

This is one of several questions posed by the Future of Life Institute's recent call for a pause on "giant AI experiments," which now has over 10,000 signatories including Elon Musk, Steve Wozniak, and Andrew Yang. It sounds dire—although laced through with a little bit of hype—and yet how, exactly, would AI be used to automate all jobs? Setting aside whether that's even desirable—is it even possible?

"I think the real barrier is that the emergence of generalised AI capabilities as we've seen from OpenAI and Google Bard is that similar to the early days when the Internet became generally available, or cloud infrastructure as a service became available," says Douglas Kim, a fellow at the MIT Connection Science Institute. "It is not yet ready for general use by hundreds of millions of workers as being suggested."

Source: [IEEE](#) (6 April 2023)

ARTIFICIAL INTELLIGENCE

Students Use Machine Learning in Lesson Designed to Reveal Issues, Promise of A.I.

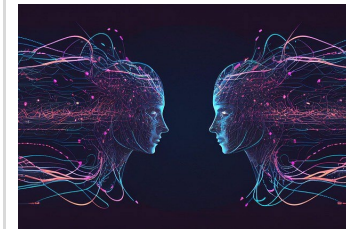


"One of the challenges for building systems for quantum computing and communications has been the lack of laser-like microwave sources that produce sufficient power but don't require extreme cooling. Now a research team has demonstrated a new room-temperature technique for making coherent microwave radiation—the kind that comes from a laser [1]. The device exploits the interaction of a magnetic material with electromagnetic fields. The researchers expect that the work will lead to microwave sources that can be built into chips employed in future quantum devices."

Source: [NCSU](#) (4 April 2023)

ARTIFICIAL INTELLIGENCE

New Cyber Software Can Verify How Much Knowledge AI Really Knows



"With a growing interest in generative artificial intelligence (AI) systems worldwide, researchers at the University of Surrey have created software that is able to verify how much information an AI farmed from an organisation's digital database.

Surrey's verification software can be used as part of a company's online security protocol, helping an organisation understand whether an AI has learned too much or even accessed sensitive data.

The software is also capable of identifying whether AI has identified and is capable of exploiting flaws in software code. For example, in an online gaming context, it could identify whether an AI has learned to always win in online poker by exploiting a coding fault."

Source: [SURREY](#) (4 April 2023)

ARTIFICIAL INTELLIGENCE

Reasoning about Causality in Games



"Causal reasoning and game-theoretic reasoning are fundamental topics in artificial intelligence, among many other disciplines: this paper is concerned with their intersection. Despite their importance, a formal framework that supports both these forms of reasoning has, until now, been lacking. We offer a solution in the form of (structural) causal games, which can be seen as extending Pearl's causal hierarchy to the game-theoretic domain, or as extending Koller and Milch's multi-agent influence diagrams to the causal domain."

Source: [ScienceDirect](#) (5 April 2023)

BIOMIMICRY

How an African bird might inspire a better water bottle



"An extreme closeup of feathers from a bird with an uncanny ability to hold water while it flies could inspire the next generation of absorbent materials.

With high resolution microscopes and 3D technology, researchers at Johns Hopkins University and Massachusetts Institute of Technology captured an unprecedented view of feathers from the desert-dwelling sandgrouse, showcasing the singular architecture of their feathers and revealing for the first time how they can hold so much water."

"It's super fascinating to see how nature managed to create structures so perfectly efficient to take in and hold water," said co-author Jochen Mueller, an assistant professor in Johns Hopkins' Department of Civil and Systems Engineering, who specialises in smart materials and design. "From an engineering perspective, we think the findings could lead to new bio-inspired creations."

Source: [EUREKALERT](#) (4 April 2023)

EDUCATION & SOCIETY

An Explosive Easter Celebration



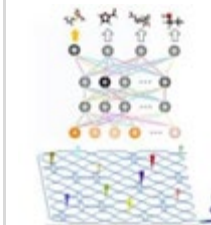
"Hunting for eggs is fun, but if you're interested in a really eye-opening (ear-opening?) Easter tradition, anthropologist David Sutton suggests turning to the Greek island of Kalymnos. Sutton describes renting a house across from a churchyard there in 1992. When locals warned him about "the dynamite" his family could expect at midnight on the eve of Orthodox Easter, he pictured a fireworks display. But what he experienced was something else:

Amid cries of "Christ is risen" several hundred pounds of TNT formed into projectiles of two or three pounds each were hurled into the sky from the church courtyard, rattling our house to its foundations, cracking two windowpanes, and sending the window handles flying across the room."

Source: [JSTOR](#) (8 April 2023)

OPTICAL SPECTROSCOPY

High-Performance, Intelligent, On-Chip Speckle Spectrometer Using 2D Silicon Photonic Disordered Microring Lattice

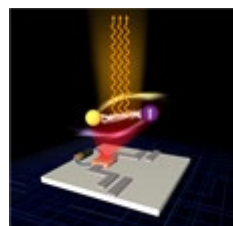


"High-performance integrated spectrometers are highly desirable for applications ranging from mobile phones to space probes. Based on silicon photonic integrated circuit technology, we propose and demonstrate an on-chip speckle spectrometer consisting of a 15x15, 2D disordered microring lattice. The proposed 2D, disordered microring lattice was simulated by the transfer-matrix method. The fabricated device featured a spectral resolution better than 15 pm and an operating bandwidth larger than 40 nm."

Source: [OPTICA](#) (7 April 2023)

POLARITONS

High-Power, Room-Temperature, Coherent Microwave Source



"One of the challenges for building systems for quantum computing and communications has been the lack of laser-like microwave sources that produce sufficient power but don't require extreme cooling. Now a research team has demonstrated a new room-temperature technique for making coherent microwave radiation—the kind that comes from a laser [1]. The device exploits the interaction of a magnetic material with electromagnetic fields. The researchers expect that the work will lead to microwave sources that can be built into chips employed in future quantum devices."

Source: [APS](#) (7 April 2023)

POWER CONVERSION EFFICIENCY

Exploring, Identifying, and Removing the Efficiency-Limiting Factor of Mixed-Dimensional 2D/3D Perovskite Solar Cells



"Three-dimensional (3D) halide perovskite (HP) solar cells have been thriving as promising postsilicon photovoltaic systems. However, despite the decency of efficiency, they suffer from poor stability. Partial dimensionality reduction from 3D to 2D was found to significantly meliorate the instability, thus mixed-dimensional 2D/3D HP solar cells have been expected to combine favourable durability and high efficiency."

Source: [ACS](#) (4 April 2023)

ROBOTS

Robots Predict Human Intention for Faster Builds

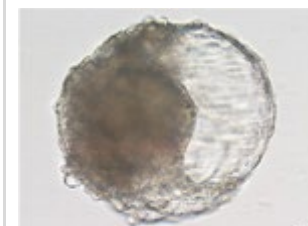


"In a new paper, a best paper award finalist at the ACM/IEEE International Conference on Human-Robot Interaction (HRI), USC Viterbi computer science researchers aim to teach robots how to predict human preferences in assembly tasks, so they can one day help out on everything from building a satellite to setting a table."

Source: [USC](#) (3 April 2023)

STEM CELL

Stem-Cell Derived 'Embryos' Implanted in Monkeys



"Scientists have created balls of cells that resemble embryos and trigger signs of early pregnancy in macaques. The stem-cell-derived blastoids could help researchers understand human embryo development without the ethical dilemmas of using real embryonic cells, according to a study published today in Cell Stem Cell."

Source: [NATURE](#) (6 April 2023)